Logistics Item Unique Identification Task Force

IMPLEMENTATION OF ITEM UNIQUE IDENTIFICATION IN DOD LOGISTICS PROCESSES

June 8, 2010

Prepared by the
Logistics Item Unique Identification Task Force

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AUTHORS

While the people listed below served as primary authors of this summary document, the bulk of the work was done by 13 teams comprising more than 130 subject matter experts from across the Department of Defense. These uniformed, civilian, and contractor experts developed their positions over months of effort, and this document is based on those expert opinions. The team leaders are listed later in the summary and most team members are listed in the appendices under their relevant team.

- Mr. Greg Kilchenstein, OSD (Task Force Chair)
- Mr. Jack Kern, LMI
- Mr. Bill Balkus, LMI
- Mr. Steve Erickson, LMI
- Mr. Rod Rowley, LMI

1. SUMMARY

This report summarizes the work accomplished by the Logistics Item Unique Identification Task Force, which was formed at the direction of the Joint Logistics Board (JLB) on 7 July 2009. It describes the approach the task force used to assess item unique identification (IUID) implementation across DoD. The task force evaluated 3 value chains and 10 logistics nodes to determine and validate IUID requirements and apply a set of assumptions and ground rules to estimate the costs and benefits of implementing IUID. The result of this effort was a set of policy recommendations and follow-on work requirements.

In general, IUID implementation will enhance and simplify serial item management (SIM) applications by standardizing previously disparate serial number schemas into a globally unique identification program and using a standard machine-readable mark for all IUID-eligible items procured by the Department of Defense. Unique item identifiers (UII), when correctly assigned and maintained, provide the granularity of item information necessary to manage this population of items correctly. The main findings and recommendations of the task force are as follows.

IUID Task Force Findings

- IUID can be cost effectively integrated into DoD logistics processes and provide substantial benefits.
- Investment of $7 billion will ultimately yield $3–5 billion in annual benefits, for an estimated $44–66 billion over the next 20 years.
- Improved management capabilities result in increased readiness and availability (up to 6 percent) as well as other efficiencies through linkages to serialized item management applications.
- Targeting IUID to items that provide greatest benefit
  - reduces IUID-managed population (from 325 million to 60 million items),
  - reduces implementation costs (from $12.4 billion to $7 billion),
  - reduces implementation time (from 15 years to 10 years),
  - optimizes benefits (payback reduced from 15–17 years to 5–8 years, including implementation time), and
  - supports the achievement of a clean DoD audit.

IUID Task Force Recommendations for the Joint Logistics Board

- Approve the task force approach.
- Endorse revised policy recommendations to incorporate IUID across the item lifecycle.
- Encourage budget priority for logistics IUID effort.
- Support continuation of implementation working groups.

2. BACKGROUND

The JLB determined there were ambiguities in IUID policy, requirements, and proposed value across DoD, as well as wide variation in the implementation strategies, execution, and funding from the military services and Defense Logistics Agency (DLA). As a result, the JLB chartered the cross-service/agency Logistics IUID Task Force, which was led by the Assistant Deputy Under Secretary of Defense for Maintenance Policy and Programs (ADUSD[MPP]). The goal was to conduct an assessment that would evaluate the value of IUID within the logistics chain, develop functional integrated requirements, assess current IUID policy in the context of optimum value, and recommend changes to policy and guidance to adequately align IUID with the value proposition. The JLB directed the assessment to take place between August 2009 and January 2010, followed by a report and presentation to the JLB.

The task force comprised representatives from the military services, DLA, and the Office of the Secretary of Defense (OSD). The task force was organized along 3 value chains and 10 logistics nodes that spanned the sustainment process from acquisition logistics planning to disposal. Each node working group was led by a service, DLA, or OSD representative. Table 1 summarizes the organizational makeup of the working groups.

Table 1. IUID Task Force Organization

Value chain working groups	Lead organization	Team leader
Property Accountability	OSD	Steve Tkak
Intensive Item Management	OSD	Kathy Smith
Product Lifecycle Management	OSD	Walt Atchley (LMI)

Logistics node working groups	Lead organization	Team leader
Acquisition Logistics Planning	OSD	Bill Balkus (LMI)
Acquisition Suppliers	Navy	Jo Policastro
Distribution Centers	DLA	Reginald Burks
Transportation	OSD	Jolie Lay
Base and Forward Supply Operations	Army	John LaFalce
Depot Maintenance	OSD	Greg Kilchenstein
Field Maintenance	OSD	Chuck Field
Field Unit and Activity Operations	J4	LTC Jim Hooper
In Service Engineering and Logistics Analysis	Air Force	Greg Beecher
Disposal	DLA	Maj. Chris Stim

3. ASSESSMENT APPROACH

The JLB specifically tasked the ADUSD(MPP) to complete the following:

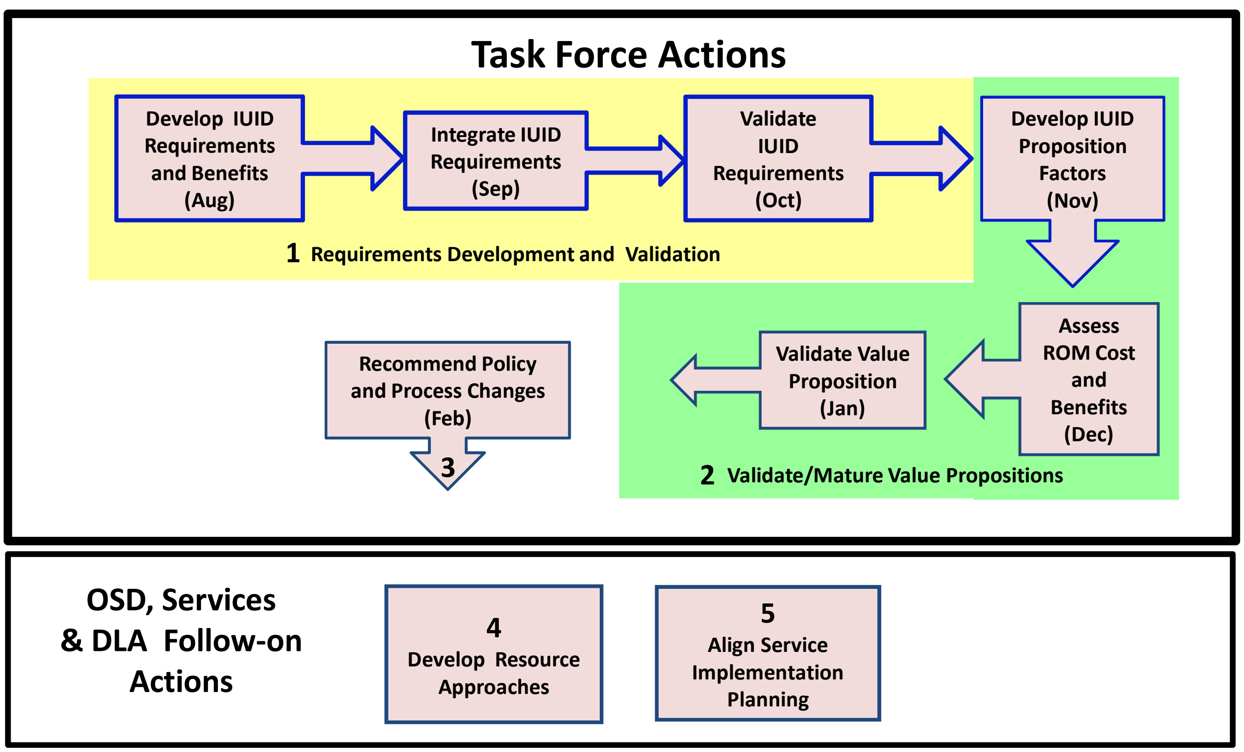
1. Conduct integrated requirements analysis.
2. Validate/mature value propositions/chains considering the
   a. benefits of using IUID, marking scope/costs, and
   b. companion automated information technology and automated information system (AIT/AIS) requirements/costs.
3. Determine policy and guidance updates consistent with 1 and 2.

Follow-on tasks to be conducted by the military services, DLA, and OSD will be as follows:

1. Assess budget resource implementation requirements.
2. Take steps to implement IUID by continuing to mature service-specific IUID and SIM implementation plans based on OSD policy and guidance and prioritized requirements.

The task force undertook its tasks through a systematic approach that followed the JLB guidance, as shown in the Figure 1.

Figure 1. Assessment Approach



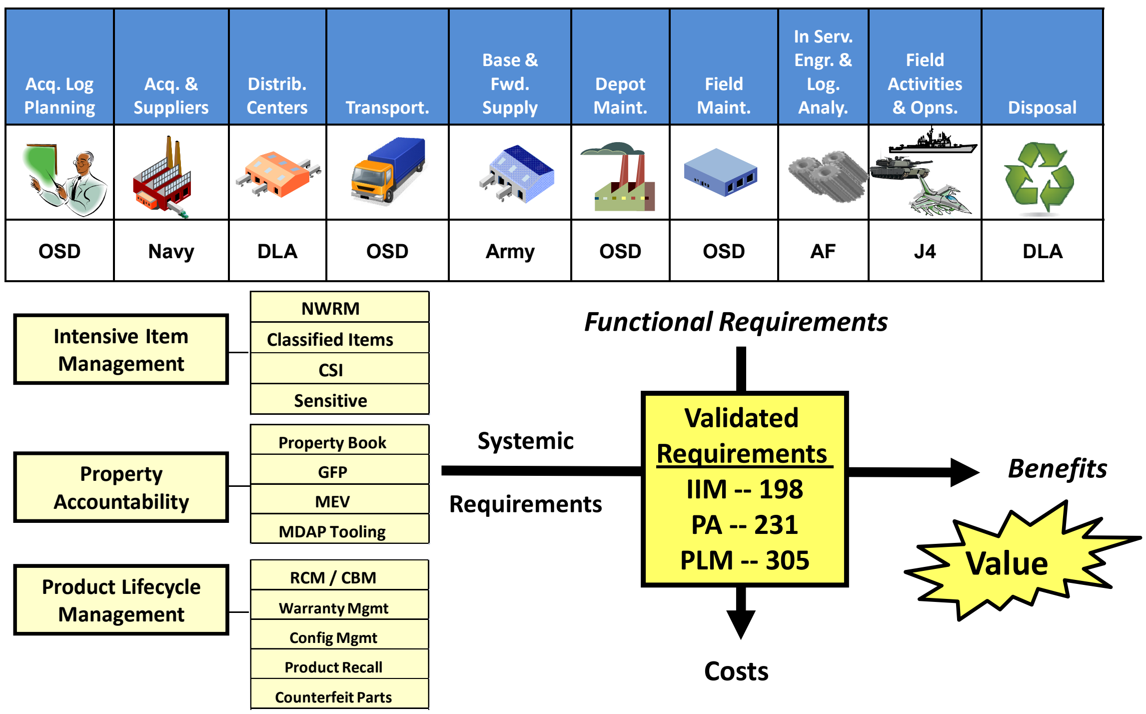
Note: ROM = rough order of magnitude.

The task force was organized into teams (working groups) that aligned with a set of value chains and functional nodes (which are described in more detail in later sections). Three value chain teams assessed the broad implications of IUID applications for the specific functional areas of property accountability, intensive item management, and product lifecycle management. Ten logistics node working groups assessed costs and implementation issues for sustainment planning elements. The intersection of the value chain and node products served as the foundation for establishing and validating functional requirements as well as estimating the costs and benefits of IUID implementation.

4. REQUIREMENTS VALIDATION

The task force determined requirements based on existing policy and analysis and then validated these requirements. This set the stage for each value chain and logistics node working group to conduct its specific cost analysis. The task force developed and validated requirements in each value chain: 198 intensive item management requirements, 231 property accountability requirements, and 305 product lifecycle management requirements. The value chain teams then conducted subsequent benefits analysis, while the logistic node working groups conducted their cost analyses. Figure 2 illustrates the overall requirements validation process. Each value chain and logistics node team developed an assessment document. These are attached to this summary as appendices. The validated requirements are in an appendix, as well.

Figure 2. Integrated Proposition Analysis



Note: Acq = Acquisition; AF = Air Force; Analy = Analysis; CSI = Critical Safety Items; Distrib = Distribution; Fwd = Forward; GFP = Government-furnished Property; IIM = Intensively Managed Items; J4 = Joint Staff Directorate for Logistics; Log = Logistics; Maint = Maintenance; MDAP = Major defense Acquisition Program; MEV = Military Equipment Valuation; NRM = Nuclear Weapon Related Materiel; Opns = Operations; PA = Property Accountability; PLM = Product Lifecycle Management; Serv = Service.

The value chain working groups divided their assessments according to a set of functional areas, as depicted in Figure 2, to represent the major functions and processes that will benefit from IUID and SIM. While other areas could have been examined, the task force restricted its analysis to these areas in order to reasonably size the project.

Ultimately, the functional requirements identified by the logistics node teams were consolidated and validated by the value chain teams to form the integrated set of functional requirements that supported the remainder of the task force activities. A complete set of validated requirements is provided as Appendix N.

5. ASSUMPTIONS AND GROUND RULES

The task force used an extensive set of assumptions and ground rules to add commonality and uniformity to its estimates and analysis. The task force developed a current requirements baseline using current policy and implementation plans. It analyzed re-procurement and legacy item populations to determine what items should be marked, and then considered the effects of modification, obsolescence, and system replacement. The task force also assumed that new procurements will continue to have IUID marking applied by the supply source.

The task force considered analyzing IUID implementation efforts already underway, but decided that most marking of legacy systems, equipment, and reparable parts will take place using organic and contract maintenance activities. To minimize the negative effects on readiness, the task force assumed an opportunistic approach to marking will be taken (rather than withdrawing materiel from service or stocks for marking). Weapon systems and other items also will not be disassembled just to mark installed or embedded items. This means that, in all probability, items will not be marked while in storage, but they may be marked before being issued if marking the item will not impede the supply cycle time.

The task force used rough order of magnitude (ROM) estimates to develop its analysis. This included using military service and DLA estimates, data, studies, and input from subject matter experts. The task force also called on service and DLA experience for IUID marking costs and non-recurring engineering (NRE) estimates, and it assumed that legacy items not marked under contract will include NRE and marking costs. Costs already expended for IUID programs were not recounted in the task force's estimates, and funding estimates were based on existing programs and budgets.

In addition, the task force decided to conduct its analysis at a relatively high level, using existing policy, plans, and budgets to develop ROM estimates and advise the JLB in the time requested. This decision was made, in part, because the military services and DLA are responsible for implementing any recommendation made by the task force, and each service and agency will develop subsequent budgets, programs, and implementation plans. As a result, while some of the reports developed by the value chain and logistic node working groups contain detailed data, they were developed using a combination of service-provided and node-generated estimates, in addition to actual budget and contract information. The estimates should not be used for direct budget formulation.

The task force estimated costs based on existing budgets and contracts in addition to established prices for AIT equipment, which primarily consists of readers, scanners, and printers for marking and labeling. More extensive use of this equipment and the associated processes could reduce the level of effort for data capture and entry (as opposed to manual processes) up to 80 percent, and it could reduce the error rate to nearly zero with no future corrections required. Overall benefits are assessed in Section 8 (Benefits).

The task force accounted for investments for which funding is already planned under other initiatives. For example, the task force did not cost the military services' enterprise resource planning (ERP) systems; however, it did assess ERP acquisition milestones to determine whether the systems will be capable of handling IUID data in the 2015 timeframe, which is in line with current policy. IUID and SIM functionality is inherent in the design and framework of the ERP systems and was not considered by the task force as an additive cost. Some supporting AISs will need modifications (as noted in the individual node reports), and numerous system modifications have already been made to accommodate IUID.

IUID implementation throughout DoD will occur over the course of several years. Each military service must prepare for IUID implementation by meeting DoD IUID compliance requirements for its automated information systems. Legacy AISs and future ERP systems must be ready to comply with IUID requirements by 2015. The services should expect to see the full benefit of IUID as their respective ERP systems go live, or when their inventories reach a critical mass that allows for management via IUID. IUID implementation will have entered the execution phase once the services' ERP systems go live. Changes to regulations and other policy must be made to successfully implement IUID.

6. ANALYSIS

DLA and each military service determined the total number of national item identification numbers (NIINs) that meet the IUID marking requirement and an average cost to conduct the non-recurring engineering (NRE) per NIIN. To determine the average cost, each service looked at a variety of factors, including engineering change packages, publications updates, and engineering evaluations (which include organic vs. commercial engineering, minimum vs. detailed engineering, time to select constructs, mark type and location), and identified IUID candidates. The services also factored in their own unique requirements to determine average NRE cost per NIIN.

Each node working group determined the cost to implement logistic support programs to analyze and utilize data. To determine this cost, the node teams examined costs to support improvement processes (such as condition based maintenance, reliability centered maintenance, and system lifecycle integrity management). The node teams also identified whether IUID modification of AISs should be included. DLA did not determine a cost to implement logistic support programs.

The primary cost drivers for this analysis were

- the population of items to mark,
- the cost to mark (which is mostly labor), and
- the NRE costs to revise the item technical documentation and business processes.

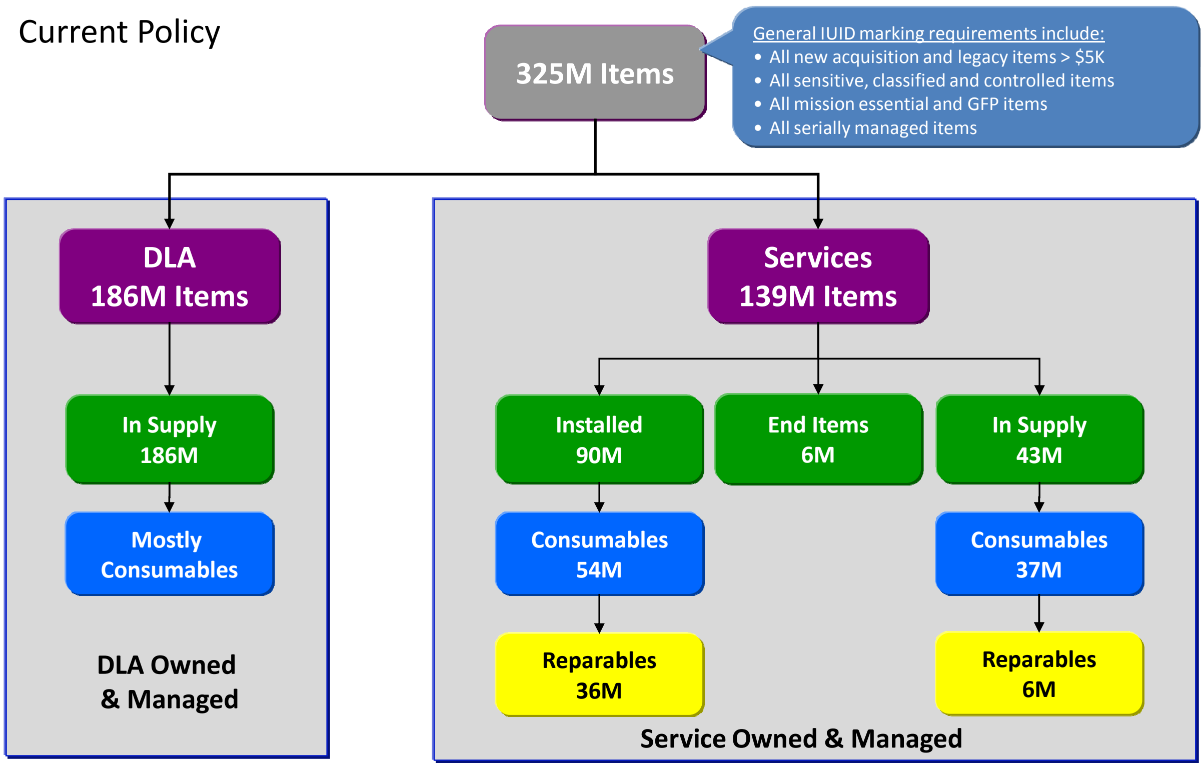
NRE cost estimates were rough order of magnitudes and based on NRE components and the percentage of cost, the depth of analysis required (greater analysis would be required for critical safety items, for example) by the percentage of the estimated population, the cost range estimate (from high to low), and the estimated number of NIINs requiring NRE.

Other costs may be considerable in aggregate, but they do not drive the value proposition when compared to these three cost drivers. Other cost elements include AIT equipment (primarily printers and readers); AISs, including the ERPs and other systems; and recurring costs for operating with IUID. Although these costs did not drive the analysis, they cannot be ignored when budgets are being considered. The task force analysis indicated that the “ancillary costs” can be as much as $350 million, or about 5 percent of the total implementation costs, which is $7 billion. These AIT and AIS costs must be budgeted to provide the architecture of systems, equipment and business processed to gain the benefit of IUID implementation.

While the task force incorporated service and DLA estimates and current budget information (when available), it also applied high-level and ROM estimates to develop a DoD-wide picture of the IUID environment. Significant effort was applied to ensure double counting was avoided and that the numbers used can be supported and are synchronized. The task force had to make assumptions that should not be used as a sole substitute for budgetary input in more rigorous service and DLA estimating processes.

DLA and each service stratified its inventory of equipment and items in supply, including estimates of items installed or embedded on equipment. These were rolled up by the task force to the general categories of major end items, consumables, and reparables. The task force counts quickly grew in excess of 300 million legacy items when all items were considered, including installed and in-stock inventories.[1] A total of about 334 million items was established as the DoD legacy[2] population to be marked; subtracting about 9 million items already marked (principally from new procurement) leaves 325 million items to mark. That total is split between the services and DLA, as shown in Figure 3.

Figure 3. Potential Items to Mark Under Current Policy



The task force used a bottom-up method to estimate the number of items that fall within current policy criteria. The services and DLA provided end-item and in-supply item counts stratified in the various schemas. These item counts were combined with task force estimates of the number of installed items that would be IUID marked and managed by weapon system categories. This bottom-up method provided the task force with an estimate of the number of items to mark and manage so the logistics node working groups could develop costs estimates and the value chain teams could consider the benefits of managing subsets of these items.

The task force then identified subsets of the population of items that optimize benefits. It determined that it is not cost-effective to mark non-serially managed classified and sensitive items (CSI) or consumables and pilferables that cost less than $5,000. These items are already under adequate control in the various logistics processes; adding an IUID requirement would not make economic sense and would not provide any additional benefit to the three value chains.

[1] Installed or embedded items had not been considered in previous estimates, and service and DLA stratifications had not been made.

[2] Throughout this summary, the term "legacy" connotes materiel already in the possession of the DoD components, as distinguished from new materiel being acquired by contract.

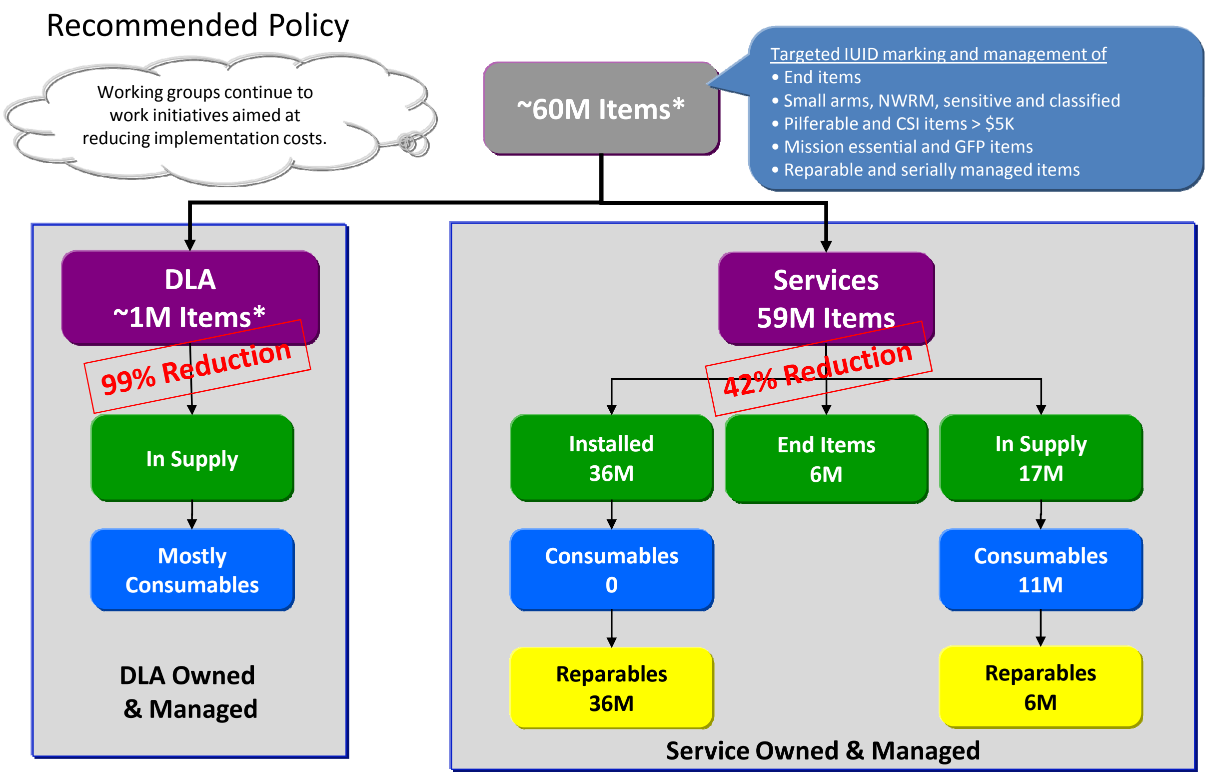
The task force's analysis adhered to the current policy to only perform opportunistic marking. As a result, the task force expects to mark primarily in the depot maintenance process and onsite in units and activities as determined by the services (e.g., by specialized teams or unit members marking unit equipment). The task force reinforced the assumption that serviceable materiel would not be disassembled solely for the purpose of marking installed or embedded items.

After a thorough assessment of logistics areas that would benefit from the unique identification and management of items, the Logistics IUID Task Force recommends including the following items to be marked:

- Small arms, nuclear weapons-related materiel (NWRM), and classified items
- Sensitive, pilferable, and critical safety items over $5,000
- End items over $5,000
- Mission-essential items
- Reparable items
- Serially managed items
- Government-furnished property
- Consumables that do not meet one or more of the above criteria (as determined at the requiring authority's discretion).

These subsets of items reduce the potential population of items from 325 million to 60–61 million. By excluding low cost CSI and pilferables and including all reparable items regardless of acquisition cost, the task force deduced that this targeted population of items to mark and manage returns the greatest benefit, as shown in this revised item population in Figure 4.

Figure 4. Targeted Items to Mark Under Recommended Policy (compared to Figure 3.)



***** Varies depending on RA discretion*

7. COSTS

The task force identified costs by node and benefits by value chain. Detailed cost estimates are contained in the appendices under each node report. As discussed in the assumptions and ground rules, the task force worked at a high level and used ROM estimates. The primary cost drivers were the population of items to mark, the cost to mark (mostly labor), and the NRE costs to revise the item technical documentation and business processes.

As an example, the Depot Maintenance Node Working Group, after estimating the number of items to mark, was able to develop a non-recurring cost estimate. Principal cost elements included the cost to purchase and install equipment, to conduct initial training for a depot maintenance workforce, and to engineer the capability into the depot repair cycle. The working group did not compute similar cost estimates for commercial support; it assumed original equipment manufacturers were already marking new items. The group did, however, estimate a substantially higher cost to mark items from commercial sources.

In another example, the Acquisition Logistics Planning (ALP) Node Working Group identified 6 planning activities that are required to accomplish the 43 validated value chain requirements placed on the ALP node:

- IUID implementation plan preparation and distribution (staffing time varies and is not included in our analyses)
- AIS integration planning (what AIS would be affected by IUID implementation on items for which the acquisition program is responsible and the integration method if necessary)—this is a major input to the plan
- IUID implementation plan updates
- Requirements determination (identifying which NIINs need to be marked)
- Engineering analyses (selecting where to mark items, analyzing the engineering impact on the item, and what technology to use)
- Drawing or repair specification updates.

In a final example, the In Service Engineering and Logistics Analysis Node Working Group estimated the number of NIINs that meet the IUID marking requirement by each service and DLA, the average cost to conduct NRE per NIIN, and the cost to implement logistic support programs to analyze and utilize data.

A comparison of costs and benefits is provided at the end of Section 8.

8. BENEFITS

In general IUID implementation will enhance and simplify multiple SIM applications by standardizing previously disparate serial number schemas into a globally unique identification program and using a standard machine-readable mark for all IUID-eligible items procured by the Department of Defense. Unique item identifiers, when correctly assigned and maintained, provide the granularity of item information necessary to manage this population of items correctly.

Although national security and safety are the two most important considerations of inventory accountability, it is difficult to assign a monetary value. The more tangible benefits of IUID marking include the strict accountability and control of the department's most critical assets to ensure their security and safety. Accountability targeted benefits of IUID for equipment will make the required linkage between financial and logistics data possible, thus improving the availability of mission-critical information to acquisition decision makers, better equipping our armed forces for missions, and complying with federal and DoD policy, regulations, and law. Other planned (or expected) benefits include better control over government property that is under contractor control (i.e., government-furnished property and contractor-acquired property). The use of IUID will also improve total lifecycle management of systems, components, and items, and the application of UII for serial item management enables more timely, accurate, reliable, and actionable information to improve maintenance and material management. These benefits—which are derive from the harvesting the serial item data captured by IUID—can make product lifecycle management programs more effective.

Examples and General Benefits

The task force reviewed anecdotal evidence of benefits across the three value chains and found numerous examples of increased efficiency and capability that would improve lifecycle management through the use of automated practices, condition-based maintenance, SIM, and the introduction of IUID. These include reduced manpower costs, increased accuracy, and reduced time to prepare documentation for inventories, issue and subsequent cyclic issue/re-issue of sensitive items such as weapons. Examples, specific and general, are listed in Table 2 and Table 3.

Table 2. Examples of Value Chain Benefits

Product Lifecycle Management
F-16 repair—$123 million over 10 years; projected $1 billion in savings over the life of the program
Army AH-64—5.2% improved readiness; 41,000 fewer maintenance labor hours
Army UH-60—4.4% improved readiness; 36,000 fewer maintenance labor hours
NAVY ERIP Program—3× increase in T58 engine time-on-wing; and 2× increase in T64 engine time-on-wing
Navy ships MOFM—64% reduction in auto work notify (AWN)errors; 5% reduction in incorrect repair part orders; 7× reduction in MMH to generate AWM; 15% increase in configuration accuracy
AF serial # tracing BCA—1–5% reduction in spares procurement ($20 million–$1 billion annually) through SIM; 10% of Navy items retrograded for repair while under warranty
Intensive Item Management
Navy—25% reduction in annual carcass loss of $80 million
Navy—$7–38 million in labor savings for error corrections and data entry from SNT deployment
Navy—Suppliers' (ICP) labor savings of $710,000 over 2 years
Navy SNT BCA—$109 million in acquisition savings over 6 years
Coast Guard ALC—2D data matrix reduces contract modifications by 80–85%
Property Accountability
DPAS Office Study—$97.5 million reduction in labor costs for DoD physical inventories
USMC SIM equipment issue study—more than 33 hours saved; 18% increase in data accuracy; 15% increase in data quality
Army study—Research time reduced from 40 hours to 5 minutes, with vastly improved accuracy

Table 3. General Benefits of Using IUID

Product Lifecycle Management
3–6% improvement in readiness
$3–5 billion in annual benefits
Safety risk reduction
Counterfeit item controls and recall improvement
Reliable data for engineering analysis and logistics support decisions
Intensive Item Management
Accountability—strict accountability and control of the most critical DoD assets to ensure security and safety
Readiness—differentiation of like items; identification of "bad actors;" more precise recalls; more accurate maintenance records
Resources—efficiencies in labor, data entry, inventories, forecasts, warranty management, and targeted maintenance
Data quality—accurate DoD databases; granularity of data for better item management
Risk reduction—improved in-transit visibility, correct item info for proper asset management
Regulatory, policy, and statutory compliance—better DoD 4140.01M policy guidance for DoD 4000.25 procedures
Property Accountability
Reduction of $97.5 million in labor costs for DoD physical inventories
Reduction of $8 million in labor cost for 22 reports over 5–12 years
Improved data accuracy and speed using AIS/AIT
Reliable data for engineering analysis, logistics support decisions, and valuation (a clean DoD audit)

Value Chain Benefits

Each of the value chain working groups described potential benefits that can be attained by implementing IUID. The following paragraphs provide a synopsis of these benefits by value chain. Additional information for each can be found in the appropriate value chain appendix.

PRODUCT LIFECYCLE MANAGEMENT

The Product Lifecycle Management (PLM) Value Chain Working Group focused on how IUID is used to improve total lifecycle management of systems, components, and items. By using UII for serial item management, more timely, accurate, reliable and actionable information can be obtained to improve maintenance and material management. The benefits derive from harvesting the serial item data through IUID and utilizing the data to make PLM programs more effective.

The PLM benefit estimates are predicated on assumptions, the most important of which is that DoD will implement the necessary business process improvements and system changes to realize the full potential of IUID. IUID implementation offers the DoD the potential for substantial benefits through the expansion of PLM programs if it is properly implemented. Assigning UIIs to new and legacy items will eventually result in unique identification of most DoD equipment and reparable assets. By implementing the necessary management information system changes and business process improvements to capture, integrate, and intelligently utilize maintenance and operating data recorded primarily through maintenance transactions, DoD can achieve significant reliability and maintainability improvements and some material management improvements. The task force estimates that IUID PLM implementation could produce weapon system and equipment readiness improvements between 4 percent and 6 percent, savings between \$3 billion and \$5 billion annually, and minimal reductions in safety and other risks.

To realize IUID benefits in logistics, many business processes must change, including the following areas:

- Reliability-centered maintenance
- Conditioned Based Maintenance Plus
- Warranty management
- Configuration management
- Total ownership cost management
- Safety management
- Maintenance planning and engineering
- Reliability, availability, and maintainability planning and analysis
- Controlling counterfeit parts
- Demilitarizing condemned items
- Precision maintenance
- Property accountability
- Inventory control
- Intensive item management
- Product recalls
- Other materiel management efficiencies.

Many of the benefits relate to the improvement of total lifecycle management of systems, components, and items. With more timely, accurate, reliable, and actionable information, system reliability, maintenance, and materiel management can all improve. The estimated benefits are ROM estimates across all nodes based largely on anecdotal data. The total estimated PLM benefits are as follows:

- 3–6 percent improvement in readiness
- Annual savings of $3–5 billion, for a total estimated savings of $44–66 billion by 2030 (4–6 percent reduction in field and depot maintenance labor and material costs, and retrograde shipping costs)[3]
- Risk—minimal reduction.

INTENSIVE ITEM MANAGEMENT

According to the Intensive Item Management Value Chain Working Group, DoD requires automated processes to decrease the risk of human error and facilitate more frequent and expedited inventories of items that are intensively managed because of their sensitivity. A standard approach to SIM will improve the management of these items across supply chain nodes. The IUID program enhances current SIM programs by standardizing previously disparate serial number schemas into a globally unique identification program and by using a standard machine-readable mark for all IUID-eligible items procured by the Department of Defense. Unique item identifiers, when correctly assigned and maintained, provide the granularity of item information necessary to correctly manage this population of sensitive items.

Implementation of the IUID program and these integrated procedures will provide DoD with the means for enhancing intensive item management capability throughout the department by significantly decreasing the potential for human error and confusion. Users at the base level often make item identification errors; in fact, item identification can be so technically complex that correct identification requires a certified engineer. A machine-readable UII would rectify this issue. Managers of these types of items have consistently emphasized the value that DoD-wide implementation of an IUID program and standard procedures would provided.

Items within four categories—NWRM and classified, sensitive, and critical safety items—often carry a high price tag, so managing them would prevent substantial financial losses. Of course, financial benefits are not the primary focus of this value chain. The cost of not implementing an IUID or SIM program includes the potential loss of critical items and military-unique technology. The benefits of implementation, as mentioned above, include the strict accountability and control of the Department's most critical assets to ensure the security and safety of these assets. The task force expects that business benefits will be realized by each supply chain node as a byproduct of intensive item management.

[3] Based on FY2008 total costs of DoD field and depot-level maintenance ($83 billion), and FY2009 estimated DoD retrograde transportation costs ($192 million).

PROPERTY ACCOUNTABILITY

The Property Accountability Value Chain Working Group concluded that targeted benefits of IUID for functional processes include making the required linkage of department and component-level financial and logistics data, thus improving the availability of mission-critical information to acquisition decision makers, better equipping the armed forces for missions, and complying with federal and DoD policy, regulations, and law. Other expected benefits include ensuring better control over government property.

The enterprise-level implementation of IUID will permit the tracking of military equipment (ME) and general equipment (GE) assets across their lifecycle by tying them to accountable property officers in accountable property systems of records (which link to custodial owners, location, condition, status, inventory history, and historical maintenance and warranty-related information). As an example, unique identification will ensure the services' staffs and commanders know which assets they control and the related maintenance and supply history of those assets. Once condition and location information is available at an enterprise-level, decisions can be made about cross-leveling equipment and finding replacements near at hand, which may help to replace losses faster. Information on assets controlled and their condition would also be available to commanders at the battalion level in the Army and Marine Corps and at the wing-level in the Air Force and Navy. In addition, when physical asset records are linked to financial asset records, information about asset value and the remaining useful life would be accessible.

Today, IUID information, along with its benefits, is not readily available for all ME and GE. As an example, there is a significant amount of equipment (specifically, tracked and wheeled vehicles and smaller items, such as small craft in the Navy) that is not globally and uniquely identified. Once available, decision makers in the services and OSD can use IUID information to keep track of assets so they can make better acquisition and resource investment decisions.

Finally, the use of automated information technology and systems (AIT/AIS) will improve the accuracy of information recorded on equipment assets and will also strengthen the components' abilities to achieve greater accuracy with physical inventories. The use of AIT/AIS will also decrease the time and cost to complete physical inventories.

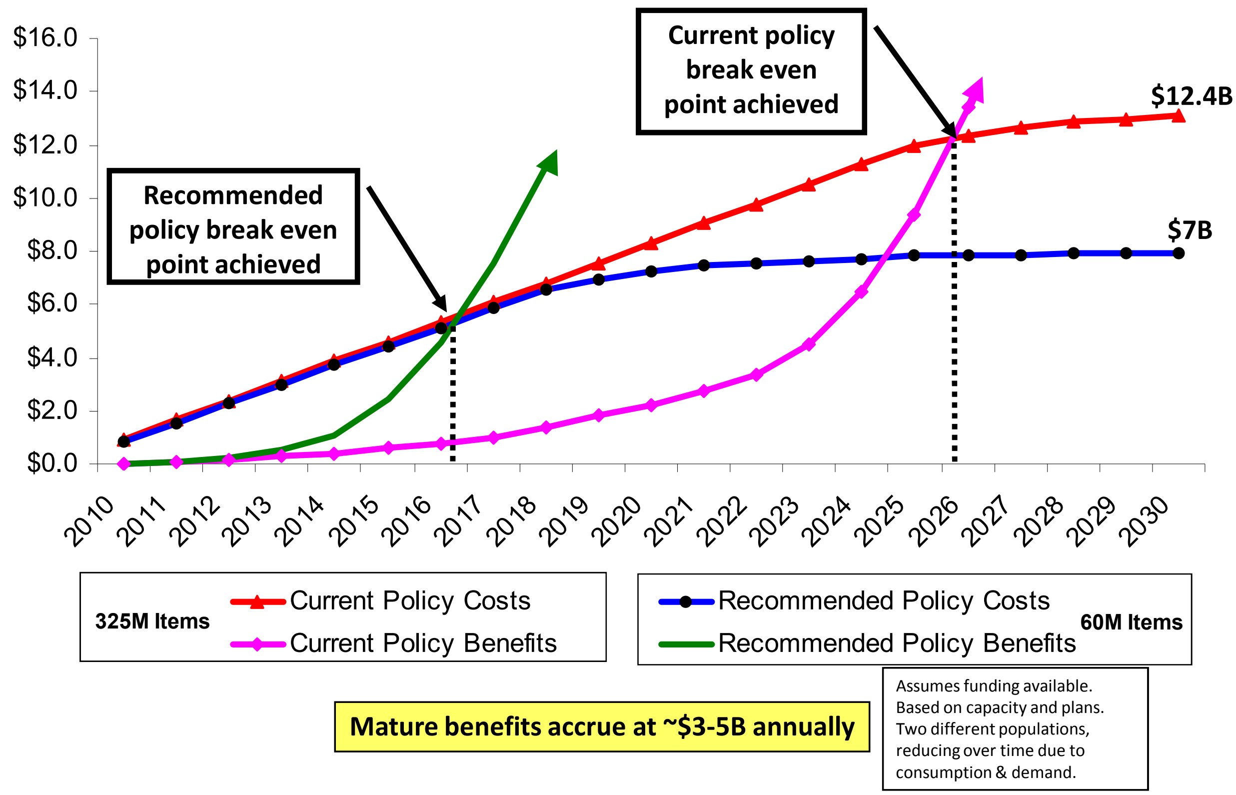
Assessing Costs and Benefits

When comparing benefits and costs, the task force looked at the cost to mark items using the current (325 million possible items) and recommended (60–61 million targeted items) policy. While some benefits are accruing today, the task force assumed that benefits would not appreciably increase until the implementation of the service and DLA ERPs and their supporting AIS infrastructure in about 2015.

By current policy, marking 325 million items would take about 15 years to complete. By targeting the population of items that provide optimum value, the time to mark is reduced to about 10 years. Providing a faster path to IUID by focusing on the items that provide the most benefit of marking achieves better control of the DoD inventory and especially that of intensively managed items. In addition, it enables timelier implementation of benefits accruing from improved management of numerous programs, such as maintenance and improvement of total lifecycle management of systems, components, and items.

The task force modeled, analyzed, and compared cumulative costs and benefits over time as a method to compare the effect of marking and managing a targeted subset of the population of items. This allowed the task force to estimate when cumulative benefits would surpass cumulative costs, in other words the breakeven point. The breakeven points are about 15–17 years for the current policy with a larger population, and about 5–8 years for the recommended policy with a more targeted population. After the breakeven points, the benefits of using IUID accrue at about $3–5 billion per year (totaling an estimated $44–66 billion through 2030), allowing for increased accuracy and improved techniques to manage the DoD inventory. Figure 5 is a graphical depiction of these costs, benefits, and break-even points.

Figure 5. Comparison of Estimated Costs and Benefits



9. POLICY RECOMMENDATIONS

Considering the costs and benefits associated with implementing IUID across DoD, the task force determined the benefits are substantial and significantly outweigh the costs if the population of items to be marked and managed is targeted to those that return the greatest benefit. To achieve this outcome, policy changes are necessary. The task force recommendations outline these policy changes with the intent to target specific populations of items. Recommendations are shown in a comparison of current and recommended policy, as shown in Table 4.

Table 4. Policy Recommendations—Targeting IUID Item Management

Current Policy	Recommended Change	Impact
Mark all applicable items by 2015 and end items by 2010.	Apply UII to applicable legacy systems in accordance with updated policy. Use UII for lifecycle management NLT 2015.	Links mark and use policy.
Mark all sensitive, classified, and controlled items.	Apply IUID management to intensively managed and track items (IIM, new and legacy: • Small arms, NWRM, and sensitive and classified items • Pilferable and CSI over $5,000.	Targets population; can reduce IUID-managed items by ~176 million.
Mark all new acquisitions and legacy items over $5,000, and all mission-essential, serially managed, and GFP items.	Apply UII to new acquisition and legacy items: • End items • Mission-essential items • Reparable items • Serially managed items • GFP • Non-intensively managed consumables (at RA discretion).	Targets items that provide greatest benefit, and can reduce the number of managed items by ~90 million.
All other items at the discretion of the RA.	No change; achieve management goals and benefits in an orderly and cost-effective manner.	N/A
Services and DLA budget for implementation costs.	Services and DLA prioritize non-recurring engineering for IUID in budgets.	Focuses implementation strategy.

Note : RA = requiring activity.

10. CONCLUSIONS

IUID has great potential to provide value in the logistics areas of the DoD, and it should be implemented as soon as is practicable, as the benefits are substantial. Targeting a specific population of items will focus on core benefits and save dollars, and DoD will reach the benefit breakeven point much earlier; however, benefits will not be achieved unless all IUID infrastructure is in place, including a significant number of marked items, sufficient readers and markers (along with enabled automated systems), and the business processes to accommodate and leverage this new technology.

The task force recommends the Joint Logistics Board endorse the recommended IUID policy and implementation guidance updates and support the following continued implementation working group activities:

- Legacy Parts Identification Working Group to continue the ongoing process of identifying and resolving implementation issues.
- Develop and refine standard data exchanges for IUID implementation to facilitate and integrate IUID data in integrated systems and achieve workable data fusion.
- Pursue strategies to reduce NRE—a major cost driver—through the development of alternative processes that still meet the requirements for safety, operational effectiveness, and materiel performance.
- Develop and refine business rules and AIT implementation strategies to exploit the application of IUID information in business and operational systems.

APPENDIXES

Value Chains

A. Property Accountability

B. Intensive Item Management

C. Product Lifecycle Management

Logistics Nodes

D. Acquisition Logistics Planning

E. Acquisition Suppliers

F. Distribution Centers

G. Transportation

H. Base Forward Supply

I. Depot Maintenance

J. Field Maintenance

K. Operational Field Activities

L. In Service Engineering & Logistics Analysis

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N. Logistics Requirements

Appendix A

Logistics Item Unique Identification Task Force

Property Accountability (PA) Value Chain
IUID Benefit Analysis

Final Working Paper

November 19, 2009

Prepared by the
Property Accountability Value Chain Working Group

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Figures

LIST OF AUTHORS

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Property Accountability Value Chain
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1. SUMMARY

a. Introduction

The Department of Defense (DoD) has been engaged in several initiatives to improve accountability for its mission critical assets–in particular, its equipment. Findings from these initiatives as well as several Government Accountability Office (GAO) and Office of Inspector General (IG) reports have concluded that improvements to the financial reporting for equipment require improvements in DoD's property accountability and management practices. The Department is pursuing the use of item unique identification (IUID) to achieve improved reporting for accountable and capital equipment assets (i.e., military equipment (ME) and general equipment (GE)). Accountable property includes all property and equipment valued at $5,000 or greater. Accountability requirements also pertain to classified and sensitive items that fall below the accountability threshold. Capital items are those valued at $100K or greater. (As a basis of comparison, Appendix B of this document provides accountability thresholds for other Federal Agencies).

b. Background

The Federal government lacks complete and reliable information for reported inventory and other property and equipment, and can not determine that all assets are reported. Visibility and accountability problems are a major impediment to the federal government achieving the goals of legislation for financial reporting and accountability. Lack of reliable information impairs the government's ability to:

- Know the quantity, location, condition, and value of assets it owns,
- Safeguard its assets from physical deterioration, theft, loss, or mismanagement,
- Prevent unnecessary storage and maintenance costs or purchase of assets already in hand, and
- Determine the full costs of government programs that use these assets.

Risk is high that Congress, managers of federal agencies, and other decision makers are not receiving accurate information for making informed decisions about future funding, oversight of federal programs involving inventory, and operational readiness. [1] These beliefs are further substantiated by Office of Inspector General (OIG) and Government Accountability Office (GAO) audit findings. Examples of the related OIG and GAO reports are included in Appendix C of this document.

[1] Government Accountability Office Executive Guide, "Best Practices in Achieving Consistent, Accurate Physical Counts of Inventory and Related Property," March 2002.

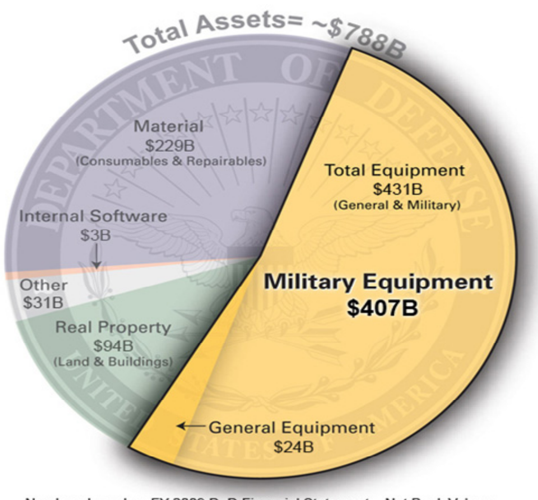
c. Equipment Defined

Equipment (Military and General): Personal Property that is functionally complete for its intended purpose, durable, and nonexpendable. Equipment generally has an expected service life of two (2) years or more; is not intended for sale; does not ordinarily lose its identity or become a component part of another article when put into use; and has been acquired or constructed with the intention of being used by the entity. For accounting and financial reporting purposes, **military equipment** (ME) assets are defined as weapon systems that meet these requirements and are used directly by the Armed Forces to carry out battlefield missions.

d. Population

At the end of FY 2009, the net book value reported for the Department's capital equipment was $431 Billion. Of this total, $407 Billon (94%) represents the total value of capital military equipment with the remaining $24 Billion (6%) representing the value of the general equipment. (Figure 1. DoD Equipment Assets)

Figure 1. DoD Equipment Assets



Capital Military Equipment Assets		
Service	**# of Programs**	**# of Assets**
Air Force	131	7,817
Army	247	105,421
ChemBio	15	1,580
MDA	14	6
Navy	451	9,687
SOCOM	36	483
USMC	81	7,621
Total	**975**	**132,615**

Numbers based on FY 2009 DoD Financial Statement – Net Book Values.

Currently there is no enterprise level capability to determine the total number of accountable and capital equipment assets across the Department.

2. OVERARCHING IUID BENEFITS TO PROPERTY ACCOUNTABILITY

Targeted benefits of IUID for equipment are that it will make possible the required linkage of Department and Component-level financial and logistics data for improving the availability of mission critical information to acquisition decision makers, better equipping the armed forces for warfighter missions, and complying with Federal and DoD law, policy, and regulations. Other planned benefits include permitting better controls over government property in the possession of contractors (e.g., GFP and Contractor Acquired Property [CAP]).

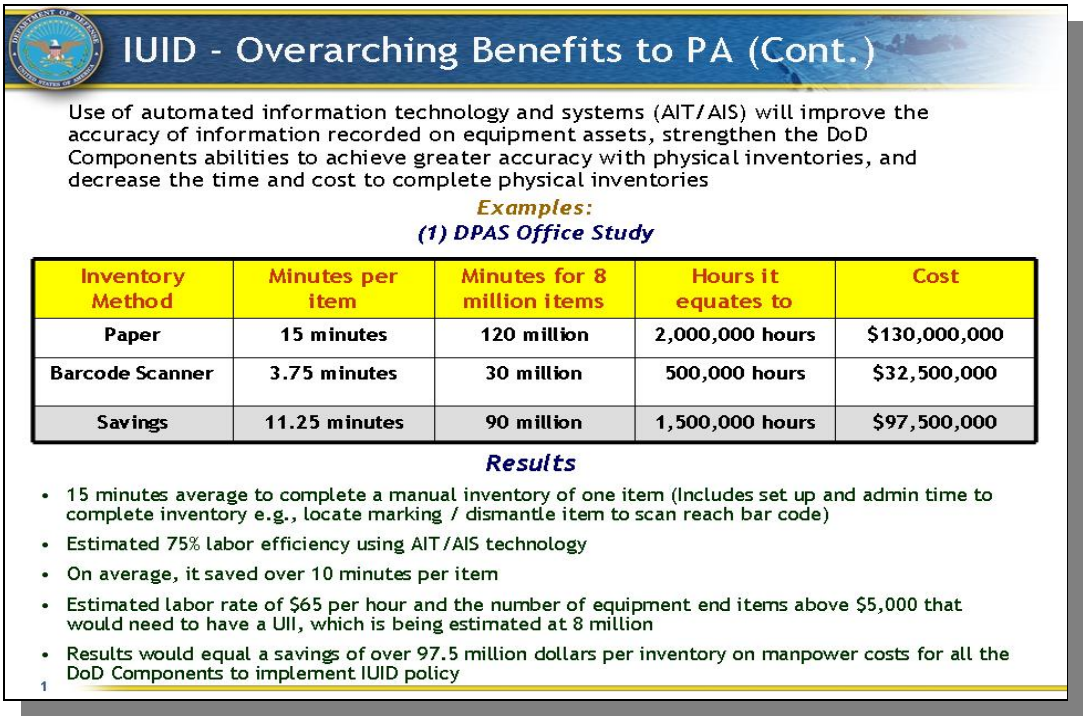
The enterprise-level implementation of IUID will permit ME and GE assets to be tracked across their lifecycle by tying them to Accountable Property Officers (APOs) in accountable property systems of records (APSRs), which link to custodial owners, location, condition, status, inventory history, and historical maintenance and warranty related information. As an example, unique identification will allow both Service staffs and Commanders to know which assets they control along with the related maintenance and supply history. Once data is available on condition and location at an enterprise-level, decisions can be made about cross-leveling equipment and finding replacements near at hand, which may help Commanders to replace losses faster. Information on assets controlled and their condition would also be available to Commanders at the battalion-level in the Army and Marines and the wing-level in the Air Force and Navy. Additionally, when physical asset records are linked to financial asset records, information about asset value and remaining useful life would be available. [2]

Today, IUID information, along with its benefits, is not readily available for all ME and GE. As an example, there is a significant amount of equipment, specifically tracked and wheeled vehicles and smaller items, such as small craft in the Navy that are not globally and uniquely identified. Where available, decision makers in both the Military Departments and OSD can use IUID information to keep track of assets so that they can make better acquisition decisions and have a better knowledge base on which to make investment decisions.

Finally, the use of automated information technology and systems (AIT/AIS) will improve the accuracy of information recorded on equipment assets and will also strengthen the Components' abilities to achieve greater accuracy with physical inventories. The use of AIT/AIS will also decrease the time and cost to complete physical inventories. A case study conducted by the Defense Finance Accounting Service (DFAS) Technical Services Operations (TSO) demonstrates efficiencies gained with equipment inventories using the IUID (Figure 2. DFAS Office Study). The study results show both cost and time savings for leveraging IUIDs for physical inventories. Furthermore, it was determined that leveraging the use of scanners to take images of assets disposed due to loss, damage, or destroyed will reduce the need for digital cameras now required to complete this function. Estimating that there would be an approximate 5000 cameras procured at $300 each, the savings across the Department would be approximately $1.5 million dollars for leveraging scanners to complete this function.

[2] Accountability and Management of Military Equipment Webcast, January 26, 2007.

Figure 2. DFAS Office Study



To provide insight of how commercial accountability practices are benefiting from use of IUID, an example of an industry optimization study leveraging its use is included in Appendix D of this document.

3. REALIZATION

a. USD (C)

The Under Secretary of Defense (Comptroller) (USD(C)) memorandum dated, August 11, 2009, Priorities for Improving Financial Information and Processes and Achieving Audit Readiness, states that one of DoD's priorities is for the Department to be able to prove existence and completeness of mission critical assets to support enterprise visibility and traceability efforts.

b. USD (AT&L)

On November 2, 2009, Dr. Ashton Carter, USD (AT&L), signed a memorandum supporting the existence and completeness efforts across the Department. For ME and GE, one of the data elements to support an assets existence is unique item identification.

c. Department of the Army Headquarters

On December 9, 2009, The Army distributed Headquarters, Guidance for Supply Operations and Property Accountability for IUID. The guidance requires immediate implementation of the use of unique item identifiers (UIIs) in place of serial number. The Army states that they will use the IUID as the common data key to support financial, acquisition, supply, maintenance, and property accountability management within current and future logistics automated information systems (AIS).

In the December 2009 IUID Scorecard meeting, the Army cited an initial goal for IUID use is to provide transparency and traceability of procurement funded equipment from program and budget justification to receipt at the unit level. The Army initiated this plan to implement a systematic data collections capability using the UII. Automated capabilities are necessary to fulfill a quarterly reporting requirement to Congress and the Office of the Under Secretary of Defense (OSD) on unit level deliveries of new equipment by appropriation year and account. A decision was made to use *UII for preventing the manual collection of data for 22 reports at a rate of $8.1 million in dedicated labor hours for a 5 ½ year period*. (The Army's Enterprise Resource Planning (ERP) solution GCSS is not targeted for implementation until FY 2015 that would otherwise permit the needed capability).

Leveraging existing IUID implementation plans and the dollars already spent ($2.9 billion on approximately 4 million pieces of new equipment and secondary items) a decision was made to spend an additional $370K to capture 100% of newly procured equipment via AIT to meet this requirements. The benefits realized from this change are that it enables reinvestments of operator time and makes it convenient to capture the data error free. It also preserves the audit trail linkage between the acquisition, supply, and property systems.

Furthermore, the Army also considered that it would cost nothing more to modify its legacy property book system to enable capturing about 80% of new equipment using a concept already in use. The concept is automated transaction processing interface where delivery acceptance data in the same system that feeds the DoD IUID Registry is used to upload batches of new property records at the serial number level of detail. *This method reduces the time to enter data for property records from 40 hours to 5 minutes. It also eliminates the probability for error associated with a manual process.*

In the update section of the IUID Score Card Meeting briefing, the Army identifies over arching benefits for implementing IUID as being: *improved reliability analysis, increased readiness, optimized logistics and business processes, and reduced total ownership cost*.[3] Additional IUID and AIT benefits to the Army were cited in an October 2009 TACOM briefing given by the ILSC IUID/POC. The benefits described were: *knowing what is owned, knowing who has possession of the assets, knowing the configuration of assets, consistency with inventory of assets, identification of systems under warranty, and distribution of assets to Guard and Reserve*. [4]

[3] IUID Logistics Score Meeting Briefing, December 8, 2009.
[4] Item Unique Identification & Automated Identification Technology Briefing, October 14–16, 2009.

d. The Department of the Air Force

In a February 2004 case study on serial number tracking (SNT), the Air Force sited several benefits to implementing serial tracking.

- SNT will extend the expeditionary ability of the warfighter by providing asset visibility at any time and place.
- Enhanced logistics and engineering analysis resulting from SNT will facilitate an increase in weapon systems availability.
- SNT will support achievement of accurate asset valuation and inventory practices, which will reduce weapon system sustainment costs.
- Automated data capture will vastly improve data accuracy and reduce tracking efforts.
- Deployment of AIT will result in improved data, which will improve weapon system maintenance and usage history.[5]

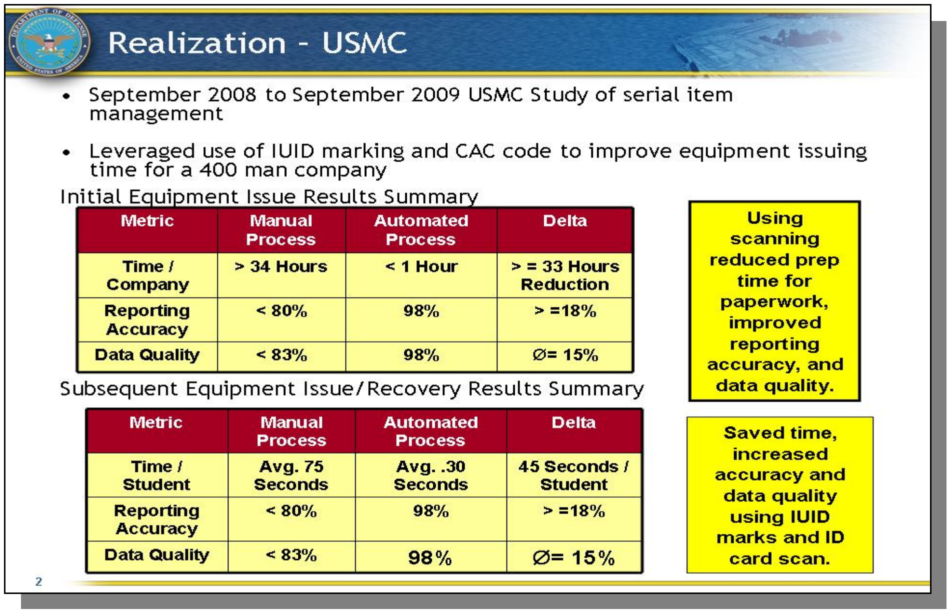
e. USMC

From September 2008 to September 2009, the USMC conducted a serial item management study to determine the efficiencies gained from the implementation of IUID (Figure 3. USMC Serial Item Management Study). [6]The study leveraged the UII coupled with the Common Access Card (CAC) to in process and issue equipment for a company of 400 students. Based on the study results, ***it was determined initial equipment issuing time decreased from >34 hours to < 1 hour using automated processes for a company of 400 persons. Additionally, subsequent equipment issue/recovery time per student decreased from an average of .75 seconds to .30 seconds.*** The reduction was a result of using scanning technology to input all required information vise manual keypunching. The scanning method allowed for all 400 ID cards to be scanned in approximately 22 minutes. In addition, all required information was obtained from the ID cards and subsequently transferred to the NAVMC forms (10576, 10520).

[5] Final Report on Defense Business Operations to Congressional Defense Committees, March 15, 2009.

[6] USMC Automated Armories to Product Group 13 Briefing, September 2009.

Figure 3. USMC Serial Item Management Stud



f. USMC (GE)

The USMC accounts for GE in the Defense Property Accountability System (DPAS). DPAS allows USMC to record, report, and mark legacy assets through the Virtual IUID function. DPAS, with the use of Intermec products, allows the virtually assigned IUIDs to be printed on the bar code label. The scanners allow USMC to read vender assigned IUID and associate it to the accountable record in DPAS. Through this automated system, USMC has accurate information in an accountable system of record. USMC has assigned 100% of its Garrison Mobile Equipment (GME) and approximately 55% of its GE. Percentages will increase as inventories are completed**.**

4. IUID BENEFITS FROM LOGISTICS NODES

The Property Accountability community has pursued the ability to uniquely identify an asset quickly and accurately since the implementation of the policy. The development of the linear Bar Code has long been used to tag and identify assets. This method works very well, but is not always unique outside of the immediate organization that assigned the value. Several Components have setup operations to centrally issue asset tags (Bar Codes) to facilitate unique tags within their Component. This does not pose an issue in most instances because the assets are rarely transferred to another Component, but it poses issues when the Component is co-located with another Component. The UII improves upon the standard bar code in that it is unique across the Department, which ensures the asset can be accurately identified regardless of where it originated.

The property accountability benefits to be achieved from IUID by Logistic Node are outlined in Appendix A of this document.

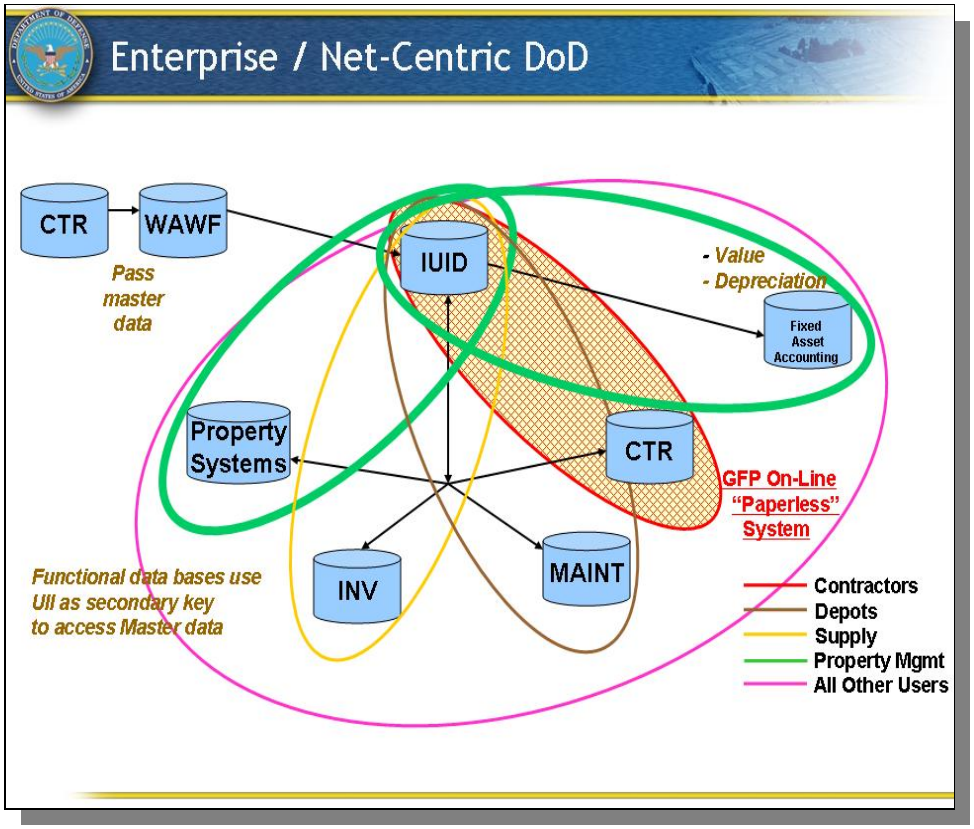
5. ASSUMPTIONS

The benefits identified throughout this document can only be achieved with full implementation of all authoritative guidance by each Logistics Node. The policy guidance is identified below.

- DoD Instruction 8320.04: Item Unique Identification (IUID) Standards for Tangible Personal Property
- DFARS 252.211-7003
- DFARS 252.211-7007
- DoDI 5000.64, Accountability and Management of DoD-Owned Equipment and Other Accountable Property (November 2, 2006)
- DoDI 5000.02 Operation of the Defense Acquisition System
- MIL-STD 129: Military Marking for Shipment and Storage
- MIL-STD 130: Identification Marking of U.S. Military Property
- SFFAS No. 6, Accounting For Property, Plant, and Equipment (June 1996)
- Chief Financial Officers Act of 1990

The highest level of property accountability will occur when the acquisition and supply systems are interfaced with Wide Area Work Flow (WAWF), IUID Registry, financial accounting, and the property accountability information systems (Figure 4. Enterprise Net-Centric DoD). Having the supply, accounting, maintenance and disposal systems communicate with the property accountability systems using the UII will greatly add to the efficiency and accuracy of the asset tracking. Implementing AIT equipment will add to this efficiency if it is integrated into the systems to produce forms and initiate transactions for the receipt, transfer, accounting, maintenance and/or disposal processes.

Figure 4. Enterprise Net-Centric DoD



As the data capture occurs and is linked to in-service data sources, users will have access to a broad range of reliable data for engineering analysis, logistics support decision making, valuation and even operational decision making. It will also mean fewer errors should occur in the acceptance and reorder processes.[7]

6. ISSUES

The size and complexity of DoD business processes, coupled with its primary mission, presents many challenges to fully implementing IUID requirements across the Property Accountability value chain; it is difficult in peace time and will be more complex given that the Department is currently engaged in two major wars. Furthermore, prior to the Military Departments full implementation of their Enterprise Resource Planning (ERP) solutions, there is no enterprise-level capability to determine the full volume of both accountable and capital ME and GE assets.

7. CONCLUSION

Processes described in this document are currently being accomplished in a non-automated/non integrated environment, and in many cases, without the use of the IUID. Results from DoD Financial Accountability Initiatives as well as IG and GAO audits have indicated that efficiencies with property accountability practices are needed to improve reporting. Full implementation of the IUID policy guidance with the appropriate AIT/AIS will greatly support the necessary improvements as well as improve information available for decision makers. The highest level of

[7] IUID Logistics Score Meeting Briefing, December 8, 2009.

property management will occur with full integration of acquisition, accountability and logistic systems. Improvements realized by the enterprise-level view of this information will also improve the availability of mission critical information to acquisition decision makers, for better equipping the armed forces for warfigher missions, and for complying with Federal and DoD law, policy, and regulations.

REFERENCES

Law, Policy, and Regulation:

- DoDI 5000.64, Accountability and Management of DoD-Owned Equipment and Other Accountable Property (November 2, 2006)
- DoDI 5000.02
- DoD Instruction 8320.04: Item Unique Identification (IUID) Standards for Tangible Personal Property
- MIL-STD 129: Military Marking for Shipment and Storage
- MIL-STD 130: Identification Marking of U.S. Military Property
- SFFAS No. 23, Eliminating the Category National Defense Property, Plant, and Equipment (May 2003)
- SFFAS No. 6, Accounting For Property, Plant, and Equipment (June 1996)
- Chief Financial Officers Act of 1990

Property Accountability Value Chain References:

- DoD-IG. Defense Logistics Agency Action to Improve Property, Plant and Equipment Financial Reporting. Report No. 97-148. 29 May 1997.
- GAO. Financial Audits Highlight Continuing Challenges to Correct Serious Financial Management Problems. GAO/T-AIMD/NSIAD-98-158. 16 April 1998.
- DoD-IG. Defense Logistics Agency FY 1998 Property, Plant, and Equipment Financial Reporting. Report No. 99-142. 26 April 1999.
- DoD-IG. Defense Logistics Agency FY 1998 Property, Plant, and Equipment Financial Reporting. Report No. 2000-133. 30 May 2000.
- DoD-IG. Disposal of Excess Government-Owned Property in the Possession of Contractors. Report No. D2001-004. 13 October 2000.
- DoD-IG. United States Special Operations Command's Reporting of Real and Personal Property Assets on the FY 2000 DoD Agency-Wide Financial Statements. Report No. D-2001-169. 2 August 2001.
- DoD-IG. Statement of Francis E. Reardon, Deputy Inspector General for Auditing. Report No. DL-2004-105-T. 8 July 2004.
- Report to Congress on IUID Program September 2006

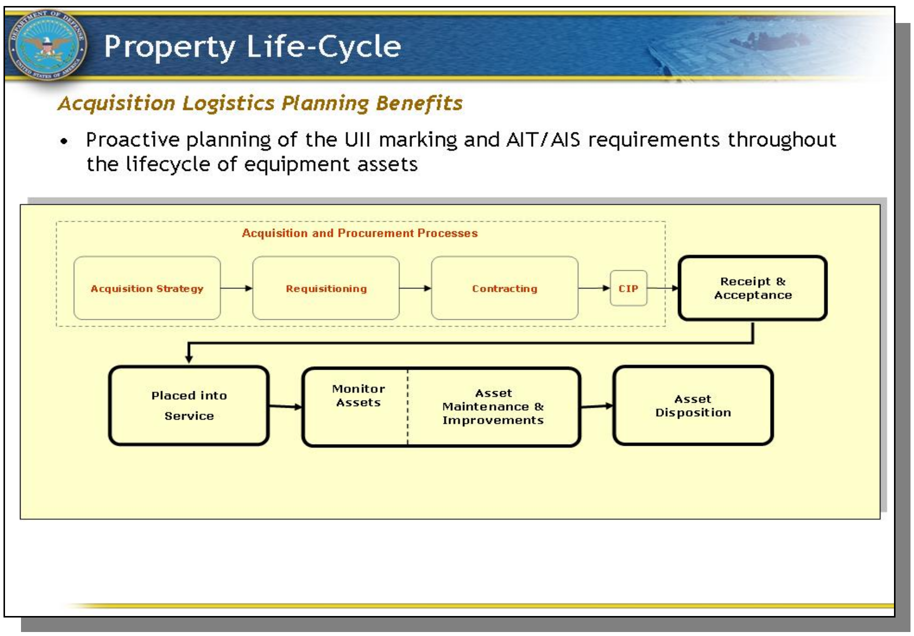
- Accountability and Management of Military Equipment Webcast January 26, 2007
- Naval Audit Service. Management of Special Tooling and Special Test Equipment at Space and Naval Warfare Systems Command. N2008-NAA000-0076.000. 7 Nov 2008.
- Final Report on Defense Business Operations to Congressional Defense Committees, March 15, 2009
- USMC Automated Armories to Product Group 13, September 2009 Briefing
- IUID Logistics Score Meeting Briefing- December 8, 2009

APPENDIX A. PROPERTY ACCOUNTABILITY BENEFITS BY LOGISTICS NODE

A. Acquisition Logistics Planning (ALP)

Authoritative Guidance - DoDI 5000.02: Requirement to include an IUID implementation plan in the Acquisition Strategy (DoDI 8320.04).

The overarching benefit realized by the Acquisition Logistics Planning node is that full implementation of the guidance will improve the proactive planning of the UII marking and AIT/AIS requirements throughout the lifecycle of equipment assets (Figure 5. Property Life-Cycle).



B. Acquisition Suppliers

Authoritative Guidance: DoD Instruction 5000.64, DFARS 252.211-7003, 252.211-7007, 211.274-3, 252.246-7000, MIL-STD-130, Accounting Standard No. 6 Accounting for Property Plant and Equipment

The overarching benefit realized by the Acquisition Supplier Node is that full implementation of the guidance will improve capabilities to automate the procure-to-pay processes for equipment in four ways: 1) Enables marking UIIs on equipment items upon delivery per contract specifications by contractors; 2) Enables identification of embedded items (GFP) and government unit acquisition cost (GUAC) of embedded UIIs by contractors; 3) Automates delivery of equipment invoices and receipt and acceptance documentation electronically into DoD systems; and 4) Enables more accurate process for valuing equipment based on actual cost.

Ensuring the assets will be marked during the acquisition and supply phases of the life cycle will enable property accountability personnel to accurately identify the assets. A machine-readable, unique identifier on assets entering DoD's inventory, enables a common language of business for strategic sourcing, asset visibility and reliable accountability. It also supports accounting practices for item management that meet the requirements of Federal accounting standards in accordance with the Chief Financial Officers Act of 1990.[1]

The highest level of accountability will occur when the acquisition/supply systems are interfaced with Wide Area Work Flow (WAWF) and/or the property accountability information systems. The ability to notify the item managers of the pending receipt of assets would greatly benefit current accountability processes. The UII then allows accurate reconciliation with the assets order to the assets received. As the data capture occurs and is linked to in-service data sources, users will have access to a broad range of reliable data for engineering analysis, logistics support decision making, valuation, and even operational decision making. It will also mean fewer errors should occur in the acceptance and reorder processes.[2]

C. Distribution Centers

Authoritative Guidance: DoD Instruction 5000.64, MIL-STD-130.

The overarching benefit realized by Distribution Centers Node is that full implementation of the guidance will improve abilities to ensure equipment assets by UII are valid and active in an APSR and status, location, and condition are available if required for physical inventorying.

D. Transportation

No Property Accountability Requirements

E. Base and Forward Supply

Authoritative Guidance: DoD Instruction 5000.64, MIL-STD-130

The overarching benefit realized by Base and Forward Supply Node is that full implementation of the guidance will ensure equipment assets by UII are valid and active an APSR and available, if required for physical inventorying.

F. Depot Maintenance

Authoritative Guidance: DoD Instruction 5000.64, MIL-STD-130, Statement of Federal Financial Accounting Standard No. 6 Accounting for Property Plant and Equipment

The overarching benefit realized by Depot Maintenance Node is that full implementation of the guidance will ensure equipment assets by UII are valid and active in APSR status, location, and condition are available if required for physical inventorying, traceability of GFP provided to contractors either under contractor logistics support (CLS) or performance-based logistics (PBL) arrangements, and automate capturing cost of modifications/improvements that should be treated as capital expenditures.

[1] Report to Congress on IUID Program September 2006.
[2] Report to Congress on IUID Program September 2006.

G. Field Maintenance

Authoritative Guidance and Overarching Benefits the same as described in the Depot Maintenance Node's Benefits

H. In Service Engineering and Logistics Analysis

Authoritative Guidance: MIL-STD-130

The overarching benefit realized by In Service Engineering and Logistics Analysis Node is that full implementation of the guidance will ensure equipment assets by UII have instructions for applying/updating the mark. Furthermore, the accuracy of information captured by UII could enable improved logistics analysis to occur on both end items and embedded items to improve logistics decision making.

I. Field and Unit Operations

Authoritative Guidance: DoD Instruction 5000.64, MIL-STD-130.

The overarching benefit realized by the Field and Unit Operations Node is that full implementation of the guidance will ensure equipment assets by UII are valid and active in an APSR and status, location, and condition are available if required for physical inventorying.

J. Disposal

Authoritative Guidance: DoD Instruction 5000.64, MIL-STD-130, Statement of Federal Financial Accounting Standard No. 6 Accounting for Property Plant and Equipment

Integrating the Property Accountability and Disposal communities enables the property accountability community to accurately identify to the disposal personnel the assets they will be receiving for disposal. When the assets are officially disposed of the Disposal Information Systems can accurately notify the property accountability information systems of the disposal and final disposition actions can be made (i.e., stop depreciation of asset values if included in capital equipment valuations, ensure parts cannibalized for re-use are properly marked and recorded in APSRs, ensure final disposed assets are coded with proper status code in APSR with proper supporting documentation to support physical inventories).

APPENDIX B. OTHER FEDERAL AGENCIES ACCOUNTABILITY THRESHOLD

Federal Agency	Threshold
Department of Agriculture	5,000
Department of Commerce	5,000
Department of Education	500
Department of Energy	5,000
Department of Health & Human Services	5,000
Department of Housing & Urban Development	1,000
Department of Interior	5,000
Bureau of Land & Management	250
Bureau of Reclamation	5,000
U.S. Fish & Wildlife Service	50
U.S. Geological Survey Service	5,000
Department of Justice	1,000
Federal Bureau of Investigation	5,000
U.S. Federal Bureau of Prisons	5,000
U.S. Customs Service	5,000
Department of State	500
U.S. Agency For International Development	100
International Trade Administration	5,000
Department of the Treasury	5,000
Department of Veterans' Affairs	5,000
Federal Communications Commission	500
National Aeronautics & Space Administration	5,000
National Park Service	5,000
National Science Foundation	5,000
Nuclear Regulatory Commission	300
Social Security Administration	1,000

APPENDIX C. GAO AND IG AUDITS ON GENERAL EQUIPMENT

Numerous audits have been conducted on GE and these audits document deficiencies in the accountability and financial reporting of GE due to insufficient management controls. Specifically, the audit reports document deficiencies in accounting for property in the possession of contractors, supporting documentation for cost, traceability, valuation for historical cost, and asset classification. Outlined below are sample audit reports relating to each of these deficiencies.

A. Valuation and Reporting of Property in Possession of Contractors

DoD acknowledges that it is unable to accurately account for government-furnished property. The Department asserts that the lack of accountability is due to changes in accounting requirements and lack of an integrated reporting methodology within the industry.[1]

As part of the National Performance Review, DoD established a goal to dispose of $5 billion in excess property consisting of special test equipment, special tooling, industrial and other plant equipment from contractors' plant by December 31, 2001. Defense Contract Management Agency (DCMA) claimed to have achieved its goal by removing $7.3 billion in excess property in the possession of contractors by December 31, 1999. Audits revealed this number to be inaccurate. DCMA reported property transferred between contracts as disposals. The DCMA data for reporting the property disposals was not supported because the data was obtained from an unreliable property disposal system and DCMA did not have adequate management controls established to compile property disposal data. DCMA could not provide accurate support for the amounts reported to OUSD (AT&L).[2]

B. Traceability

The GAO report "Financial Audits Highlight Continuing Challenges to Correct Serious Financial Management Problems" documents that inventories of personal property have been less than reliable. There have been extensive discrepancies between physical counts of inventories actually on hand and quantity information recorded. The DoD-IG reported an overall 24 percent error rate at primary Navy storage facilities. As a result of the discrepancies between recorded quantities and actual on-hand amounts, DoD officials do not have all the decisional-quality information needed to make informed purchases. [3]

Naval Audit Service report, "Management of Special Tooling and Special Test Equipment at Space and Naval Warfare Systems Command," documents a lack of asset traceability. The Navy does not have an accurate inventory of all special tool and special test equipment (ST/STE). The Space and Naval Warfare Systems Command (SPAWAR) was unable to provide visibility over at least $83.6 million of its ST/STE. This inaccuracy was due to an over-reliance on DCMA as a substitute for ST/STE inventory accountability. SPAWAR relied on inefficient and ineffective data call processes, had limited communication between SPAWAR, the administrative contracting officers,

[1] DoD-IG. *Statement of Francis E. Reardon, Deputy Inspector General for Auditing*. Report No. DL-2004-105-T. July 8, 2004.

[2] DoD-IG. *Disposal of Excess Government-Owned Property in the Possession of Contractors*. Report No. D2001-004. October 13, 2000.

[3] GAO. *Financial Audits Highlight Continuing Challenges to Correct Serious Financial Management Problems.* GAO/T-AIMD/NSIAD-98-158. April 16, 1998.

and property administrators, and had no central points of contact for maintaining accountability of ST/STE. There was also an absence of management processes to obtain ST/STE information from Program Executive Offices and SPAWAR System Centers. Based on the analysis of the SPAWAR ST/STE, the Naval Audit Service concluded that the ST/STE inventory results were inaccurate, incomplete, and unreliable.[4]

In the DoD-IG audit report "Defense Logistics Agency Action to Improve Property, Plant and Equipment Financial Reporting," the DoD-IG identifies three major DLA organizations consisting of 50 sites which failed to accurately record all of their PP&E assets on their financial records due to the fact that they had not allocated sufficient resources to perform directed inventories and had not established the necessary procedures to ensure that accurate and reliable financial information was entered into the Defense Property and Accountability System (DPAS).[5]

Although the Defense Logistics Agency (DLA) was attempting to improve reporting of GPP&E, audits show that personnel were not entering all existing or newly acquired property into DPAS. DLA did not have centralized control over the inventories and financial reconciliation of its PP&E. Although DLA asserted that complete inventories of assets had been conducted within the recent period, the documentation required by financial management regulations to certify the inventories had not been maintained.[6] Additional audits by the DoD-IG highlight that the personnel were continuing to fail at creating a property record for newly acquired assets in DPAS.[7]

During a 2001 DoD-IG audit it was found that Special Operations Command (SOCOM) component commands used the regulations of their executive agents to determine whether property should be reported to SOCOM Headquarters or the military departments. As a result of using different regulations, there were inconsistencies and inaccuracies in the reporting of GE. As an example, Naval Surface Warfare Center (NSWC) used equipment purchased by both SOCOM and the Navy, but based on instructions from the Navy was only reported on equipment that was not recorded in Navy systems. NSWC reported $6.9 million in GPP&E because it was not resident in the Navy systems, but there was no method to establish to whom the equipment belonged. Additionally, as a result of the Navy policy and guidance, NSWC failed to report on $1.7 million in construction and engineering support equipment that it owned because it was already recorded in a Navy system.

In addition to relying on policy and guidance of their executive agencies, SOCOM components relied on a combination of Service-specific property accountability systems and its own database of GPP&E. The SOCOM internal controls over the process did not consider the comparability of the variety of systems nor did the internal controls consider the discrepancy in policies governing the accountability systems. As a result, SOCOM did not have assurance that all of its equipment was actually recorded in a property accountability system. The DoD-IG concluded GPP&E data

[4] Naval Audit Service. *Management of Special Tooling and Special Test Equipment at Space and Naval Warfare Systems Command.* N2008-NAA000-0076.000. Novovember 7, 2008.

[5] DoD-IG. *Defense Logistics Agency Action to Improve Property, Plant and Equipment Financial Reporting.* Report No. 97-148. May 29, 1997.

[6] DoD-IG. *Defense Logistics Agency FY 1998 Property, Plant, and Equipment Financial Reporting*. Report No. 99-142. April 26, 1999.

[7] DoD-IG. *Defense Logistics Agency FY 1998 Property, Plant, and Equipment Financial Reporting*. Report No. 2000-133. May 30, 2000.

was fragmented and SOCOM lacked defined procedures to ensure accountability and control of GPP&E.[8]

[8] DoD-IG. *United States Special Operations Command's Reporting of Real and Personal Property Assets on the FY 2000 DoD Agency-Wide Financial Statements*. Report No. D-2001-169. August 2, 2001.

APPENDIX D. COMMERCIAL BENEFIT STUDY

Industry Optimization Analysis

A 2004 internal study by the Aerospace Engine Division of Rolls Royce identified significant quality improvements and a 4% direct labor savings from the use of IUID in conjunction with automated data capture in the manufacturing process. The study could not quantify, but anticipated equally dramatic labor savings in operations and support. A 1999 study at DaimlerChrysler (Airbus) indicated, “Over a period of five years, the Cumulative Net Cash Flow amounts to the sum of 2.25 million DM… without considering the additional ‘soft’ benefits”, for implementing bar-coded component tracking in aircraft production. A 2003 study by ATKearney performed on behalf of UCCnet identified savings in the following areas:[1]

Business Area Affected	Business Impact
Merchandising and Sales time handling data	5% reduction
Customer service time dealing with purchase orders	5+% reduction
Finance time reconciling invoices	5–10% reduction
Inventory	0.5–1% reduction
Out-of-stocks	1+% reduction
Logistics costs	1+% reduction
Warehouse and direct store delivery	1,000s of hours saved
Speed to market	2 weeks less time on new items
Shelf tag and scan errors	1,000s of hours saved
Data Cleansing	$4 saved for every $1 spent

[1] Report to Congress on IUID Program September 2006.

Appendix B

Logistics Item Unique Identification Task Force

Intensive Item Management Value Chain IUID Benefit Analysis

Final Working Paper

April 5, 2010

Prepared by the
Intensive Item Management Value Chain Working Group

CONTENTS

LIST OF AUTHORS

The Services, DLA and DLMSO contributed to the effort.

Kathy Smith and Megan Yonke were principal authors of this document.

Intensive Item Management
IUID Benefit Analysis

1. SUMMARY

a. IIM Value Chain Definition

The Intensive Item Management (IIM) Value Chain proposition focuses on the value of using the Unique Item Identifier (UII) to intensively manage and control critical and sensitive items. It involves strict accountability and tracking, by UII, of these items while in receipt, physical inventory, and issue. At the most intensive level of management, the Integrated Materiel Management (IMM) must manage worldwide inventory by UII. At the least intensive level of management, users must capture and maintain the item UII while in storage and within configuration records, but the IMM manages worldwide inventory by NSN.

b. Background

The Department is in the process of issuing updated policy to strengthen accountability and control of the Department's most critical and sensitive assets. Items such as Nuclear Weapons Related Material (NWRM), Classified, Sensitive, and Critical Safety Items (CSIs) are crucial to U.S. national security. Recent lapses in strict accountability and control of these sensitive items highlighted the need to intensively manage these types of items throughout their entire lifecycle. A proposed set of integrated requirements has been developed and distributed to supply chain node leaders detailing procedures for maintaining strict item accountability using the Unique Item Identifier (UII) during receipt, physical inventory and issue for enhanced in-transit and in-use visibility.

Following the loss of positive inventory control of some critical items in 2008, it was clear an enterprise-wide approach to intensively managing these assets was required. Specifically, the Department must require automated processes to decrease the risk of human error and facilitate more frequent and expedited inventories of these sensitive items. A standard approach to Serial Item Management (SIM) will improve management of these items across supply chain nodes. The Item Unique Identification (IUID) program enhances current SIM programs by standardizing previously disparate serial number schemas into a globally unique identification program and by using a standard machine-readable mark for all IUID-eligible items procured by the Department of Defense. UIIs, when correctly assigned and maintained, provide the granularity of item information necessary to manage this population of items correctly.

Implementation of the IUID program and these integrated procedures will provide the DoD with the means for enhancing intensive item management capability throughout the entire Department by significantly decreasing the potential for human error and confusion. In fact, users at the base level made item identification errors on some of these items when they were so technically complex that correct identification of the item required a certified engineer. A machine-readable UII would rectify this issue. Managers of these types of items have consistently emphasized the value that would be provided by a DoD-wide implementation of the IUID program and standard procedures.

c. Approach

The IIM Team estimated the benefits of intensively managing these critical items across the enterprise. National security and safety are the two largest considerations of this value chain, to which monetary value is difficult to assign. Benefits, as mentioned above, include the strict accountability and control of the Department's most critical assets to ensure the security and safety of these assets. Costs include the potential loss of critical items and the potential loss of military-unique technology. This value chain expects that business benefits will be realized by the supply chain nodes as a by-product of intensive item management. Items within four categories (Nuclear Weapon Related Material, Classified, Sensitive, and Critical Safety Item(s)) often have a high price tag themselves, so managing them would prevent substantial financial losses to the Department. However, financial benefits are not the primary focus of this value chain.

2. BENEFITS FROM NODE VALUE PROPOSITION ANALYSES

Most benefits of managing controlled items intensively are not node-specific. Where node-specific benefits are anticipated, detailed information is provided below in Appendix A.

3. ISSUES/ASSUMPTIONS

Discipline and consistency in collecting and using UII for intensive item management is required at all nodes for success.

Transition steps/interim business processes must be developed and used until end-state can be achieved, such as: prioritizing and marking legacy items to include consumables; maintaining inventory of marked and unmarked items on same NSN; developing systems changes etc.

A code is required in the Federal Logistics Information System (FLIS) to aid in the intensive management of these controlled items using the IUID in the logistics automated information systems (AISs).

The IUID DFARS clause must be updated to include MIL-STD 129 packaging requirements to heighten visibility of this key enabler to management of controlled items by IUID internal to the Department.

Logistics AISs must be capable of exchanging IUID information in standard transaction sets across the Components using DLMS and DTEB data exchange standards.

4. CONCLUSION

Regardless of the results of the value chain analysis, this set of items must be intensively managed. The IUID permanent, machine readable UII is a crucial enabler to affording these assets the highest level of accountability and control.

REFERENCES

Policy References:

- DoD-D 4140.1-R Supply Chain Materiel Management Regulation
- DoD 4000.25-M DLMS Manual
- DoD 4100.39-M: Federal Logistics Information System (FLIS) Procedures Manual, Volume 10: Table 61: Controlled Inventory Item Codes (CIIC)
- DoD Instruction 8320.04: Item Unique Identification (IUID) Standards for Tangible Personal Property
- MIL-STD 129: Military Marking for Shipment and Storage
- MIL-STD 130: Identification Marking of U.S. Military Property

IIM Value Chain References:

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APPENDIX A. NODE-SPECIFIC BENEFITS

Most benefits of managing controlled items intensively are across the enterprise and are not node-specific. Where node-specific benefits are anticipated, detailed information is provided in this appendix.

A. Acquisition Logistics Planning

i. Categories

1. Resources

Inserting the MILSTD 129 IUID packaging requirements into the IUID clause will facilitate internal DoD management of these key assets.

2. Efficiency

It would be inefficient if acquisition resources are used to procure incorrect items caused by lack of a UII.

ii. Risk

Ensuring the correct item is procured up-front can reduce risks later in the supply chain.

iii. Quality–materiel and data

Confirming correct item information at the initial acquisition stage will ensure clear item information resides in DoD systems. Also, IUID will help prevent instances of counterfeiting and enable precise recall if it does occur.

B. Suppliers

i. Commercial

1. Risk/Accountability

IUID will allow the Department to identify bad actors and differentiate them from those with consistently positive performance. Once fully implemented, IUID will ensure commercial supplier accountability–a benefit to all involved.

2. Readiness

In some cases, items may appear similar but actually are two different items of supply, each its own NSN. Using the UII to correctly identify which NSN to requisition (rather than visual observation) will improve demand projection within the Department of Defense. This will benefit commercial suppliers, as the Department will be more precise in its ordering.

3. Quality—Materiel and Data

Suppliers adding the IUID to the exterior packaging will facilitate internal DoD management of these key assets.

ii. Inventory Control Point (Item Manager)

1. Categories

Managing these assets intensively will require additional resources, but use of standard processes and automatic identification technologies should lessen costs over time. As the Item Manager, officials at this node will be responsible for leading investigations on any lost controlled item and expending substantial effort to perform follow-up research/error correction. As directed by the Secretary of Defense following the loss of positive inventory control of critical items in 2008, Navy, Air Force, and DLA were required to perform extensive inventories of these controlled items, taking considerable time and effort. Not only should IUID lessen the need for such inventories in the future, but if an enterprise-wide inventory still be necessary, IUID should lessen the time and effort necessary to execute.

In addition, the availability of information will allow for more thorough analysis of enterprise business processes and will provide better information to corporate-level decision-makers. Specifically, use of the UII to capture actual performance metrics in operations can lead to more accurate forecasts for the future.

Using the UII to correctly identify which NSN to requisition will improve demand projection within the Department of Defense and improve inventory management by increasing the accuracy of records, preventing the creation of duplicate or incorrect records. IUID would also enable planners to identify parts in need of replacement ahead of schedule and place orders accordingly.

IUID will allow the Item Manager to direct the economic disposal of specific instances of an item of supply based on its age, condition, manufacturer, and specific item cost. This will also allow more accurate economic and contingency retention calculations (by knowing the age and maintenance history of each item). Disposal actions could be directed at the individual piece-part vice NSN, disposing of the oldest parts first. This will ensure that the Department optimizes use of managed items.

2. Risk

Since the Item Manager is concerned with managing the item throughout the supply chain, he/she is responsible for managing risk of item loss to the entire enterprise. IUID could facilitate better risk management.

3. Readiness

The Department may need fewer of these items if they are more accurately tracked and their inventory is more accurately measured.

4. Quality–materiel and data

UIIs, when correctly assigned upon item manufacture, provide the granularity and accuracy of item information necessary to manage this population of items correctly.

5. Weapon System/Equipment Performance

Positive benefits would be realized by all applicable nodes.

5. Training

Discipline and dissemination of proper training to all levels down to the lowest level will be key to the effectiveness of any implemented process. Included in the Military Service responses to the required controlled item inventory was an acknowledgement that inconsistent compliance and process discipline allowed the accumulation of overages, i.e., assets not listed in accountable item records.

7. Accountability

Intensive item management leaves an extensive history trail of item activity, providing managers with a means to establish accountability for any mishaps, as well as to reward those who followed requirements.

8. Regulatory, Policy, Statutory

These requirements will enhance current DoD 4140.01-M policy and provide guidance for DoD 4000.25 procedures, assigning procedures to a concrete sub-population of items.

C. Distribution Centers

i. Categories

In some cases, items may appear similar but actually are two different items of supply, each its own NSN. Using the UII to correctly identify the item will benefit distribution centers by ensuring accurate item identification/inventories.

ii. Risk

In addition, IUID program will facilitate standardized processes for sharing information across the lifecycle of an item through item disposal. Should an IUID item that was disposed of as being counterfeit and/or non-conforming inadvertently re-enter the supply system, distribution depot personnel would be able to identify the counterfeit/non-conforming item upon re-entry into the DoD supply chain.

IUID will provide personnel at distribution depot locations with the correct item information necessary to correctly manage items (i.e. hazardous) per their environmental-specific needs. This information is necessary to ensure personnel health and safety, in addition to item functional quality.

iii. Readiness

Better internal processes at the Distribution Center will facilitate more efficient services to Military Service customers, increasing readiness. Expedited and more accurate inventories facilitated by IUID will allow for more accurate demand projections, saving the Department money. Implementation of IUID would improve inventory management by increasing the accuracy of records, preventing the creation of duplicate or incorrect records.

Should an item recall be necessary, IUID will facilitate the precise identification of the correct instances of an item of supply to recall. Without the UII, DoD readiness could be negatively affected if all items within a given NSN required disposal due to a recall.

iv. Quality–materiel and data

UIIs, when correctly assigned upon item manufacture, provide the granularity and accuracy of item information necessary to manage this population of items correctly.

v. Accountability

Enhanced intensive item management using IUID at the Distribution Center will ensure correct ownership alignment of assets in storage.

D. Transportation

i. Risk

Using IUID to maintain the referential link between the TCN and supply systems will improve in-transit visibility of controlled items and reduce the risk of misrouting assets away from secure facilities.

E. Base and Forward Supply

i. Categories

IUID will allow for expedited inventories and minimized errors currently associated with manual data entry of human readable serial numbers.

In some cases, items may appear similar but actually are two different items of supply, each its own NSN. Using the UII to correctly identify which NSN to requisition (rather than visual observation) will benefit base and forward supply, as they will be better able to identify items being turned in for storage, improve spare part inventory management, and improve demand forecasts.

ii. Risk

Having a machine readable UII will facilitate data collection and maintenance of equipment used within U.S. forces as well as those distributed to the non-U.S. forces, thus enhancing accountability at Base and Forward Supply.

In addition, IUID program will facilitate standardized processes for sharing information across the lifecycle of an item through item disposal. Should an IUID item that was disposed of as being counterfeit and/or non-conforming inadvertently re-enter the supply system, Base and Forward Supply personnel would be able to identify the counterfeit/non-conforming item upon re-entry into the DoD supply chain.

iii. Readiness

Better internal processes at the Base and Forward Supply locations will facilitate more efficient services to Field and Unit Operations, increasing force readiness. Expedited and accurate inventories facilitated by IUID will allow for more accurate demand projections, saving the Department money. Implementation of IUID would improve inventory management by increasing the accuracy of records preventing the creation of duplicate or incorrect records. IUID would also enable planners to identify parts in need of replacement ahead of schedule and place orders accordingly.

Should an item recall be necessary, the IUID will facilitate precisely identifying the correct instances of an item of supply to recall. Without the UII, DoD readiness could be negatively affected if all items within a given NSN required disposal due to a recall.

iv. Quality–materiel and data

UIIs, when correctly assigned upon item manufacture, provide the granularity and accuracy of item information necessary to manage this population of items correctly.

v. Accountability

Better intensive item management at the Base and Forward Supply location will ensure correct ownership alignment of assets in storage.

F. Depot Maintenance

i. Categories

1. Resources

Implementation of IUID will enable Depot Maintenance to spend less time correctly identifying parts to be installed or replaced, especially for Critical Safety Items. Applying UIIs will also enable the DoD to optimize the use of reparables across their life spans and reduce the number of unnecessary parts that are re-ordered. IUID will facilitate targeted/scheduled repair and consistent availability of item warranty history.

In some cases, items may appear similar but actually are two different items of supply, each its own NSN. Using the UII to correctly identify which NSN to requisition will improve demand projection within the Department of Defense. Using the UII to correctly identify which NSN is used in a maintenance action will ensure correct configuration management.

2. Efficiency

Being able to correctly identify and track parts and reparables will enable Depot Maintenance to respond to customer requests more efficiently. Depot Maintenance will be able to know what resources they have available and more accurately predict when an item is at the end of its useful lifetime so they can order necessary parts.

The Marine Corps also performed a study of serial item management business benefits realized from September 2008 to September 2009, see charts below.

Initial Equipment Issue Results Summary

Metric	Manual Process	Automated Process	Delta
Time / Student	> 34 Hours	< 1 Hour	>= 33 Hours Reduction
Reporting Accuracy	< 80%	98%	>= 18%
Data Quality	< 83%	98%	>= 15%

Subsequent Equipment Issue/Recovery Results Summary

Metric	Manual Process	Automated Process	Delta
Time / Student	Avg. 75 Seconds	Avg. 30 Seconds	45 Seconds / Student
Reporting Accuracy	< 80%	98%	>= 18%
Data Quality	< 83%	98%	>= 15%

Source: USMC Automated Armories Presentation–Product Group 13. Major Brian Spooner, LPC-1. Study September 2008–September 2009.

ii. Risk

1. Environmental/safety/health

For safety reasons, it is important to remove items on the verge of failure and prevent them from being installed into end items. IUID will facilitate more accurate and expedited failure reporting and analysis and recall/latent defect detection.

iii. Readiness

Collection of key data by individual item using the UII, e.g. availability, OST, throughput, frequency may help identify parts that are in need of replacement. Optimized maintenance will facilitate optimized weapon system and equipment performance.

Should an item recall be necessary, the IUID will facilitate precisely identifying the correct instances of an item of supply to recall. Without the UII, DoD readiness could be negatively affected if all items within a given NSN required disposal due to a recall.

iv. Quality—Materiel and Data

Uniquely identifying materiel using the UII would ensure that only items not on the verge of failure would be installed into end-items or replaced. Depot Maintenance would be able to track that part and alert the end user when it is due to be replaced.

v. Accountability

It is important that the DoD maintain strict accountability of these items. In addition to monetary savings, Falcon Flex also directly supports weapon system availability goals of the Air Force Smart Operations for the 21st Century (AFSO21). From the start, the Falcon Flex program realized the value of uniquely identifying parts by serial number to solve supply chain problems. The Falcon Flex program and its utilization of the DRILS maintenance data collection tool is a solid model for the Air Force as it pushes ahead with the implementation of serialized item management. The goal is to stop buying high-failure parts and to reduce the time to procure improved parts which in turn increases the reliability and availability of weapon systems while reducing sustainment costs.[1]

G. Field Maintenance

i. Categories

1. Resources

Implementation of IUID will enable Field Maintenance to spend less time correctly identifying parts to be installed or replaced, especially for Critical Safety Items. Applying UIIs will also enable the DoD to optimize the use of reparables across their life spans and reduce the number of unnecessary parts that are re-ordered. IUID will facilitate targeted/scheduled repair and consistent availability of item warranty history.

In some cases, items may appear similar but actually are two different items of supply, each its own NSN. Using the UII to correctly identify which NSN to requisition will improve demand projection within the Department of Defense. Using the UII to correctly identify which NSN is used in a maintenance action will ensure correct configuration management.

2. Efficiency

Being able to correctly identify and track parts and reparables will enable Field Maintenance to respond to customer requests more efficiently. Field Maintenance will be able to know what resources they have available and more accurately predict when an item is at the end of its useful lifetime so they can order necessary parts.

ii. Risk

1. Environmental/Safety/Health

For safety reasons, it is important to remove items on the verge of failure and prevent them from being installed into end items. IUID will facilitate more accurate and expedited failure reporting and analysis and recall/latent defect detection.

iii. Readiness

Implementation of IUID would improve configuration management by increasing the accuracy of records preventing the creation of duplicate or incorrect records. Collection of key data by individual item, e.g. availability, OST, throughput, frequency will benefit field maintenance by

[1] Success Stories: Implementing Item Unique Identification in DoD. "Falcon Flex: Turning Maintenance Information into Air Power." Kevin J. Berk.

identifying the exact parts that are in need of replacement. Optimized maintenance will facilitate optimized weapon system and equipment performance.

Should an item recall be necessary, the IUID will facilitate precisely identifying the correct instances of an item of supply to recall. Without the UII, DoD readiness could be negatively affected if all items within a given NSN required disposal due to a recall.

iv. Quality—Materiel and Data

Uniquely identifying materiel would ensure that only items not on the verge of failure would be installed into end-items or replaced. Field Maintenance would be able to track that part and alert the end user when it is due to be replaced.

v. Accountability

It is important that the DoD maintain accountability of these items.

H. In Service Engineering and Logistics Analysis

i. Efficiency/Cost/Man Hours/Quality of Materiel and Data

Though the IUID program will require substantial up-front expenditure of time and effort for engineering, standardized processes will allow engineering officials better access to shared tech data. Therefore, it should minimize the cost of future engineering efforts. In addition, should an item be misplaced, it should be much easier to identify the type of item lost and obtain item-level information due to tracking in historical records. There should be fewer classification mistakes due to better available information.

In addition, the availability of information will allow for more thorough analysis of enterprise business processes and will provide better information to corporate-level decision-makers. Specifically, use of the UII to capture actual performance metrics in operations can be provided back to in-service engineering to help improve engineering estimates for the future.

I. Field and Unit Operations

i. Risk

1. Security

IUID management of controlled items will reduce risk of greater harm and help prevent inadvertent release of NWRM, classified, or sensitive items into the wrong hands. IUID intensive item management of our most sensitive items will help maintain greater accountability of asset possession/location.

2. Environmental/Safety/Health

Intensive management of CSI will enhance safety of personnel during operations.

ii. Readiness/Weapon System/Equipment Performance

As the end user of these items, they will be the single biggest beneficiary of intensive item management–enhanced safety.

Should an item recall be necessary, the IUID will facilitate precisely identifying the correct instances of an item of supply to recall. Without the UII, DoD readiness could be negatively affected if all items within a given NSN required disposal due to a recall.

iii. Quality—Materiel and Data

UIIs, when correctly assigned upon item manufacture, provide the granularity and accuracy of item information necessary to manage this population of items correctly.

J. Disposal

i. Categories

This node is responsible for the resale of items to non-DoD entities and the reutilization of items to other DoD entities, therefore serving as the supplier of another's supply chain. When preparing for issue, disposal personnel are required to perform research to identify items to the furthest extent possible, requiring time and effort. IUID will ensure that disposal officials issue the correct item and decrease the amount of time and effort currently necessary to perform item research. More importantly, UII will enable disposal officials to identify items that are not to be released to the public (e.g. F-14 parts).

ii. Risk

1. Political

Per the Arms Export Control Act (AECA) and Foreign Assistance Act (FAA), the U.S. government has a continual responsibility, from time of title transfer until eventual disposal, to ensure defense articles and services sold and/or transferred to foreign countries are being used for their intended purposes. Using the UII will help ensure items are correctly identified prior to release and enable appropriate tracking after sale/transfer.

In addition, the IUID program will facilitate standardized processes for sharing information across the lifecycle of an item up through item disposal. When an IUID item is disposed of as being counterfeit and/or non-conforming, this node will record that to help prevent the inadvertent reentry of that item into the supply system and the risk that that would entail.

UII will enable disposal officials to identify items that are not to be released to the public (e.g. F-14 parts) and avoid the political risk of inadvertent disclosure.

iii. Quality—Materiel and Data

UIIs, when correctly assigned upon item manufacture, provide the granularity and accuracy of item information necessary to manage this population of items correctly.

Appendix C

Logistics Item Unique Identification Task Force

Product Lifecycle Management Value Chain IUID Benefit Analysis

Final Working Paper

February 3, 2010

Prepared by the
Product Lifecycle Management Value Chain Working Group

CONTENTS

LIST OF AUTHORS

Members of this value chain included the following:

- Army: Steve Hayes
- Navy: Chuck Obrien, Jerry Zamer
- Air Force: Greg Beecher
- LMI: Walt Atchley

All of the above contributed to the effort.

Walt Atchley was the principal author of this document.

Product Lifecycle Management Value Chain IUID Benefit Analysis

1. SUMMARY

a. PLM Value Chain Definition

The Product Lifecycle Management IUID Value Chain proposition focuses on using IUID to improve total lifecycle management of systems, components, and items. By using Unique Individual Identifiers (UII) for serial item management, more timely, accurate, reliable and actionable information can be obtained to improve maintenance and material management. The benefits derive from harvesting the serial item data made possible through IUID and utilizing the data to make Product Lifecycle Management programs more effective.

The PLM Team identified twelve primary Tier 2 programs within the PLM Value Chain:

- Reliability Centered Maintenance (RCM)
- Conditioned Based Maintenance Plus (CBM+)
- Total Ownership Cost (TOC) Management
- Reliability, Availability and Maintainability (RAM) Planning and Analysis
- Maintenance Planning and Engineering
- Precision Maintenance (Improved maintenance processes)
- Warranty Management
- Configuration Management
- Safety Management
- Controlling counterfeit parts
- Demilitarizing condemned items
- Other Material Management Efficiencies

b. Approach

The PLM Team estimated benefits across all value chain nodes. To minimize the risk of double-counting benefits of overlapping programs, the eleven Tier 2 programs were grouped into three broad categories, namely: SIM Tier 2, Logistics Planning Tier 2, and Material Management

Tier 2. Benefits for each of these categories were then estimated in terms of Readiness, Savings, and Risk. Appendix A provides more detail on the methodology used to estimate benefits.

c. Results

Estimated benefits are rough order of magnitude (ROM) across all nodes based largely on anecdotal data. The total estimated PLM Value Chain benefits are as follows:

- Readiness: 3%–6% improvement.
- Savings: $3 billion–$5 billion annually
- Risk: minimal reduction, primarily in safety.

2. BENEFITS FROM NODE COST ANALYSIS

No Nodal Team Provided Estimated Benefits to the PLM Team

3. ISSUES

The PLM benefit estimates are predicated on certain assumptions listed in Appendix A, the most important of which is that DoD will implement the necessary business process improvements and system changes to realize the full potential of IUID. If this or other of the assumptions prove invalid, the potential benefits estimated by the team would likely not be fully realized.

4. CONCLUSION

IUID implementation offers the DoD the potential for substantial benefits through the expansion of PLM programs if it is properly implemented. Assigning IUID's to new and legacy items will eventually result in unique serial numbers for most DoD equipment and reparable assets. By implementing the necessary MIS changes and business process improvements to capture, integrate, and intelligently utilize maintenance and operating data recorded primarily through maintenance transactions, DoD can achieve significant reliability and maintainability improvements and some material management improvements. The PLM Team estimates that IUID PLM implementation could produce weapon system/equipment readiness improvements between 4% to 6%, savings between $3 billion to $5 billion annually, and minimal reductions in safety and other risks.

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- United States Air Force Serial Number Tracking Business Case Analysis dated 10 February 2004
- U.S. General Accounting Office, Defense Inventory, Navy Logistics Strategy and Initiatives Need to Address Spare Parts Shortages, GAO/NSIAD-03-708 (Washington, DC: June 27, 2003)
- DODI 4151.19, Serialized Item Management (SIM) for Material Maintenance
- DODI 8320.04, IUID Standards for Tangible Personal Property
- DODI 5000.02, Operation of Defense Acquisition
- DFAR 211.274 Item Identification and Valuation Requirements
- DoD 5000.64, Accountability and Management of DoD-Owned Equipment and Other Accountable Property
- DODI 5151.22, CBM+ for Materiel Maintenance
- DODI 4151.18, Maintenance of Military Materiel
- MIL-STD 129 marking requirements in plans/contracts

APPENDIX A. PLM VALUE CHAIN BENEFITS ESTIMATION METHODOLOGY

1. To minimize the risk of double-counting benefits of similar Tier 2 programs that sometimes overlap, the PLM Team grouped the eleven PLM Tier 2 programs into the three broad categories listed below:
   - Serial Item Management (SIM) Tier 2 Programs
     - Reliability Centered Maintenance (RCM)
     - Conditioned Based Maintenance Plus (CBM+)
     - Total Ownership Cost (TOC) Management
   - Logistics Planning Tier 2 Programs
     - Reliability, Availability and Maintainability (RAM) Planning and Analysis
     - Maintenance Planning and Engineering
     - Precision Maintenance (Improved maintenance processes)
   - Material Management Tier 2 Programs
     - Warranty Management
     - Configuration Management
     - Safety Management
     - Controlling counterfeit parts
     - Demilitarizing condemned items
2. PLM Benefits were estimated across the entire value chain. No attempt was made to isolate benefits by node to avoid potentially double-counting overlaps across nodes. Among the Value Chain Nodes, PLM value chain benefits derive primarily from improvements in maintenance management and, to a lesser extent, material management. PLM data is captured largely through maintenance transactions for equipment and reparable items in the Field Maintenance and Depot Maintenance nodes, and operational data obtained from the Field Activities and Operations node. The benefits of the UII data are derived primarily by analyzing the data in the In-service Engineering and Logistics Analysis node. The benefits of the Material Management Tier 2 Programs are derived largely in the supply nodes and were estimated to be much less than the SIM Tier 2 and Logistics Planning Tier 2 Programs.

The following are examples of how of serial item data can produce PLM benefits:

- Reduced Total Ownership Cost (RTOC)–through analysis of serialized repair data, the root causes of failure modes can lead to the most cost effective reliability and maintainability solutions for both part number families and individual serial parts.

- Bad Actor Identification -IUID maintenance and operational data can be used to identify specific unserviceable reparable carcasses that fail and are repaired disproportionately to the population of the same items.

- Resolving Cannot-duplicate (CND)/No Faults Found (NFF)–through analysis of serialized repair data at field and depot-level maintenance, resources can be focused to identify the causes of CND/NFF.

- Test Station Anomaly Investigation–through analysis of historical test station results, insights can be gleaned into the history of a particular tester. By comparing test results at each level of testing, test anomalies among testers can be identified and resolved.

- Source of Repair Cost and Performance Comparisons–analysis of serialized repair data enables the identification of maintenance activities which are performing poorly so that corrective actions can be taken, and conversely, the identification of maintenance activities which are performing the best so that they can be emulated.

- Predictive Maintenance–through analysis of serial item maintenance and operational data, RCM and CBM+ programs can better predict when items are likely to fail and when preventive maintenance should be optimally scheduled, thus improving supply and maintenance planning, reducing the risk of catastrophic failures, and increasing readiness.

- Material Management–tracking of items by serial number can reduce the probability that the DoD will unknowingly repair or dispose of items under warranty, enable more accurate configuration management and Bills of Materials (BOMs), increase the accuracy on data on life-limited and other critical safety items, reduce the chances of counterfeit parts being utilized, and increases the likelihood that items requiring demilitarization will receive proper disposition.

3. The PLM Team grouped PLM benefits as follows:

- Readiness

  - Reliability

  - Maintainability, and

  - Availability.

- Savings
    - Maintenance labor reductions–both in the field and at the depots, organic and contractor, and in maintenance planning and in maintenance execution.
    - Material reductions–fewer spare and repair parts required; less material required during maintenance.
    - Transportation reductions–less frequent shipments of failed equipment and reparables to depot maintenance.
- Risk Reduction
    - Safety improvements, e.g., for log book and flight safety items
    - Environmental health and safety
    - Political, e.g., less risk of being on the front page of the Washington Post or New York Times

4. In developing benefit estimates, the PLM Team's predicated them on the following assumptions:
    - DoD will implement the necessary business process improvements and system changes to realize the full potential of IUID. In other words, IUID will be implemented the way it should to be fully successful.
    - While the number of items with serial numbers will increase exponentially through IUID, at any one time the number of serially-item managed (SIM) items may not.
    - The number of in-service engineers and logistics analysts may not increase significantly with IUID. If the number of personnel does not increase, however, improved management information systems (MIS) will be necessary to enable these personnel to perform SIM more efficiently and effectively than with current SIM programs. For example, MIS will need to be programmed to use serial-item data to identify automatically items and maintenance activities that will benefit the most from SIM attention.
    - The increase of serial item data through IUID will enhance the implementation of PLM Tier 2 programs by enabling them to be implemented on a much broader scale than under current SIM programs.
    - All estimates of PLM benefits are predicated on IUID being fully implemented at maturity, notionally about 2020 or beyond. No attempt was made to estimate benefits prior to full implementation.

5. The PLM Team's estimates are rough order of magnitude. They are based on informed judgments of PLM/SIM Subject Matter Experts (SME) and data that was largely anecdotal. The data includes examples of improvements and savings achieved through limited applications of PLM Tier 2 programs and serial item management. While the examples themselves did not directly produce the Team's estimates, together they appear to validate that the Team's estimates are reasonable. Examples are as follows:

   - Through the use of serialized maintenance data and a combination of PLM programs, the Air Force's F-16 Falcon Flex program achieved $123 million in repair savings over a ten-year period. The program projects savings of nearly $1B over the life of the program.[1]

   - Through the application of CBM+ programs to 15 parts on the AH-64, the Army achieved a 5.2% readiness improvement and a reduction of 41K maintenance man hours annually, the equivalent of the man hours required to support an additional AH64 Battalion. Similarly, application of CBM+ to the UH-60 improved readiness by 4.4% and reduced maintenance requirements by 35,750 hours annually, the maintenance equivalent of two additional battalions.[2]

   - By utilizing RCM and serial item management in NAVAIR's Engine Reliability Improvement Program (ERIP), the Navy was able to triple the time on wing for the T58 engine used on the H-46, and double the time on wing for the T64 engine used on the H-53.[3]

   - An Air Force Business Case Analysis of Serial Number Tracking indicated that serial number tracking programs in industry have resulted in parts reductions as high as 50%. The Air Force BCA estimated that the Air Force would conservatively save between 1%–5% of their annual spares budget through SIM, i.e., $204M to $1B annually in FY 04 dollars.[4]

   - The Air Force Business Case Analysis cites an earlier Navy study that found that that 10% of retrograde shipments were for items still under warranty, indicating that serial item tracking could significantly improve accountability and warranty management.[5]

   - According to a 2003 GAO Report, the Navy budgeted $58 million over five years to implement Serial Item Management using contact memory buttons, which the Navy anticipated would produce $193 million in net savings over seven years, primarily through reduced spares loss.[6]

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[1] F-16 Falcon Flex White Paper by C. Nathan Howard, 2d Lt, USAF, dated 3 December 2009 and ARINC Falcon Flex Briefing dated March 2007.

[2] "Implementing CBM Today" Briefing, Army PEO for Aviation, dated 16 June 2005.

[3] ADUSD (L&MR) MPP, G. Kilchenstein email, Subject: T58/T64 ERIP Benefits, dated 30 November 2009.

[4] United States Air Force Serial Number Tracking Business Case Analysis dated 10 February 2004.

[5] Ibid.

[6] U.S. General Accounting Office, Defense Inventory, Navy Logistics Strategy and Initiatives Need to Address Spare Parts Shortages, GAO/NSIAD-03-708 (Washington, DC: June 27, 2003).

6. The PLM then estimated the readiness, savings and risk benefits for each of the three groups of PLM Tier 2 programs described above. Estimated benefits were made across all nodes based on largely on anecdotal data benefit estimates from PLM and other serial item management programs.
   - Serial Item Management (SIM) Tier 2 Programs
     - Readiness (2%–4% improvement)
     - Savings (3%–5% reduction in maintenance labor and material costs, and retrograde shipping costs)
     - Risk—minimal reduction
   - Logistics Planning Tier 2 Programs
     - Readiness (0.5%–1% improvement)
     - Savings (0.5%–1% reduction in maintenance labor and material costs, and retrograde shipping costs)
     - Risk Reduction—minimal
   - Material Management Tier 2 Programs
     - Readiness (less than 0.5% improvement)
     - Savings (0.2%–0.5% reduction in maintenance labor and material costs, and retrograde shipping costs)
     - Risk Reduction—minimal
   - Totals All Tier 2 PLM Programs (Estimates are rounded to whole numbers)
     - Readiness (3%–6% improvement).
     - Annual Savings $3billion–$5 billion (4%–6% reduction in field and depot maintenance labor and material costs, and retrograde shipping costs). Based on FY08 total costs of DoD field and depot level maintenance ($83 billion), and FY09 estimated DoD retrograde transportation costs ($192 million).
     - Risk–minimal reduction.

Logistics Item Unique Identification Task Force

Acquisition Logistics Planning Node
IUID Cost Analyses

Final Working Paper

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Prepared by the
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CONTENTS

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Acquisition Logistics Planning Node IUID Cost Analyses

1. SUMMARY

Our analyses resulted in Acquisition Logistics Planning (ALP) Node Item Unique Identification (IUID) implementation planning non-recurring delta costs of approximately $702 million. We estimate that these non-recurring delta costs would be incurred over a notional 5 years. These delta costs include decrements for IUID implementation planning already completed and for current Service Serialized Item Management (SIM) planning costs. Starting in year two, this Node would also incur estimated recurring planning costs of $157 million annually for total delta costs through a notional five-year period of about $1.3 billion. All of these costs are labor costs related to IUID implementation planning activities, which encompasses contracted efforts. There is no ALP Node equipment or training costs as there is no Value Chain marking or tracking requirements at the ALP Node.

The non-recurring costs are for existing acquisition programs IUID Implementation Plan preparation and distribution, non-recurring engineering planning and for program-related automated information systems (AIS)/automatic identification technology (AIT) integration planning. The recurring costs are for annual updates of existing acquisition program IUID implementation plans, as necessary, and the initial IUID implementation planning activities of newly established acquisition programs.

2. PROCESS TO BE UNDERTAKEN AND VALUED

The processes undertaken and valued by the ALP Node Working Group are the program management processes to define logistics requirements for life cycle management of weapon systems and subsystems. These program management processes are performed by Acquisition Category (ACAT) I, II, and III programs. Size, complexity, and risk will generally determine the category of an acquisition program. Department of Defense Instruction (DoDI) 5000.02 states that programs shall plan for and implement IUID and the planning and implementation shall be documented in an IUID Implementation Plan. DoD Instruction 8320.04 requires the IUID Implementation Plan at Milestone A, B, and C. The ALP Node Working Group estimated the costs associated with new acquisition program IUID implementation planning activities to include developing and updating IUID implementation plans, which encompasses contracted efforts.

3. APPROACH TO DETERMINE RETURN ON INVESTMENT

The ALP Node Working Group considers the return on investment to be the benefits gained through full IUID implementation across all the nodes using AIS/AIT and the costs associated with ALP Node IUID implementation planning activities. The benefits will accrue to other node processes across the Value Chains rather than directly to the ALP Node.

4. ASSUMPTIONS

- The ALP Node Working Group only considered new acquisition program IUID implementation planning activates.
- The ALP Node Working Group did not consider the costs of applying the mark.
- PB-10 is the baseline for delta cost determination.
- Calculations assume that program waivers to the policy requirement for IUID implementation will not be granted.
- Costs and benefits are evaluated using current policy.
- The ALP Node Working Group did consider the planning costs for integrating IUID into AIT/AIS for items for which the acquisition programs are responsible. This did not include the costs to modify AIS to handle UII.

5. EXECUTION

Non-recurring IUID implementation planning by existing acquisition programs will occur over some number of years rather than in a single year. For estimating purposes, the ALP Node Working Group used a notional initial implementation period of 5 years and decremented those costs by estimated current Service SIM planning costs and the estimated costs of IUID implementation planning already completed. Starting in the second year of the notional 5 year-period, newly established acquisition programs will develop IUID Implementation Plans, existing acquisition programs will update their IUID Implementation Plans as needed and non-recurring engineering (NRE) will occur for new NIINs.[1]

6. ESTIMATED COSTS[2]

The ALP Node Working Group identified 6 planning activities that are required to accomplish the 43 validated Value Chain requirements placed on the ALP Node. These planning activities are:

1. Program IUID Implementation Plan preparation and distribution (staffing time varies and is not included in our analyses)
2. AIS integration planning (what AIS would be affected by IUID implementation on items for which the acquisition program is responsible and the method of integration if necessary) this is a major input to the plan
3. Program IUID Implementation Plan updates
4. Requirements determination (identifying which NIINs need to be UII marked)

[1] NIIN = National Item Identification Number; includes NIINs for planned increments.

[2] Our cost estimating approach leverages LMI report "*Item Unique Identification (IUID) Non-Recurring Investment Costs Within the DoD Maintenance Enterprise*", 2005 by Steve Heilman.

5. Engineering analyses (selecting where to mark items, analyzing the engineering impact on the item, and what technology to use)
6. Drawing/repair specification updates

Assumptions for Estimating Costs

The ALP Node Working Group estimated that existing acquisition programs would initially need to evaluate 375,000 weapons system-related personal property NIINs that are likely candidates for IUID marking (includes embedded items). This initial evaluation of NIINs for which the existing acquisition programs are responsible would not occur in a single year but would occur over a notional 5 years. Life-cycle management responsibility for these NIINs is distributed among 161 major programs (ACAT I)[3] and 500 less-than-major programs (ACAT II and below)[4] within DoD as follows:

- Major programs = 100,000 NIINs (621 each)
- Less-than-major programs = 275,000 NIINs (550 each)

Each program will prepare and publish an IUID Implementation Plan for the NIINs over which it has cognizance. Contained within each IUID plan are the budget estimates for infrastructure, manpower, and training requirements. Estimated average times for the identified 6 planning activities are:

- Plan preparation and distribution:
  - Major program IUID plan = 160 hrs
  - Less-than-major program IUID plan = 140 hrs
- Program AIS integration planning[5]
  - Major program = 80 hours
  - Less-than-major program = 40 hours
- Annual plan updates/distribution, if necessary, (approximately 10 percent of existing program plans will need to be updated each year at 50 percent of the initial planning time)
  - Major program IUID plan = 80 hrs
  - Less-than-major program IUID plan = 70 hrs

[3] The number of ACAT I programs on the Major Defense Acquisition Program list as of December 16, 2009 provided by ODASD (MR).

[4] The Defense Acquisition Management Information Retrieval (DAMIR) system showed 500 ACAT II and below programs on December 7, 2009.

[5] From one program manager's perspective, there are so few AIS in the DoD that use UII that this planning area has received little effort.

- Requirements determination = .5hr/NIIN
- Engineering analyses = 4hrs/NIIN
- Drawing/repair specification updates = 8hrs/NIIN.

In order for programs to meet their IUID responsibilities, the following program planning investments are required:

- Program IUID implementation plan preparation and distribution and annual plan updates (if necessary) (@$100/labor hour)
- Program AIS integration planning (@$100/labor hour)
- Requirements determination (@$150/labor hour)
- Engineering analyses (@$200/labor hour)
- Drawing/repair specification updates (@$150/labor hour).

Methodology

Using our assumptions, the ALP Node Working Group estimated the costs of the 6 planning activities required to satisfy the 43 validated Value Chain requirements placed on the ALP Node. The Working Group estimated four sets of costs:

- Baseline non-recurring IUID implementation planning costs
- Decremented non-recurring IUID implementation planning costs; the baseline non-recurring IUID implementation planning costs decremented by estimates for current planning costs to approximate the non-recurring delta costs
- Recurring IUID implementation planning costs
- Delta IUID implementation planning costs; the decremented/delta non-recurring IUID implementation planning costs plus the recurring implementation planning costs.

Baseline Non-Recurring IUID Implementation Planning Costs

The ALP Node Working Group was asked to estimate delta costs. Before we could estimate the delta costs, we first had to estimate the baseline non-recurring IUID implementation planning costs. Baseline costs are incurred by existing new acquisition programs. Using our assumptions (see Appendix A for the details of our calculations), the baseline non-recurring planning costs for IUID implementation by the major acquisition programs and less-than major acquisition programs are:

Planning Activities	Major Program	Less-than Major Program	Totals
Plan Preparation & Distribution	$2,576,000	$7,000,000	$9,576,000
AIS Integration Planning	$1,288,000	$3,500,000	$4,788,000
Requirements Determination	$7,500,000	$20,625,000	$28,125,000
Engineering Analysis	$80,000,000	$220,000,000	$300,000,000
Drawing/Repair Spec Updates	$120,000,000	$330,000,000	$450,000,000
Totals	$211,364,000	$581,125,000	$792,489,000

Decremented Non-Recurring IUID Implementation Planning Costs

To approximate delta costs, we had to decrement our estimated baseline non-recurring IUID implementation planning costs by estimated costs for current planning activities. The first decrement is the estimated cost of non-recurring IUID implementation planning activities already completed.

The DoD guidance required that ACAT I programs complete an IUID implementation plan by 2008. As of April 2008, all ACAT I programs had completed an IUID Implementation Plan as well as 96 percent of ACAT II and below programs.[6] Because few AIT/AIS are UII capable, acquisition programs find it hard to justify the resources needed for IUID implementation planning. Therefore, we estimated that 25 percent of ACAT I programs and 5 percent of ACAT II and below programs have completed the IUID implementation planning activities.

[6] Estimates provided by the Unique Identification and Information Assurances Office, Director, Defense Procurement, AT&L.

Based on these additional assumptions, we decremented the baseline non-recurring IUID implementation planning costs for the major programs and less-than major programs by the estimated costs of IUID implementation planning activities that are already completed (see Appendix A for the details of our calculations). These decremented non-recurring costs are:

Planning Activities		**Major Program**		**Less-than Major Program**	**Totals**
Plan Preparation & Distr		*Done*	(4%)	$280,000	$280,000
AIS Integration	(75%)	$966,000	(95%)	$3,325,000	$4,291,000
Requirements Determination	(75%)	$5,625,000	(95%)	$19,593,750	$25,218,750
Engineering Analysis	(75%)	$60,000,000	(95%)	$209,000,000	$269,000,000
Drawing/Repair Spec Updates	(75%)	$90,000,000	(95%)	$313,500,000	$403,500,000
Totals		$156,591,000		$545,698,750	$702,289,750

To more closely approximate delta costs, we further decremented our estimated baseline non-recurring IUID implementation planning costs by the estimated costs to develop the current Service SIM plans.

We asked each Service to estimate the costs of their current SIM planning efforts. The Services reported one-time costs totaling $486,000. The estimated one-time costs for current SIM planning reported by each Service[7] are:

- Air Force estimated $50K one-time costs
- Department of the Navy approximated $360K one-time costs
- Army estimated $76K one-time costs

After decrementing the estimated baseline non-recurring IUID implementation planning costs by the estimated costs for the IUID implementation planning activities already completed and by the estimated costs to develop the current Service SIM plans, the estimated delta non-recurring IUID implementation planning costs are $701,803,750. These delta non-recurring IUID implementation planning costs would be incurred over a notional five years rather than in a single year.

Recurring IUID Implementation Planning Costs

Each year, approximately 8 to 13 new major programs are established (we used 10 programs or 6 percent in our calculations) and about 40 to 50 new less-than-major programs are established (we used 45 programs or 9 percent in our calculations).[8] Newly established programs must invest in initial IUID implementation planning and are recurring costs of IUID implementation. In addition, 10 percent of existing program IUID Implementation Plans will need to be updated each year. Updating existing plans is estimated to require 50 percent of the time that was required to initially develop the plan and is a second recurring cost of IUID implementation. In addition, an

[7] Estimates were provided by the IUID Task Force Service representative or those they designated to provide the input.

[8] These estimates were provided by Office of the Under Secretary of Defense, Acquisition Technology and Logistics, Portfolio Systems Acquisition Office.

estimated 75K new NIINs are acquired each year.[9] Non-recurring engineering of new NIINs is a third recurring cost. Based on these additional assumptions (see Appendix A for the details of our calculations), we estimated the annual recurring costs for IUID implementation planning by major programs and less-than major programs is:

Planning Activities		Major Program		Less-than Major Program	Totals
Plan Updates(10 % @ 50% hrs)		$128,000		$350,000	$478,000
Plan Preparation & Distribution	(6%)	$160,000	(9%)	$630,000	$790,000
AIS Integration	(6%)	$80,000	(9%)	$315,000	$395,000
Requirements Determination	(75K)	$1,500,000	(75K)	$4,125,000	$5,625,000
Engineering Analysis	(75K)	$16,000,000	(75K)	$44,000,000	$60,000,000
Drawing/Repair Spec Updates	(75K)	$24,000,000	(75K)	$66,000,000	$90,000,000
Totals		$41,868,000		$115,420,000	$157,288,000

Delta IUID Implementation Planning Costs

The delta IUID implementation planning costs include decremented non-recurring IUID implementation planning costs that the ALP Working Group estimated would be incurred over a notional 5 years plus annual recurring implementation planning costs incurred starting in year 2 and continuing each year for as long as IUID is used. The delta IUID implementation planning costs for a notional five-year period are:

Cost Categories	Year 1	Year 2	Year 3	Year 4	Year 5	Five-Year Totals
Delta Non-Recurring	$140,360,750	$140,360,750	$140,360,750	$140,360,750	$140,360,750	$701,803,750
Annual Recurring	—	$157,288,000	$157,288,000	$157,288,000	$157,288,000	$629,152,000
Totals by Year	$140,360,750	$297,648,750	$297,648,750	$297,648,750	$297,648,750	$1,330,955,750

For the notional five-year period, the delta IUID implementation planning costs are estimated to total $1.3 billion. After the notional five years, recurring planning costs of $157 million continue to incur annually.

[9] Data source: SLIS DC-79 4th Qtr Additions/Deletions Report.

7. AFFECTED SYSTEMS

The following major Service AIS would be affected by IUID implementation and would need to be modified to handle the UII (list below is not all inclusive). Our cost estimate includes acquisition program planning for AIS integration for the items for which they are responsible and not the costs for AIS modifications to handle UII.

1. Army
    - ULLS (Unit Level Logistics System)–Ground
    - ULLS–Aviation
    - Standard Army Maintenance System–Enhanced (SAMS-E) (replacement for ULLS–G)
    - SAMS–Standard Army Maintenance System
    - LMP (Logistics Modernization Plan)
2. Air Force:
    - Expeditionary Combat Support System (ECSS) (Log ERP)
3. Navy/Marine Corps
    - Naval Aviation Logistics Command Management Information System (NALCOMIS)
    - Standard Navy Maintenance and Material, Management Systems (3-M)

8. BENEFITS

The anticipated benefits gained through full IUID implementation across all the nodes using AIS/AIT will accrue to other node processes across the Value Chains rather than directly to the ALP Node.

9. ISSUES

The only issue that the ALP Working Group has is the number of assumptions we had to make due to a lack of empirical data.

10. CONCLUSIONS

The ALP Node Working Group has concluded that the anticipated benefits gained through full IUID implementation across all the nodes using AIS/AIT are worth the estimated recurring and non-recurring costs incurred at the ALP Node.

APPENDIX A. IUID IMPLEMENTATION PLANNING COST CALCULATIONS

This appendix provides the cost calculations for each planning activity by major acquisition programs (Acquisition Category (ACAT) I) and less-than major acquisition programs (ACAT II and below).

Baseline Non-Recurring IUID Implementation Planning Costs

Based on our assumptions for estimating costs (see page 4), the baseline non-recurring costs for IUID implementation by existing acquisition programs is estimated to be approximately $792,489,000. We estimate that these baseline costs would not be incurred in a single year but rather over a notional 5 years at approximately $158,497, 800 per year. The existing acquisition programs estimated baseline IUID implementation planning costs are:

1. The major acquisition programs would incur baseline non-recurring costs of approximately $211,364,000 for five planning activities. These costs by planning activity are:

    - IUID implementation plan preparation and distribution: $2,576,000 [25,760 hours (161 plans × 160hrs) × $100/hr]
    - Automated information system (AIS) integration planning: $1,288,000 [12,880 hours (161 plans × 80hrs) × $100/hr]
    - Requirements determination: $7,500,000 [50,000 hours (.5hrs/NIIN × 100,000 NIINs) × $150/hour]
    - Engineering analyses: $80,000,000 [400,000 hours (4hrs/NIIN × 100,000 NIINs) × $200/hr]
    - Drawing/repair specifications updates: $120,000,000 [800,000 hours (8hrs/NIIN × 100,000 NIINs) × $150/hr]

2. The less-than-major acquisition programs would incur baseline non-recurring costs of approximately $581,125,000 for five planning activities. These costs by planning activity are:

    - IUID implementation plan preparation and distribution: $7,000,000 [70,000 hours (500 plans × 140hrs) × $100/hr]
    - AIS integration planning: $3,500,000 [35,000 hours (500 plans × 70hrs) × $100]
    - Requirements determination: $20,625,000 [137,500 hours (.5hrs/NIIN × 275,000 NIINs) × $150/hour]
    - Engineering analyses: $220,000,000 [1,100,000 hours (4hrs/NIIN × 275,000 NIINs) × $200/hr]
    - Drawing/repair specifications updates: $330,000,000 [2,200,000 hours (8hrs/NIIN × 275,000 NIINs) × $150/hr]

Decremented Non-Recurring IUID Implementation Planning Costs

As of April 2008, all ACAT I programs had completed an IUID Implementation Plan as well as 96 percent of ACAT II and below programs.[10] Because few if any AIT/AIS are UII capable, acquisition programs find it hard to justify the resources needed for IUID implementation planning. Therefore, we estimated that 25 percent of ACAT I programs and 5 percent of ACAT II and below programs have completed the IUID implementation planning activities.

Based on the data provided and our assumptions, we estimated that the delta non-recurring costs for IUID implementation planning by existing acquisition programs are approximately $702,289,750. We estimated that this delta cost would be incurred over a notional 5 years at approximately $140,457, 950 per year. The existing acquisition programs estimated delta non-recurring planning costs are:

1. Major acquisition programs would incur decremented non-recurring costs of approximately $156,591,000 for six planning activities:
   - IUID implementation plan preparation and distribution: completed
   - Automated information system (AIS) integration planning: $966,000 [9,660 hours (12,880 hours (161 plans × 80hrs) × .75) × $100/hr]
   - Requirements determination: $5,625,000 [37,500 hours (50,000 hours (.5hrs/NIIN × 100,000 NIINs) × .75) × $150/hour]
   - Engineering analyses: $60,000,000 [300,000 (400,000 hours (4hrs/NIIN × 100,000 NIINs) .75) × $200/hr]
   - Drawing/repair specifications updates: $90,000,000 [(800,000 hours (8hrs/NIIN × 100,000 NIINs) × .75) × $150/hr]
2. Less-than-major acquisition programs would incur decremented non-recurring costs of approximately $545,698,750 for six planning activities:
   - IUID implementation plan preparation and distribution: $280,000 [2,800 (70,000 hours (500 plans × 140hrs) × .04) × $100/hr]
   - AIS integration planning: $3,325,000 [33,250 (35,000 hours (500 plans × 70hrs) × .95) × $100]
   - Requirements determination: $19,593,750 [137,500 hours (130,625 (.5hrs/NIIN × 275,000 NIINs) × .95) × $150/hour]
   - Engineering analyses: $209,000,000 [1,045,000 (1,100,000 hours (4hrs/NIIN × 275,000 NIINs) × .95) × $200/hr]
   - Drawing/repair specifications updates: $313,500,000 [2,090,000 (2,200,000 hours (8hrs/NIIN × 275,000 NIINs) × .95) × $150/hr]

[10] Estimates provided by the Unique Identification and Information Assurances Office, Director, Defense Procurement, AT&L

We then asked each Service to estimate the costs of their current SIM planning efforts. The estimated one-time costs for current SIM planning reported by each Service[11] are:

- Air Force estimated $50K
- Department of the Navy approximated $360K
- Army estimated $76K

The Services reported total one-time costs of $486,000 ($50,000 + $360,000 + $76,000). We subtracted the Services one-time costs for current SIM planning from the non-recurring IUID implementation planning costs previously decremented for IUID implementation planning activities already completed ($702,289,750 − $486,000). This yielded approximated non-recurring IUID implementation planning delta costs of $701, 803,750. We estimate that these delta non-recurring IUID implementation planning costs would be incurred over a notional five years at approximately $140,457,950 per year rather than in a single year.

Recurring IUID Implementation Planning Costs

Each year, approximately 8 to 13 new major programs are established (we used 10 programs or 6 percent in our calculations) and about 40 to 50 new less-than-major programs are established (we used 45 programs or 9 percent in our calculations).[12] Newly established programs must invest in initial IUID implementation planning and are recurring costs of IUID implementation. In addition, 10 percent of existing program IUID Implementation Plans will need to be updated each year. Updating existing plans is estimated to require 50 percent of the time that was required to develop the plan and is a second recurring cost of IUID implementation. In addition, an estimated 75K new NIINs are acquired each year.[13] Non-recurring engineering of new NIINs is a third recurring cost. Based on these additional assumptions, we estimated the annual recurring costs for IUID implementation planning by acquisition programs is approximately $157,288,000.

The annual recurring costs by major programs and less-than major programs are:

- Major programs would incur recurring annual costs of approximately $41,868,000 for six planning activities:
  - IUID implementation plan preparation and distribution: $160,000 [1,600 hours (161 × .06 = 9.66 or 10 plans × 160hrs) X $100/hr]
  - AIS integration planning $80,000 [800 hours (10 plans × 80hrs) × $100/hr]
  - IUID implementation plan updates: $128,000 [1,280 hours (161 × .10 = 16 plans × 80hrs) × $100/hr]

[11] Estimates were provided by the IUID Task Force Service representative or those they designated to provide the input.

[12] These estimates were provided by Office of the Under Secretary of Defense, Acquisition Technology and Logistics, Portfolio Systems Acquisition Office.

[13] Data source: SLIS DC-79 4th Qtr Additions/Deletions Report.

- Requirements determination: $1,500,000 [10,000 hours (.5hrs/NIIN × 20,000 new NIINs per year) × $150/hour]
- Engineering analyses: $16,000,000 [80,000 hours (4hrs/NIIN × 20,000 new NIINs per year) × $200/hr]
- Drawing/repair specifications updates: $24,000,000 [160,000 hours (8hrs/NIIN × 20,000 new NIINs per year) × $150/hr]

- Less-than-major programs would incur recurring annual costs of approximately $115,420,000 for six planning activities:
  - IUID implementation plan preparation and distribution: $630,000 [6,300 hours (500 × .09 = 45 plans × 140hrs) × $100/hr]
  - AIS integration planning $315,000 [3,150 hours (45 plans × 70hrs) X $100]
  - IUID implementation plan updates: $350,000 [3,500 hours (500 plans × .10 = 50 plans × 70hrs) × $100]
  - Requirements determination: $4,125,000 [27,500 hours (.5hrs/NIIN × 55,000 new NIINs per year) × $150/hour]
  - Engineering analyses: $44,000,000 [220,000 hours (4hrs/NIIN × 55,000 new NIINs per year) × $200/hr]
  - Drawing/repair specifications updates: $66,000,000 [440,000 hours (8hrs/NIIN × 55,000 new NIINs per year) × $150/hr]

Delta IUID Implementation Planning Costs

IUID implementation planning delta costs include non-recurring IUID implementation planning decremented costs estimated previously plus annual recurring implementation planning costs estimated above. The ALP Node Working Group projected that one-fifth of the delta non-recurring IUID implementation planning costs would be incurred in each year of a notional five-period rather than in a single year. The Working Group further estimated that starting in year 2 of the notional 5 year-period, annual recurring costs are also incurred and would continue each year for as long as IUID is used. The estimated delta IUID implementation planning costs for each year of a notional five-year period are:

Cost Categories	Year 1	Year 2	Year 3	Year 4	Year 5	Five-Year Totals
Delta Non-Recurring	$140,360,750	$140,360,750	$140,360,750	$140,360,750	$140,360,750	$701,803,750
Annual Recurring	—	$157,288,000	$157,288,000	$157,288,000	$157,288,000	$629,152,000
Totals by Year	$140,360,750	$297,648,750	$297,648,750	$297,648,750	$297,648,750	$1,330,955,750

For the notional five-year period, the delta IUID implementation planning costs are estimated to total $1.3 billion. After the notional five years, recurring planning costs of $157 million continue to incur annually for as long as IUID is used.

APPENDIX B. APPLICABLE GOVERNING POLICIES

The governing policies that are applicable to the ALP Node for IUID are as follows:

- DoDI 5000.02 Operation of the Defense Acquisition System
  - Planning for entering full cost of item in IUID registry upon delivery– Encl 2, Para 7.c(4)
  - IUID Implementation plan – summarized in SEP at MS A, annex to SEP at MS B and MS C – Encl 4, Table 3
- DoDI 8320.04 IUID Standards for Tangible Personal Property
  - Incorporates DFAR 211.274 requirements (see below)
  - Planning that includes provision for GFP
  - Planning for marking standardization in accordance with Mil-Std-129 and Mil-Std-130
- DoDI5000.64 Accountability and Management of DoD-Owned Equipment and Other Accountable Property
  - Planning for mandatory use of AIT – Para 6.1.2
  - Planning for GFP – Para 6.3 and 6.4
- DFARS 211.274 Item Identification and Valuation Requirements
  - Planning for UII of all delivered items of $5,000, or more
  - Planning for UII of items that are serially managed, mission essential, controlled inventory, or if the requiring activity determines a UII is required
- DoD Directive 8320.03 Unique Identification (UID) Standards for a Net-Centric DoD
  - Planning that accounts for data exchange standards
- DoD 4140.1-R DoD Supply Chain Materiel Management Regulation
  - Planning for system design to accommodate a Unique Item Identifier (UII) for individual assets – C5.7.3.2.8
  - Planning for Unique Item Tracking (UIT) program, as appropriate – C5.7.3.2.7.

Logistics Item Unique Identification Task Force

Acquisition Suppliers Node
IUID Cost Analysis

Final Working Paper

December 21, 2009

Prepared by the
Acquisition Suppliers Node Working Group

CONTENTS

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Acquisition Suppliers Node
IUID Cost Analysis

1. SUMMARY

The primary focus of the Acquisition Suppliers node is the business areas of wholesale asset management and procurement/acquisition. While benefits to wholesale asset management are qualified in this node, they are not significant in comparison to the Maintenance Community. Based on input from the Acquisition Community, they do not foresee benefits. This node determined the cost to tag assets as an enabler to benefit other business areas, in particular, maintenance.

Contracting departments are responsible to implement the IUID DFARS clause to ensure assets are tagged during procurement/acquisition as well as organic and commercial repair. However, cost to tag assets through repair will not be tabulated under this node since that cost was developed from the Depot Maintenance node. The 2D data matrix will also be placed on the packaging so that the Supply Community does not need to open the package to read the data. The cost to tag assets is outlined in Section 6 of this document.

While other business areas will achieve benefits from IUID, benefits of implementing IUID to the wholesale asset management business area are relatively insignificant. The IUID process will apply the 2D data matrix to the packaging material per MIL-STD-129. Most existing processes are currently capable with bar codes and AIT devices. In addition, IUID will allow the wholesale Integrated Material Manager (IMM) to differentiate between assets within a stock number. However, the IMM mainly requires stock number, location and condition code about assets to perform their duties, and differentiating assets within the same stock number does not add significant value to the IMM. Therefore, we do not see any significant benefits to wholesale asset management from implementing IUID, unless there are proposed process changes within Intensive Item Management that affect root causes in the existing process.

The Services and DLA are implementing Enterprise Resource Planning systems (ERPs) that will need to be modified to accommodate IUID. In addition, a number of asset management legacy AISs that remain after ERP implementation will also need to be modified and made IUID compliant, and will need to interface with the OSD Registry to ensure it is updated; e.g., DRMO. Requirements statements are not yet available to specify systems modifications to achieve benefits. AIS cost information was provided in aggregate by separate correspondence from the Services and DLA. This is to ensure all AISs are included and that none are duplicated by provided costs per AIS associated per node.

The current policy directs a very large volume of assets to be tagged which will require many years to accomplish. AIS will need to be modified in order to achieve benefits. AIS modifications will also require years to accomplish. A time line to implement the program is imperative. Otherwise, we may be tagging many assets that will become obsolete before the capability to read and process the data to achieve benefits.

2. PROCESS TO BE UNDERTAKEN AND VALUED/SCOPE

The primary business areas affected within this node are wholesale asset management and procurement/acquisition as affected by the DFARS clause to tag assets. Again, cost to tag assets through repair will not be tabulated under this node since that cost was developed from the Depot Maintenance node. The Acquisition segment of this node will only be applied to tag material through their contracts. The Acquisition Community did not foresee benefits from IUID within their business area.

3. APPROACH TO BE USED TO DETERMINE ROI

An ROI was not determined since benefits were not quantified. The nodes determined cost and benefits were rolled up and quantified at the Value Chain level. This node has significant costs associated with execution of the DFARS clause. In addition, modifying AISs will also result in a cost. While benefits to this node are not significant, this node will tag assets and modify AISs to enable other nodes to achieve benefits, in particular the Maintenance Community.

4. ASSUMPTIONS

- The DFARS clause applies to repair as well as procurements at contracting activities.
- Engineering data will be available to enact the DFARS clause.
- Funding will be available to cover the cost for the ICPs to pay for marking assets.
- AISs will be modified to read, store, share and enable process improvements which includes automated analysis due to the large volume of assets included in the program.
- This node will not purchase AIT equipment. The contracting activities will have assets tagged by vendors thru procurement and commercial and organic repair, but contracting personnel will not be tagging or reading assets. That will occur at retail supply, depot/field maintenance and distribution depots.

5. EXECUTION

The two primary areas to execute IUID in this node are (1) tagging assets through the DFARS clause, and (2) modifying AISs to enable process improvements. A more global view of implementation/execution is described below.

a. Phasing Schedule

1. Tag assets
2. Modify AISs
3. Obtain sufficient data from reading assets
4. Make process improvements from the data
5. Allow process improvements to be in place to achieve benefits

b. AIT/AIS Requirements

1. AIT: N/A for the Acquisition Suppliers node. The contracting activities will have assets tagged by vendors thru procurement and commercial and organic repair, but contracting personnel will not be tagging or reading assets. That will occur at retail supply, depot/field maintenance and distribution depots.
2. AIS: This information will be provided in aggregate by separate correspondence from the Services and DLA. Contracting activities associated AISs will fall under this node. We can provide the AISs pertaining to this specific node if that information is of value.

c. Time to Execute/Receive Benefits

1. Modify all AISs not just to read, store and share IUID data, but also to automate analytic processes necessary to achieve benefits as stated in Serialized Item Management (SIM) policy. All (or nearly all) AIS modifications need to be completed in order to achieve benefits. If the "daisy chain" is broken, then serial tracking disappears for a temporary period. OSD Registry updates are considered part of the AIS modifications.
2. Sufficient material needs to be tagged when the AIS modifications are capable to read the tags.
3. A sufficient number of assets within a stock number need to have historical reads in order to achieve benefits. In addition, each asset requires multiple reads in order to fully realize benefits.
4. Follow-on recommended process improvements from the IUID data need to be implemented and in place a sufficient amount of time in order to achieve benefits.

d. Policy and Guidance Changes

1. Policy:
    a. The policy to tag all consumable assets should be relaxed, in particular since it has become clear that the primary benefit of the IUID Program is from the Maintenance Community.
    b. The policy to tag all legacy assets should be relaxed or prioritized due to the massive volume of assets, the workload associated with the tagging effort, and the lengthy timeline to modify AISs (and the other factors listed above) to achieve benefits. Reduce tagging of legacy assets based on their remaining life cycle; e.g., associate with MSD and material type. The typical life of stock number is about 15 years. Legacy assets tagged today will average 7.5 years of remaining life. Many of those assets will be obsolete prior to achieving a benefit.
2. Guidance:
    a. More specific AIS requirements are needed to achieve benefits, other than read, store and share UII data. These requirements should be developed from functional experts with knowledge of the desired benefits from IUID.
    b. Proper execution of the DFARS clause, in particular regarding ECP process. Many contracting activities do not own the configuration of the assets they procure and have repaired.

c. A prioritized implementation schedule to ensure assets that are tagged will process through AISs capable of providing benefits prior to the assets becoming obsolete or Beyond Capable Maintenance.

6. COSTS

a. Dollars

1. Infrastructure/Facilities/Sustainment: N/A for the Acquisition Suppliers node
2. Equipment: N/A for the Acquisition Suppliers node
   a. marking/verifying/registering
   b. AIT
3. AIS: This information will be provided in aggregate by separate correspondence from the Services and DLA. Contracting activities associated AISs will fall under this node. We can provide the AISs pertaining to this specific node if that information is of value. In addition, automated interfaces with the OSD Registry are necessary to ensure accurate and timely updates.
   a. ERP
   b. Legacy
   c. Integration
   d. FLIS code design and population/integration
4. NRE/Tech data: N/A for the Acquisition Suppliers node, but required as input to this node from the Engineering Community to properly enact the DFARS clause.
5. Marking: This cost information pertains to the DFARS clause, and includes only procurement and acquisition since the Depot Maintenance node developed costs for organic and commercial depot maintenance. It is unreasonable to determine the number of eaches obtained through the Acquisition Community in a year by query to the Services and each of their Program Executive Offices (PEOs). Therefore, we applied 5% to the existing number of eaches that qualify for tagging to determine the number of assets obtained through procurement and acquisition.
   a. New/Sustainment: This cost represents the follow-on annual recurring sustainment costs after all legacy assets are tagged.

      Input Values:
      - 113 million existing assets qualify to be tagged
      - $30 cost to mark an asset commercially
      - 5% represents the washout rate to be procured by ICPs and replacement through acquisition
      - 113 million × 5% × $30 = $170 million
   b. Legacy: Will be tagged through maintenance which was tabulated from the Depot Maintenance Node.

b. Manpower

1. Training: Contracting
2. Discrepancy resolution data cleansing resolution: Wholesale Integrated Material Manager IMM with DLA/storage facilities
3. Marking and Tracking—minimal
4. Program Management—minimal

7. BENEFITS

- Asset management/visibility: We did not see significant benefits for asset management from IUID. The IUID process will apply the 2D data matrix to the packaging material. All existing processes are capable with bar codes and AIT devices. In addition, IUID will allow the wholesale IMM to differentiate between assets within a stock number. However, the IMM mainly requires stock number, location and condition code about assets to perform their duties, and differentiating assets within the same stock number does not add significant value to the IMM. Therefore, we do not see significant benefits to wholesale asset management from implementing IUID, unless a new process is developed for intensive items management of controlled assets.

- IUID will enable improvements to recalls.

- Improved source of repair determination from identifying deficient products

- Reduced manual input for serial tracked items

- Intensive Item Management–traceability for Controlled items

- Knowing age, manufacturer, price and number of failures could lead to the following benefits:

  - Economic/contingency retention/disposal pertains to economic disposal decisions when the asset position is significantly larger than the material requirement. This most often occurs during the decreasing population later in the life of a weapons system. This does not pertain to assets that are Beyond Capable Maintenance (BCM). Currently the ICP will direct economic disposal decisions by randomly selecting F condition assets to be sent to DRMO. IUID capability would allow the ICP to prioritize and select assets that have failed more frequently and/or aged assets. Engineers have seen that MTBF typically reduces for assets that have failed more times and are older. While this will improve the process, it will be a relatively minor impact on costs and benefits since economic disposal decisions are most often near the end of an item's life cycle. Again, this logic will need to be automated, as IMMs will not be able to manage on an asset basis.

- IUID will enable improvements to Warranty management, however, additional processes are required to immediately inform maintainers at each level of repair that the asset is under warranty and provide disposition instructions to transport the asset to a holding area for action by the Contracting Officer to notify the vendor and claim the warranty.
- IUID will enable improvements in shelf life management.

8. REQUIREMENTS PASSED TO OTHER NODES

None

9. ISSUES

1. Funding for sites to execute the DFARS clause.
2. More specific requirements statements to modify AISs to achieve benefits.
3. Funding to modify AISs.
4. Determining the timeline to implement and begin achieving benefits considering modifying AISs and tagging sufficient assets.
5. Engineering data and receipt and acceptance guidance to properly enact the DFARS clause
6. Determining the cost to tag assets through the commercial sector (procurement and acquisition) was difficult due to a lack of empirical data.
7. Implementation of the DFARS clause to smaller vendors that do not have the capability to tag assets, and will not be cost effective to the government for them to obtain capability. These vendors will need to outsource the tagging requirement which would increase lead times and therefore, increase material pipeline requirements.

10. CONCLUSIONS

While the IUID Program may bring benefits to DoD Logistics, the benefits within this node are relatively insignificant. The primary attributes this node brings to the program is to ensure assets are tagged upon procurement and acquisition, and to modify AISs to connect the ‘daisy chain” to prevent gaps in serial management. This node will build a foundation for the downstream benefits to other business areas.

Annual recurring sustainment costs amount to $170M. AIS modification costs were provided in aggregate for each of the Services and DLA through separate correspondence.

Logistics Item Unique Identification Task Force

Distribution Centers Node
IUID Cost Analysis

Final Working Paper

February 26, 2010

Prepared by the
Distribution Centers Node Working Group

CONTENTS

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Gary Ziegler, HQ DLA, and John Newton, LMI, were the principal authors of this document.

Distribution Centers Node
IUID Cost Analysis

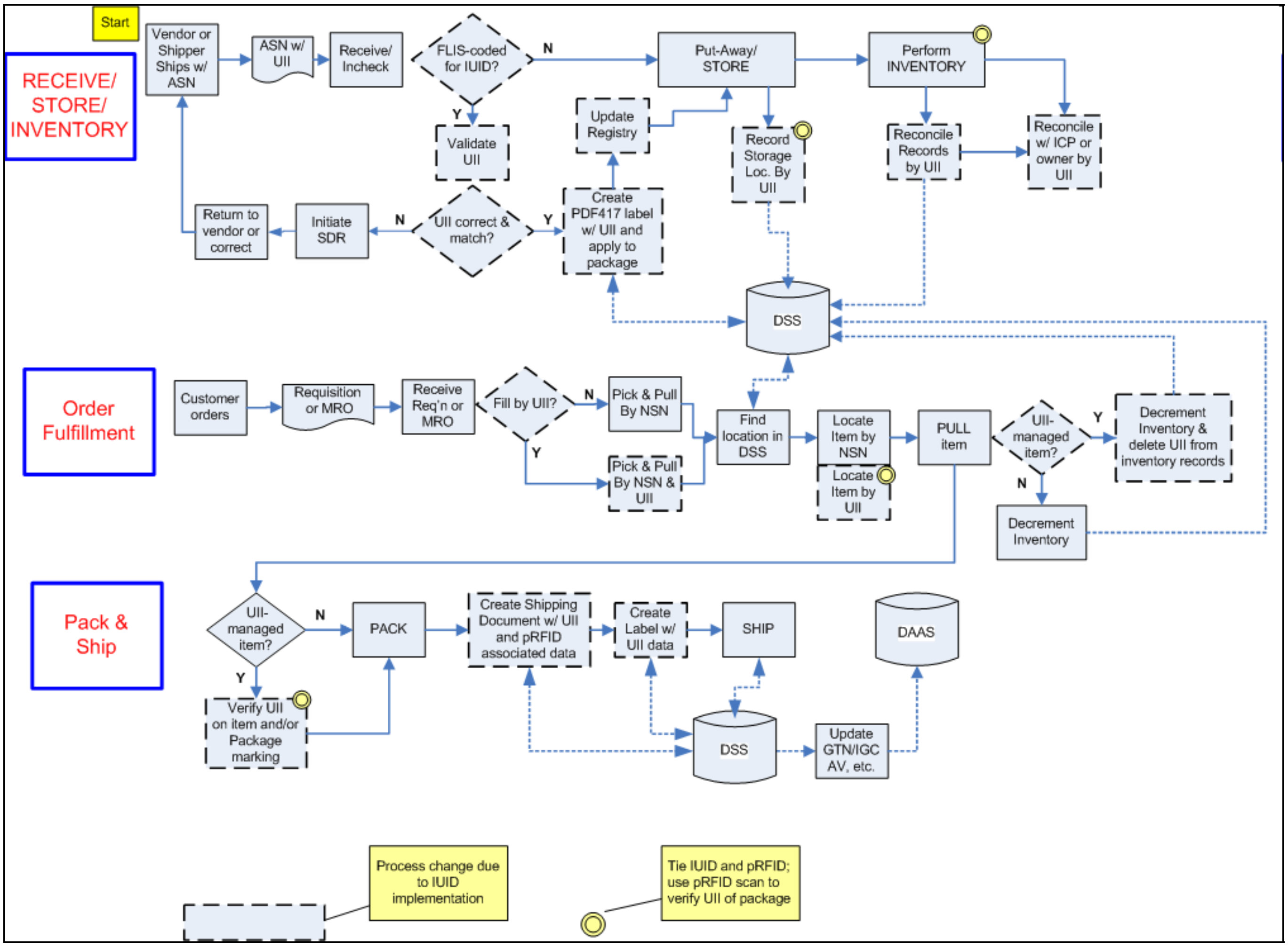
1. SUMMARY

The Distribution Center Node **<u>does not</u>** anticipate any quantitative benefit from implementing and using Item Unique Identification (IUID). Of the three IUID value chains, intensive item management (IIM) is the most relevant to the DCs. Fulfillment of IIM requirements also satisfies property accountability and life cycle management requirements. The mission of the DCs is to receive, store, manage, and issue materiel to the DoD components and authorized customers. Management of items is primarily by national stock number (NSN). IUID requirements to manage by unique item identifier (UII) are of no value to the internal processes of the DCs. Requirements to mark external packaging with UIIs, capture and maintain UII records for individual inventory items within a NSN group, perform inventory of stocks on hand by UII, pick and issue by UII will add cost and process complexity to DC operations. Use of UII/NSN associations will not improve any internal DC processes. Cost areas for implementation as envisioned in the IIM requirements set will include manpower (productivity and training), equipment, systems modifications, and potentially physical storage infrastructure. At this time, we believe that IUID implementation will require the DCs to undertake a large number of physical marking and registration of DLA-owned legacy stocks falling into the "most intensively managed" IIM categories, as representative to the example of numbers of Critical Safety Items (CSI) anticipated to require marking.

2. PROCESS TO BE UNDERTAKEN AND VALUED

The use of IUID within the DCs involves three major process areas shown in red in Figure 1 below. We will treat the potential marking of legacy stock held by the DCs separately.) The figure illustrates the major general processes of the DC. Blocks shown with dashed lines represent process decisions and steps that have, or will, change with the implementation of IUID. We will break these down further for explanation. We also show touch points where the use of other automatic identification technology, such as passive radio frequency (pRFID) tags could be linked to include IUID data, making processes easier than what is currently written into the IIM requirements document.

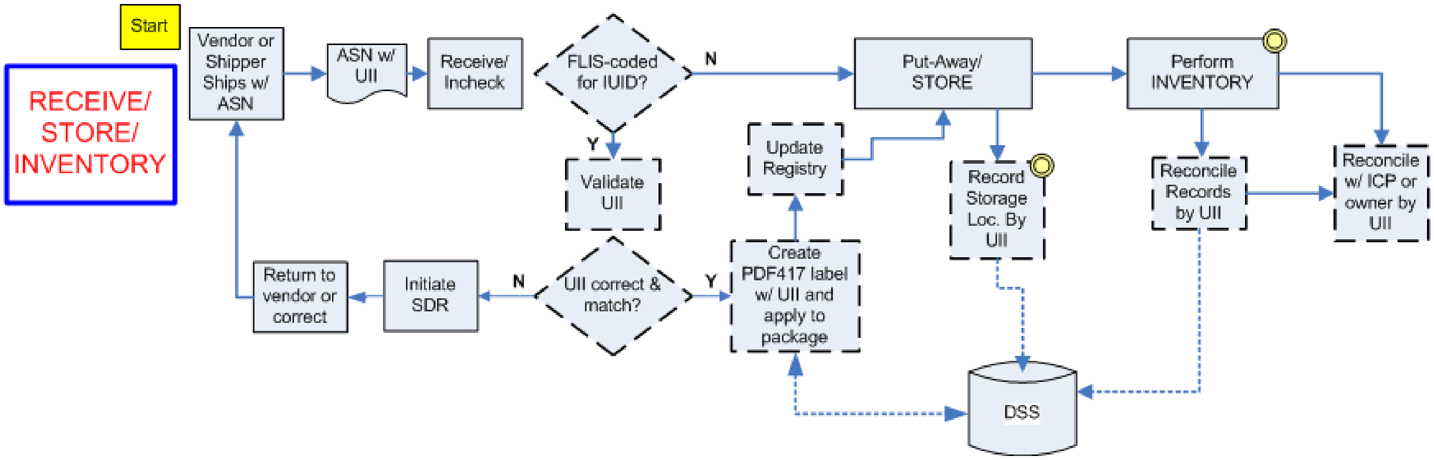
Figure 1. Overall DC Node Processes Showing IUID Interface



a. Receive/Store/Inventory

In this procedural area, functions include shipment receipt and inspection, supply receipt processing, stow, and inventory processes. These include Supply Discrepancy Reports (SDR) and Care Of Supplies in Storage (COSIS) functions to include Preservation, Packaging, Packing and Marking (PPP&M).

Figure 2 Receive/Store/Inventory Processes



1. For items requiring UII being sent to the DCs, shippers will send an advance shipment notice (ASN), to include the UII of the item(s) in the shipment, to the DC's Distribution Standard System (DSS), creating an inbound record. For new items coming from vendors requiring marking under government contract, the vendor will send the ASN through Wide Area Workflow (WAWF), and DAAS will route the ASN to DSS. When the shipment arrives, the DC will receive it from the carrier, check it for damage, and process it for supply receipt. When the shipping document is called up during the incheck process, DSS will note if the NSN is coded as requiring IUID marking.[1] If DSS flags the NSN as requiring IUID management, the inspector must verify that the UII(s) shown on the ASN match any UII markings on the outside of the package and the item contents of the package. (If the shipper or vendor has not marked the package with a PDF417 barcode containing the UII, the DC will suspend the material and await disposition from the owner/manager/ICP.)
2. Normally, if there is a discrepancy with the kind, condition or count of the shipment, DC personnel follow standard rules for producing SDRs. Under IUID, if the shipper or vendor has not sent an ASN with UII data, or there is a mismatch between the UII of the actual item and the ASN, the DC must follow new rules for discrepancy reporting (not yet developed.) The item(s) will be accepted into storage in a corresponding suspended condition code, segregated from issuable materiel.
3. If there are no discrepancies, or discrepancies have been resolved, and the package is marked with a PDF417 barcode containing the UII of the contents, DSS must initiate an update to the UII Registry indicating the item is in the possession of the DC. Once this is initiated, the item can be moved to its storage location and stowed.
4. For FLIS-coded items having UIIs, DSS must be changed to enable recording of the UIIs. (For example, if the inventory includes 10 each of one NSN, and all 10 are marked with a UII, the inventory record must include all 10 UIIs). This is required in order to manage by UII—find specific items. When the item is put away, the stow location and UII must

[1] Before this process step can occur, it will be necessary for DLIS to properly identify and code all NSNs as requiring IUID management in the Federal Logistics Information System (FLIS). We do not know when this will occur.

be noted in DSS so that the item can be found. pRFID and data associations of the package, UIIs, and stow location could simplify this process.

5. Once in inventory, the stock must be maintained per COSIS rules. At this time, the DCs have processes for managing stock that do not involve UII. We feel these are adequate, and see no need to change those procedures to accommodate IUID at this time.

6. IIM requirements, as written, require the periodic inventory of IUID FLIS-coded items, by UII. "Depots must verify, by physical location, all UIIs by condition code against the accountable record." As written, and depending on the level of management, inventory may involve locating the items in the storage location, and either reading the PDF417 barcode containing the UII(s) of the contents, or actually physically opening the package and verifying the item's UII via a machine-read. The requirements and periodicity of inventory/validation will be based on the business rules and how intensively the NSN is managed. For package-level inventories, we believe that linking UII data with pRFID tags on packages could simplify this process, allowing multiple simultaneous reads of tags, as opposed to having to physically handle each package in order to use a barcode reader to capture the UII data from the package.

7. The current IIM requirements document requires the DC to do inventories and reconciliations by UII.

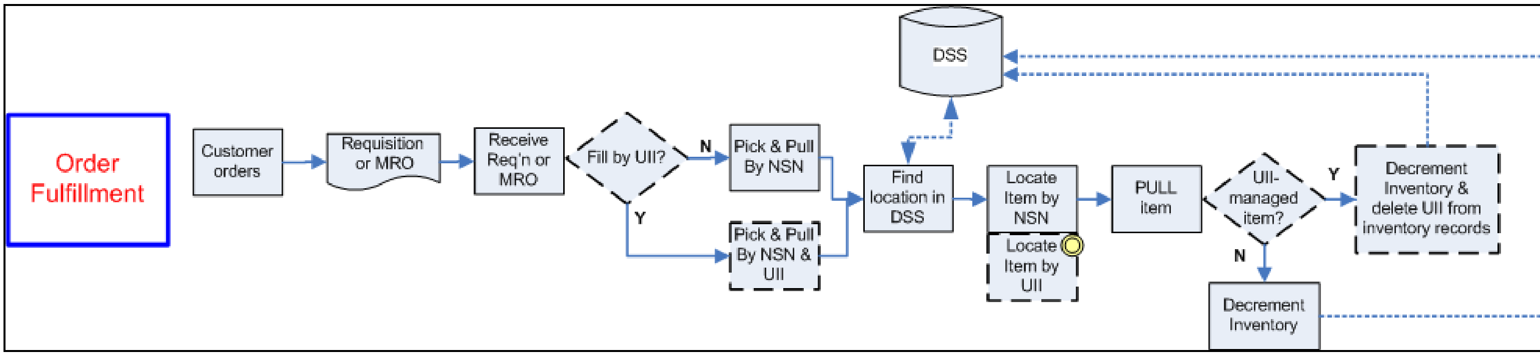
   "Each DoD Component shall implement a record reconciliation program that shall consist of both a location survey and a location reconciliation. Depots should be required to conduct location reconciliations (annual and end of day) with the owner/manager by UII. If UII is not included in the location reconciliation, there is no way to be assured that both the owner/manager and the depot have the same UIIs on tier respective records, even if the quantities match."

This requirement needs to be analyzed for practical reasons. Depending on the number of NSNs involved, daily recapture of UII data (per location surveyed) for items stored at the depot may be too labor-intensive. If the owner/manager (e.g. inventory control point, or ICP) is advised of UIIs on-hand as items are received (or upon any in-place marking of legacy stock), and the current number of UIIs matches the item count number, and inventory records showing UIIs are decremented as items are issued (see below), only an annual or as-directed reconciliation by location may be required. If this is not changed and daily recapture of UIIs in inventory is still required, use of pRFID tag reads with associated UII data may be sufficient to validate items/UIIs on-hand.

b. Order Fulfillment

The IIM requirements document levies a requirement to fill a requisition by UII. This is contrary to current DC practice, which is to fill by NSN from available stock. Currently, no effort is made to locate and issue a specific item identified by serial number or other unique item tracking (UIT) method. Figure 3 shows the new IUID process.

Figure 3. Order Fulfillment Process

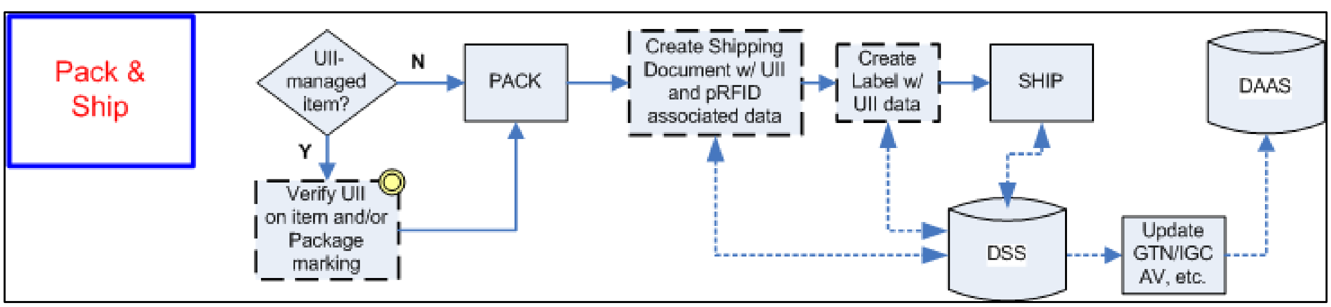


1. If the requisition is for a FLIS-coded NSN managed by UII, it will be necessary for the DC to alter the pick and pull process to locate a specific item. DSS must show the location of the specific UII item. The supply person must then find and pull the specific item from the stow location, verifying the UII by either a barcode scan of the package, or via the read of a pRFID tag which would return the UII on the reader for confirmation that the package contains the correct item.
2. Once the item is pulled and processed, the UII must be decremented from the on-hand inventory. (Using our above example, if one of the 10 items in a NSN group is pulled, the UII should be removed from the on-hand list of UIIs, leaving only 9 UII records for the NSN.) The stage at which this occurs in DSS must be defined per business rules and will require a systems change.

c. Pack and Ship

Military Standards 129 and 130 contain rules for the marking of packaging for storage and for shipping. These standards incorporate IUID guidelines.

Figure 4. Pack and Ship Process



1. If the item is FLIS-coded as an IUID managed item, the correct item will have been pulled from the stow location and turned over to the shipment preparation section. Part of the packaging process may be to again verify the UII of the item, either through a scan of the UII in the package barcode, or depending on the intensity of management, actual verification of the mark on the item via a machine-read. After packing for shipment, the outer package or consolidation package must be labeled IAW MILSTD 129, which now requires the UII(s) of contents to be included in the label barcode. If one or more pRFID

tags are applied to the packaging as items are consolidated, UIIs can be associated with the tag ID, so that parent-child associations can be made. These should mirror associations reflected in the data in the military shipping label applied to the package. Similarly, if the item is consolidated into an ocean container or an airlift pallet (layer 4), an active RFID tag may be applied per business rules. UII data could be linked to content data associated with the aRFID tag ID.

2. Shipment planners will create shipping documents within a DSS module for the packages and capture all data regarding the contents of single or consolidation packages. This data will include UIIs of all FLIS-coded IUID items. Shipping data, to include UII and other AIT information related to parent-child relationships will be passed in ASNs to downstream locations, and in transactions with other transportation and visibility systems, such as the Global Transportation Network (GTN) and Asset Visibility (AV).

3. APPROACH TO DETERMINE RETURN ON INVESTMENT (ROI)

For this effort, we have carefully compared as-is processes and IUID-related processes shown above to consider where IUID may have a quantitative or subjective positive effect on business operations within the DCs. The table below shows, for each functional process area used above, whether there is an IUID-related benefit, or whether implementation will result in a liability (cost or increased effort/time). In some cases, there is no change realized from IUID implementation at the DCs.

Table 1. Relative Benefit/Liability by Functional Process Area

	Receive	Store	Inventory	Pick	Pack	Trans Planning	Trans Documentation
Productivity (increase/decrease)							
manpower (labor)	~	~	+	+	+	~	+
system transactions	+	+	+	~	+	+	+
system time	+	+	+	~	+	+	+
Accountability (increase/decrease)							
visibility of asset- internal	~	+	+	+	~	~	~
visibility of asset- external	+	+	+	~	~	~	+
reduced risk of loss	~	+	+	+	+	~	~
reduced risk of error	+	+	+	+	+	+	+
Accuracy							
data capture	+	+	+	+	+	+	+
data accuracy	+	+	+	+	+	+	+

Table 1. Relative Benefit/Liability by Functional Process Area

	Receive	Store	Inventory	Pick	Pack	Trans Planning	Trans Documentation
Supply Chain Performance (increase/decrease)							
internal process time	+	+	+	+	+	+	+
customer wait time	~	~	~	~	~	~	~
logistics response time	~	~	~	~	~	~	~
Enables other Nodes (+ = yes)							
supports downstream node	+	~	+	~	+	~	+
required for downstream node	+	~	+	~	+	~	+
Life Cycle Management (+ = yes)							
Supports LCM while in DC	~	~	~	~	~	~	~
Supports LCM while in other nodes	+	~	~	~	~	~	~

Note: yellow indicates liability, green indicates benefit, "~" indicates no change.

In terms of calculating ROI, benefits to the DC are only definable in subjective terms. **No quantitative benefits are foreseen at this time.** In fact, implementation will add time and effort to many of the DC internal tasks. Some of these may be mitigated by combining the use of pRFID to perform IUID-related functions, such as inventory. Further, any requirement to segregate marked and unmarked stock to enable storing by UII may significantly increase the infrastructure costs of the depots. Overall, while we understand that IUID implementation, starting with receipt of the item at the depot, is necessary to enable other supply chain or functional nodes—like maintenance—we do not see any cost or effort-reducing benefits to DC operations. Further, we also see no positive impact on reducing the effect on the supply chain from the time the customer requisitions an item until the consignee receives it on the far end. However, while some internal processes will take more effort and/or time within the DC, we do not envision these steps having any significant detrimental effect on the supply chain.

4. ASSUMPTIONS

Below are the assumptions that we have used in accomplishing the above table:

- Storage space requirement will not increase if items with UIIs are not segregated from generic stock—equivalent to current requirement. However, there will be a tradeoff in time/labor/cost to pick and pull a specific UII to fill an order.
- Storage space requirement will increase if segregation is required—This will have a significant impact enterprise-wide (beyond Distribution Centers) (see more below)
- Increase in time to process receipt—nominal once system changes are in place

- Increase in time to process SDR reporting to item manager for UII omissions or mismatches—nominal once system changes are in place

- Increase in time to process SDR disposition and correction actions for UII omissions or mismatches—significant

- Increase in time to open packages, inspect, verify UII(s) and process initial PPP&M—significant, especially if every item in a multiple-quantify shipment must be verified.

- Increase in time to repack/certify packaging of some items after opening to inspect/verify UII mark—this could be significant for some NSNs and at the aggregate level; and there is a possible increase in use of packaging materials.

- Increase in time to process a stow—nominal at the transaction level, but medium at the aggregate

- Increase in time to process an issue—nominal

- Increase in time to pull a nonspecific UII item—nominal once system changes in place

- Increase in time to pull a specific UII—medium to significant depending on the storage rules for UII. There is less effect if segregated-by-UII storage, higher if bulk storage.

- Increase in time to process, pack, and mark for shipment—nominal once system changes in place

- Increase in time to process inventory counts verifying each UII—significant

- Increase in time to process COSIS—no change

- Increase in time to perform periodic or daily by-location, by-UII reconciliation with owners—significant

- Increase in time to process shipments: staging, loading, and billing (Transportation functions)—nominal once system changes are in effect

Other assumptions used for this study:

- Above processes will validate and capture UII information <u>only</u> for FLIS-coded NSNs as new stock from vendors is received, or when items which have been previously marked are shipped to the DCs and receipted (e.g. reparables). *DCs will not take any action on other material that comes in which has UIIs in the ASN or on the packaging.*

- To be able to read and verify UII marks, the DCs need the ability to find or to know in advance where the mark should be located on the item. [For early implementation, contracts could require that the manufacturer/vendor specifies the location of the mark in narrative comments in the ASN to allow receiving personnel to easily find it. This information or other technical data from depot marking efforts could eventually be added into the FLIS NSN information and be shown when the UII alert comes up during receipt processing.]

- All receiving work stations will require a reader/verifier capability. Receiving personnel will verify that the UII(s) shown on the ASN and the packaging matches the marks on the contents of the package for an initial delivery of new stock from a vendor.

- Some marking of DLA-owned legacy stocks will most likely occur via in-house efforts within the depots. Marking could be performed by contract service providers, or by DLA employees. Any costs incurred by DLA for marking DLA-owned stocks will be absorbed by the Defense Working Capital Fund, and may result in an increase in the surcharge and across-the board costs to customers. We assume one complete marking system for each of the 25 DCs in our equipment costs, plus training costs.

- DLA <u>will not segregate</u> marked and unmarked items within the storage systems at depots unless directed to do so. Such direction will result in the need for physical infrastructure expansion and expense, which is contrary to our collective efforts to reduce depot footprint and costs over the last five years.

- The additional cost to locate, pick and pull a specific UII item to fill an order may result in a premium handling charge to the customer. (Discussed further below)

The requirement to manage all UII-marked items in a NSN set, in order to be able to fill a requisition by UII, forces unique challenges on the DCs. The extent of the challenge and the impact will be different for each intensively managed item, based on its configuration.

As an example, assume that a DC has 100 “eaches” of a single NSN, so there are 100 associated UIIs. Under current practice, all 100 items may be in a single location stacked 5 wide by 5 deep by 4 high. Pick and pull to fill an order would involve pulling the easiest one to access. The requirement to pull a single UII may result in having to pull all of the items to find the one in the back lower corner. This type activity will greatly increase the effort to pick and pull. The alternative is to rearrange the set of 100 so that smaller groups than 100 would have to be moved to find the correct one, or store them individually so that any single item may be accessed by stow location and pulled. Using the former, the items could be stored in 4 groups of 25, or 10 groups of 10, etc. The trade-off is space for time and effort in identifying, pulling, and restocking after the correct UII is found. Any storage reconfiguration results in an increase in footprint and attendant higher facilities cost.

Certain other requirements, conditions or circumstances may compel segregation of storage space for IIM UIIs (i.e., reconciliation by owner, or location) with the same effects.

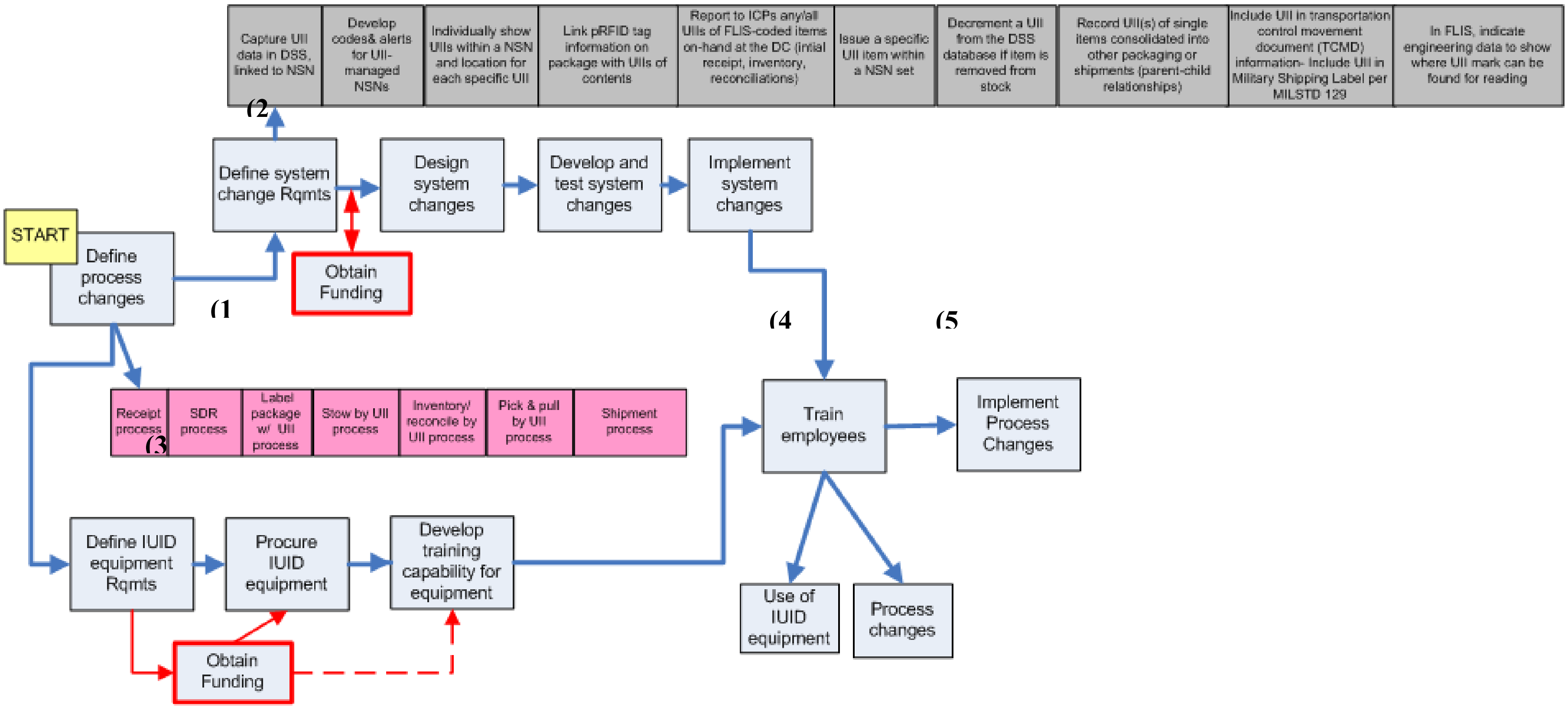
5. EXECUTION

Several challenges make implementation planning difficult. DCs must approach two major elements: 1) new stock arriving from vendors with UII markings, and 2) IIM legacy stocks (either unmarked inventory or those items returned to the DCs with marks after depot maintenance or other marking efforts).

- For the short term, the DCs will receive vendor shipments that include UII-marked items, but they have no capability to read and verify that the actual marks match the UIIs included in the ASN and/or the UII included in a barcode label on the package. This presents the dilemma of whether to trust the ASN and enter the UIIs of the items into the Registry. If there is a discrepancy at this time between the actual mark and the ASN, it cannot be detected and reported via a supply discrepancy report (SDR). Discrepancies will not be noted until discovered during some future transaction.
- The question of trust raises another issue in receipt processing. Currently, if the DCs receive 20 of an item shipped from a vendor, they open only one, to ensure that the item is what was ordered—they do not open and inspect the other 19. IIM requirements, as written, will require the receipt processor to open all 20 packages in order to read/verify the marking of the actual item, and process SDRs for mismatched UIIs or no UII on the item, then process the UIIs to the Registry. For NSNs coded as intensively managed, this step will have to be taken. If some items are received that have UIIs but the NSN has no FLIS code for IIM, DCs will not process the UII information.
- Beyond the additional time and labor to inspect each and every item, there may be issues with packaging integrity. Some items will come hermetically sealed, or have other protective measures that will be compromised when opened for inspection. This will result in the need to repack/certify prior to the item going into storage. This will involve additional time, labor, and cost.
- The requirement to manage by UII and provide by-location, by-UII reconciliation with the ICPs and other owner/managers could be extremely resource-intensive if UII data is to be pushed from each DSS account to multiple addressees. We propose alternative for consideration. Once UII data for the IIM NSNs is captured in the DC's DSS, the data should also be made visible in EBS. EBS should allow an enterprise view of all 25 DCs. Instead of pushing data to multiple parties, we recommend that linkage be established with ICPs, owners, and other managers to allow a view of the on-hand inventory and associated UIIs through EBS. If owner/managers desire a daily or other periodic reconciliation with one or more DCs, they can query EBS to view inventory and UIIs. Any receive/issue transactions will result in an adjustment to the DSS/EBS records and will be visible through queries. Periodic by-UII inventory and validation at the DCs will provide assurance that the inventory and record-keeping is correct and current.

Figure 5 shows the relationship of phased tasks and events that must occur for implementation at the 25 DCs.

Figure 5. Implementation Relationships



a. Phasing

We assume that DLA efforts will officially start when policy guidance is approved in DoD Manual 4140.01-M, Volume 11, *DoD Supply Chain Materiel Management Procedures: Management of Intensively Managed and Tracked Items*. Estimated date for this is the spring of 2010. From that point, there are multiple steps, several of which might overlap somewhat, depending on resources. The major task areas are numbered above.

(1) Define process changes based on guidance and (2) determine the needed systems changes to support the processes. These two task areas are symbiotic. The DOD 41 40.01-M and other IUID policy changes drive the process changes—which cannot be fully implemented until AIS systems changes can support them. Following (1), the process blocks in pink above represent the major areas where internal processes must be redefined or created. The new processes drive the functionality that must be changed or added to AISs (for the DCs, primarily DSS and any AIT-related middleware). These are shown in the grey blocks above.

Equipment requirements, starting with the need for reader/verifiers at the receiving stations are at (3). Employee training (4) will be required to integrate the processes and systems changes with the use of the equipment. We believe implementation of capabilities should occur in roughly the order detailed and shown in Appendix A below. Summary information follows:

b. Schedule

Many steps can be approached concurrently; others are dependent on completion of previous steps. Implementation of process changes is dependent on having the AIS/AIT tools in-place. Figure 5 shows the relationships between the process changes (in pink) and the associated AIS/AIT capabilities (in grey), in the rough order that they should occur (reading left-to-right). Training will be continuous, as equipment/software/processes come on-line and are integrated into the DC operations. Below are the final milestones we foresee for the key implementation areas.

Table 2. Key Implementation Steps

Key Implementation Steps	Completion
Determine requirements (AIS/AIT)	FY 2012
Determine/develop/produce policy guidance	FY 2012
Purchase/distribute IT equipment (printers/scanners)	FY 2013
Design systems changes	FY 2013
Implement systems changes	End of FY 2013
Training	2nd Quarter FY 2014
Complete integration with Services per ERP implementation	End of FY 2015

c. AIT/AIS Requirements

Systems changes and AIT equipment integration with DSS will be required for almost all touch points in the distribution center chain–Receiving, Storage, COSIS, Inventory, Issue, and Transportation. System change requirements also include: the capability to move UII data to the EBS and the IUID Registry; integration of AIT equipment with DSS, and Service system linkage to EBS to view UII data for stocks held at the dispersed DCs.

AIT equipment purchases will include:

- marking stations for each of the 25 DCs
- 100 UII mark verifiers for reading the marks on newly-received items and for verifying the UII of IIM items prior to shipping
- Approximately 10,700 scanners capable of reading the ECC 200-compliant data matrix symbol used for UII data (for receiving workstations and warehouse use)
- 740 printers for receiving workstations if current equipment is not sufficient for printing UII-data labels to go on the outside of packaging. (Current work stations are set up for producing put-away or other labels for internal use in the DC; the requirement to add a PDF417 barcode label with UII data may well involve a second printer at each receiving station.)

In addition to the purchase of the equipment, there will be requirements to install cabling and other infrastructure, and to configure each scanner.

d. Time to Execute/Receive Benefit

Again, we reiterate that we foresee no quantitative benefit to the DCS resulting from implementation of IUID. The time to execute is indicated in Table 2 and is driven, for the most part, by the AIS changes. DLA J6 advises that for planning purposes, system changes will take 14 months to two years from the time a requirement is identified until implementation. Systems changes could begin after the currently-approved 2011 cycle, depending on any other emerging requirements completion needed to support DC operations.

e. Policy & Guidance
(the changes required to regulations and other policy)

Several major policy issues affect DLA's ability to implement IUID at the DCs. The first is the decision of which NSNs will fall into the IIM realm. This has the greatest effect on the scope of the implementation. Two categories present the worst case for the DCs. These are the current requirement to mark and manage items which cost in excess of $5,000, and the critical safety items. The population of NSNs and number of "eaches" for either of these two groups may be unmanageable within the DCs. Another part of the Controlled Inventory Item Code (CIIC) group containing pilferable items is smaller than the SCI group, but larger than the over-$5,000 group. These may have to marked and controlled as well in the future.

Once the DoD 4140-M volume on IIM is approved, DLA will begin to adjust internal policy and guidance to field units. A decision on our above proposal to have EBS provide the by-UII reconciliation capability with ICPs and owner/managers will also be important to the implementation scope and level of effort.

6. COSTS

The tables and descriptions below provide information which we can estimate at this time. Many factors are unknown for some of the cost elements. For these, we show "to be determined", or TBD.

a. Dollars

1. Infrastructure/Facilities/Sustainment (see Table 3).

Table 3. Infrastructure Cost Elements

Cost Elements	Unit Cost (in $K)	Total (in $K)
Infrastructure/Facilities/Sustainment		
Facility Expansion for UII-managed materiel (25 sites) (non-recurring)	10,000	250,000
IT Infrastructure (cabling, hardware, etc.) (non-recurring)	20	500
Sustainment/maintenance of new facilities	100	2,500

The entry above for facilities expansion requires explanation. Above, we discussed the dilemma on staying within BRAC-directed footprint for the DCs versus the need to segregate IIM stocks by UII and/or by owner. The above estimate represents the need to expand the current facilities' capabilities if stocks must be segregated. However doubtful the approval of this could be, it represents new construction, vertical or other site expansion on existing footprint, or other contractual operations. One argument could be made for a separate facility which houses only the IIM controlled NSNs, configured to support effective management. A corresponding argument, however, is that the labor/cost/time trade-off to pull IIM stock off current shelves in order to locate, validate, inspect, inventory, or pull for issue—and then to reposition everything back into the original footprint—would have a total net cost less than the cost of new or expanded facilities. Unfortunately, we cannot estimate the recurring cost of managing per the IIM guidelines and staying within the current reduced depot footprint.

2. Equipment (see Table 4).

Table 4. Equipment Cost Elements

Cost Elements	Unit Cost (in $K)	Total (in $K)
Marking/verifying/registering		
Complete marking stations (25) (non-recurring)	102	2,550
Desktop verifiers for IUID direct part marks 100 (2 min. at each DC; larger DCs up to 10 each) (non-recurring)	10	1,000
AIT		
Scanners, 10,700 total (non-recurring)	2.5	26,750
Configure scanners (labor and travel) (non-recurring)		175
Printers 740 (non-recurring)	.678	502

3. AIS (see Table 5)

Table 5. AIS Cost Elements

Cost Element	FY12	FY131	FY14	FY15	Total
ERP: EBS	$15M	$5M	$2.5M	$2.5M	$25M
LEGACY					
DSS	$3M	$3M	$2M	$2M	$10M
FLIS	TBD	TBD	TBD	TBD	TBD
Asset Visibility (AV)	TBD	TBD	TBD	TBD	TBD

Amounts shown for modification of EBS include the capability to see UII data associated with the individual DSS systems of the DPs, and also include integration with the Services' systems to allow them to query and view UII data associated with IIM NSNs in stock at the 25 distribution centers. Modifications to FLIS include adding an alert capability for designated IIM NSNs to trigger actions within the DCs, and the capture of IUID-related technical information regarding the method and location of marking. This information must be provided from other sources—FLIS will merely record the information in an accessible format.

4. Marking

   a. **New Procurement:** Marking costs for new materiel procured by DLA will be incorporated into the acquisition contract costs. We estimate this additional cost to be $10 million per year (recurring).

   b. **Legacy items stored at Distribution Centers**: Below, we have approximated the number of NSNs and units of each which are DLA-owned inventory held at the 25 DCs. We have divided them into the initial IIM groups identified by OSD. For marking costs, we have used the depot maintenance organic average unit cost of $8.31 to mark. This includes the labor and any tagging material that might be required.

Table 6, Costs to Mark DLA Legacy Stocks

Category/$ Value	NSN	Eaches	Cost to mark (at $8.31/mark)
a. Critical Safety Items (CSI)			
CSI Less than $5K	16,860	163,131,918	1,355,626,238
CSI $5K - $25K	1,312	26,284	218,420
CSI $25K to 50K	120	1,749	14,534
CSI $50K to 100K	21	250	2,078
CSI Greater than $100K	6	0	0
CSI (all)	18,319	163,160,201	1,355,861,270
b. Non CSI Greater than $5K	159,645	1,594,259	13,248,292
c. Controlled Inventory Item Code (CIIC) Classified			
Less than $5K	71,877	733,710	6,097,130
$5K - $25K	495	400	3,324
$25K - $50K	4	10	83
$50k - $100K	1	2	17
Greater than $100k	0	0	0
CIIC Classified (All)	72,377	734,122	$6,100,554
d. CIIC Sensitive.			
- Less than $5K	313	18,792	151,162
- $5K - $25K	15	87	723
- $25K - $50k	1	0	0
- $50K - $100k	1	0	0
- Greater than 100K	0	0	0
CIIC Sensitive (All)	330	18,879	$156,884
e. CIIC Pilferable			
- Less than $5K	41,808	20,579,751	171,017,731
- $5K - $25K	724	4,093	34,013
- $25K - $50K	128	1	8
- $50K - $100K	114	4	33
- Greater than 100K	58	11	91
CIIC Pilferable (All)	42,832	20,583,860	$171,051,877
OVERALL TOTALS	293,503	186,091,321	$1,546,418,877

In addition to the categories above, there is another category which may ultimately require marking. There are 11,020,320 units of issue (eaches) with CIIC code 7: "Item assigned a Demilitarization Code other than A, B, or Q for which another CIIC is inappropriate. The loss, theft, unlawful disposition and/or recovery of an item in this category will be investigated in accordance with DOD 4000.25-25-1-M and DOD 7200.10-M." **(This may impact the Disposal Node.)** Additional cost to mark these items would be $91.6M at $8.31 per mark.

b. Manpower (Annual FTE)

We believe that there will be a manpower cost to develop the expertise needed to manage and oversee the IUID program at each of the larger DCs, which can then support the smaller ones. We have not yet decided on an approach at this time, so total cost is TBD. There may also be personnel or contractor costs associated with maintenance and calibration of the marking equipment and other AIT. This cost is also TBD.

The manpower rate used for hourly calculations is based on DLA's published reimbursable rate of $64.46 per hour. This is an aggregate of all labor costs for the DCs across the different geographical regions. We use this factor for all labor calculations.

1. Training: Our approach will be twofold. First, we will develop a train-the-trainer effort to initiate on the job training at the work center level to familiarize employees with the new tasks and system changes associated with IUID implementation. Second, we will integrate IUID requirements into current formal training programs encompassing all requirements. DDC will be primary source of training for distribution centers.

Table 7. Integrated Training Requirements

Cost Element	Unit of Measure	# of Units	Rate	Total
Develop 7 core training modules incorporating IUID (Receiving, Warehousing, Transportation, Inventory, Stock Readiness, ISDR, PPP&M) (non-recurring)	80 hours per module	560 hrs (7 X 80)	$64.46	$36,098
Additional annual formal training time incorporating IUID for 3,000 students/year (recurring)	.5 hr/year	1500 hrs (.5 X 3000)	$64.46	$96,690
Additional on-air time for formal training (VTC/IVT) (recurring)	.5 hr/session × 44 sessions/yr	22 hr	$134/hr	$2,948
Initial OJT for IUID in work centers at 25 DCs (non-recurring)	.5 hr x 5,000 personnel	2500 hrs	$64.46	$161,150
Total Training Costs				$296,886

2. Discrepancy Resolution & Data Cleansing Resolution Costs: We know that IUID-related issues will result in increased processing of SDRs and follow-up actions to resolve the discrepancies. Below are anticipated costs in this area

Table 8. Discrepancy-Related Costs

Cost Element	Unit of Measure	# of Units	Rate	Total
Research and SDR processing for UII issues (recurring)	.5hr/SDR	5000 SDR/yr	$64.46	$322,300
Resolution for new procurement- return received NSN item(s) to vendor or move to in-house marking (recurring)	1 hr/each NSN 5 NSNs/day	1200 NSNs (5 x 240 days)	$64.46	$77,352
Tracking of resolution efforts and follow-up until receipt	.5 hr/each NSN 5 NSNs/day	1200 NSNs (5 x 240 days)	$64.46	$38,676
Total Discrepancy-Related Costs				$438,328

3. Marking & Tracking: Above, we calculated a rough estimate of costs to mark legacy IIM stock held at the DCs, based on a per-mark cost of $8.31. However, we know that the DCs will not have the capability or technical knowledge to mark all items or subassemblies; therefore materiel will be directed to contractors (to possibly include original manufacturers) or maintenance depots. Some DCs have an adjoining maintenance capability, others do not. In any case, there will be manpower costs associated with identifying, pulling, preparing, and shipping the items for UII marking. We have also included a placeholder transportation dollar cost associated with movement of the material to its marking destination and return. The below costs are generally recurring.

Table 9. Marking and Tracking Costs

Cost Element	Unit of Measure	# of Units	Rate	Total
Receipt processing: Time to verify mark, determine UII, change input screens to input UII, and place PDF417 on package (recurring)	.5 hr/NSN X 480 (2/day X 240 days)	240 hr	$64.46	$15,470
Prep/stage/load to move to contractor or depot for marking	1 hr/NSN 20/day X 240 days	4800 hr	$64.46	$309,408
Tracking to/from contractor or depot for mark	.5 hr/NSN 20/day X 240 days	2400 hr	$64.46	$154,704
Total Marking-Tracking Labor Costs				$479,582
Transportation to/from contractor or depot	Shipments	500/yr	$500	$250,000
Total Annual Marking-Tracking Costs (Excluding in-house marking)				$729,582

4. Program Management: The following costs represent the management needed to follow-through with IIM at the DCs, Headquarters of the Defense Distribution Command (DDC) and at Headquarters DLA. The costs are based on a DLA FTE rate calculated using the above hourly rate × 2,080 hours/yr. (The below costs are recurring)

Table 10. Program Management Costs

Cost Element	Unit of Measure	# of Units	Rate	Total
Track and manage IIM materiel	FTE	6	$134,076	$804,460
Reports generation	FTE	6	$134,076	$804,460
Inventory strategy for IIM	FTE	20	$134,076	$2,681,536
Total IIM Program Management Costs				$4,290,457

5. Functional Data Inputs and Processing: The table below shows the aggregate amount of additional manpower we believe will be associated with IIM IUID functions at the 25 DCs. (It is based on a roll-up of per transaction time increases, and is a very unscientific estimate.) These costs are recurring.

Table 11. Data Input and Processing Charts

Cost Element	Unit of Measure	# of Units	Rate	Total
Receipt Processing	FTE	5	$134,076	$670,380
Issue Processing	FTE	5	$134,076	$670,380
Stow Processing	FTE	5	$134,076	$670,380
Inventory Processing	FTE	20	$134,076	$2,681,520
PPP&M Processing	FTE	5	$134,076	$670,380
Total Data Input and Processing Costs				$5,363,040

Note: These numbers are revised to reflect the projected policy as of March 23 JLB briefing, and do not reflect the calculations of the marking costs within (above) this document.

7. BENEFITS

a. Categories

1. Resources—None. IUID will not improve the use of or reduce requirements for resources at the DCs.
2. Dollars—None. There will be no cost savings or avoidance at DCs based on the use of IUID.
3. Manpower—None. Labor, effort, cost, and time will increase to implement IUID at the DCs.
4. Training—Increased training of DC personnel will benefit the Services/customers by helping to ensure IUID accountability, and proper stewardship of critical/intensive managed items.

5. Efficiency—If pRFID technology is used in conjunction with UII marking, inventory efficiency may increase. However, the current requirement to rely on physical access to packaging in order to scan UII information from package barcodes is less efficient and will add time and effort to locate or verify each UII.

b. Risk

If relying on UII on outside of package without further verification (as required at the distribution centers with Kind, Count, Condition) potential risk increases.

1. Political—If all nodes implement required controls, IIM by UII will decrease adverse political implications.
2. Security—UII markings on outside of containers (for shipment) may create vulnerability for classified, NWRM, or other critical requirements.
3. Environmental/safety/health—Physical movement of materiel during inventory or validation may increase the potential for injury to warehouse personnel and possibility of damage to assets/packaging.

c. Readiness

1. Improved inventory management—It is possible that the ability to locate a specific item with specific attributes will improve readiness for weapons systems, but IUID will not specifically improve inventory management at the DCs. The requirement to verify IIM items by UII may theoretically help to improve inventory accuracy; however, the DCs already require 100 percent accuracy of quantity to NSN.
2. Planning and forecasting—We see IUID having no effect on planning and forecasting at the DCs.
3. Availability—Order-to-ship time (OST), throughput, frequency, visibility, and traceability will not be positively affected by IUID implementation.

d. Quality

IUID implementation will not affect materiel or data quality.

e. Weapon System/Equipment Performance

Providing a specific part with desired attributes (e.g. a specific number of operational hours or time since last rebuild) could improve weapon system and equipment performance. However, note that the DCs will not maintain this attribute information. Other systems, such as Service maintenance systems, must record the data linked to a specific UII. The UII could then be sourced from the stocking DC and ordered by MRO from the ICP.

f. Accountability

UID implementation adds another level of complexity to inventory management at the DCs—having to ensure each item managed by UII is in stock or accounted for. This is not necessarily a benefit to the DC.

g. Regulatory, Policy, Statutory

There are no benefits to the DC in this category.

8. REQUIREMENTS PASSED TO OTHER NODES

Implementation at DCs will involve the following requirements for other nodes:

- Acquisition Logistics Planning: ALP must ensure that contracts have requirements for marking, technical information to support them, and that this information is passed to DLA for inclusion in the FLIS so that receipt processing for IIM items can be accomplished. This includes DLA's own acquisition planning elements.
- Suppliers: Suppliers must mark in accordance with contracts and technical requirements, mark packages with UIII barcodes, and pass UII data in shipment advance shipping notices (ASNs).
- ICPs: ICPs must maintain UII cognizance for the NSNs they manage, and assist in reconciliations.
- Depot Maintenance: Marking DC legacy stock may result in requirements being passed to the depot maintenance node.

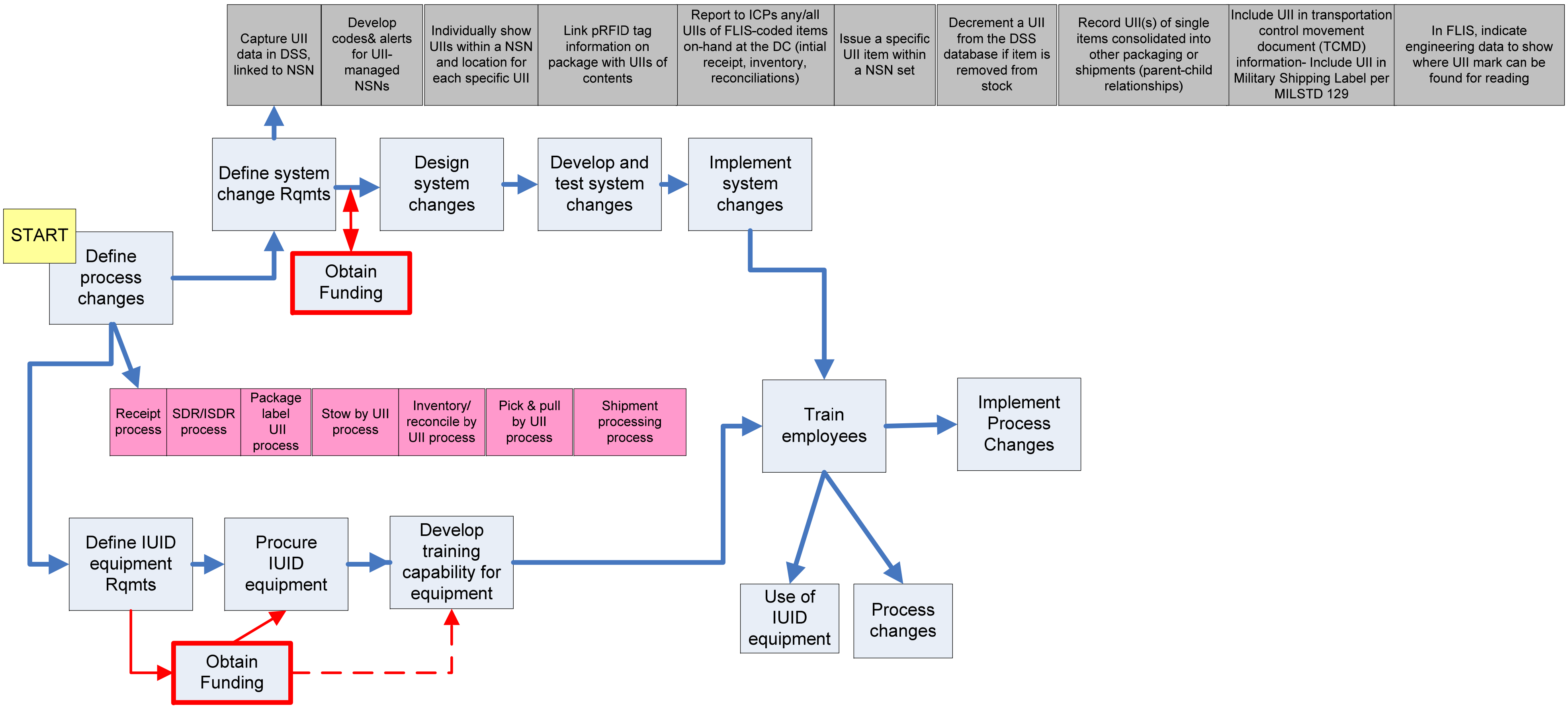
9. ISSUES

Above, we have discussed issues involved with the increased requirements on inventory and PPP&M, as well as the potential significant increase in storage space requirement that management by UII and/or owner may entail. These are major concerns for DLA. Other than awaiting required AIT/AIS changes, implementation itself will have only minor impact on the DCs. We foresee nothing that will inhibit actual implementation at this time; however, there should be an understanding that BRAC and other requirements may take precedence if the implementation schedule becomes too aggressive prior to FY 2012.

10. CONCLUSION

IUID will enable maintenance and supply chains to perform at a higher level of integrity, and is a critical component to the safety and security of our customers, the warfighter, and the nation. Distribution Centers will benefit in knowing they have played a role in facilitating this requirement. Policies surrounding the IUID program must take into consideration the high costs (in dollars, manpower, time, and infrastructure) that will be levied on the Distribution Centers; proper and informed decisions regarding Intensive Item Management (IIM) are required. The population of NIIN/NSN and/or subset of classified, nuclear weapons related materiel, critical safety items, etc. selected for IIM must be evaluated to ensure DoD is getting an exact value from this significant investment.

Implementation Diagram for Appendix A



APPENDIX A. IMPLEMENTATION OF CAPABILITIES

Capability 1- Capture UII Items on New Stock As Delivered

1.a. Receipt; verify UII/Push to Registry

At this time, we do not know which NSNs will be UII-managed, so the short-term assumption is that for all inbound shipments with an ASN that includes UIIs, all UIIs should be verified with the ASN and captured. The DCs are currently receiving some ASNs from vendors and verifying, to the extent possible, that items received have UIIs. Because they currently have no way to read a mark on the actual item, they are using UII data from any barcodes on the outside of the item package, if present. For non-sensitive material, if there are multiple "eaches" in shipments of new material being received, only one package is opened in order to confirm that the delivered item is actually what was ordered from the vendor. For shipments of material having CIIC codes of "classified, sensitive, or pilferable", all packages must be opened and verified by the receipt processor and supervisor. Any UII barcode data on the package is read into DSS (but this is not retained after the receipt to stock transaction) and a transaction is sent to the Registry.

Actions Needed:

1.a.1. Determine NSNs to be managed by UII [OSD/SCI]

1.a.2. Develop an alert capability for the DSS data record showing the item is UII-managed [DLA DLIS]

1.a.3. Verify UII mark on items during receipt

1.a.3.1. Determine policy on having to open and verify every mark on every item to secure UII data for the Registry. This applies to UII-managed as well as other material that is received with UII markings provided by the vendor.

1.a.3.2. Determine funding source for equipment [DLA]

1.a.3.3. Obtain and field the reader/verifier equipment [DLA]

1.a.3.4. Code the location of UII technical marking for the NSN in FLIS, and tie to the NSN-UII alert so receiving personnel will know where to look for the mark [DLA DLIS]

1.a.3.5. Train DC personnel on the mark verification process

Target capability dates:

1.b. Create PDF417 barcode label with UII(s) for external package

If the vendor has not marked the outside of the layer1 package with a barcode containing the UIIs of the contents, DC receiving personnel must create a new label. This capability does not exist at this time.

Actions Needed:

1.b.1. Design and develop print program in DSS to produce barcode labels containing UII(s) of package contents [DLA DLIS]

1.b.2. Train personnel on production of UII external labels (per MILSTD 130)

Target capability dates:

1.c. Initiate SDR action for missing UII or UII-mismatch

Discrepancy reporting is currently done via an automated means. DLA will need to modify procedures for actions to take when 1) UIIs are missing for FLIS-coded NSNs, 2) ASNs do not provide UIIs in advance as required, 3) items and/or external packaging are not marked with UII as required by the contract, or 4) UIIs on the package or item do not match the UIIs transmitted by the vendor via the ASN.

Actions Needed:

1.c.1. Develop new business process guidelines for UII-related SDRs.

1.c.2. Modify DSS application for creating and sending SDRs to include reason codes applying to UII discrepancies

1.c.3. Train personnel on new SDR processes for UII discrepancies.

Target capability dates:

Capability 2—Store by UII

2.a. Capture UII in DSS; add stow location by UII.

An important short-term effort is needed to be able to capture and retain UII data for new items being accepted which are marked under FAR contracts. Because we do not know which NSNs will be identified as the UII-managed set, we need system changes to DSS to allow all UIIs to be associated with their corollary NSN. We also need the capability to record the stow location of any NSN/UII combination. Once this capability is implemented, for the short term (until the IIM NSN set is known and the FLIS alerts are ready), we should plan to capture any UII data that comes via vendor ASNs and/or on external packaging. Much of this UII data may be of no IIM value, but it could be purged by-NSN later if not needed when the IIM NSN set is defined.

Actions Needed:

1.d.1. Modify DSS data structure to include/retain UII information linked to its NSN, whether UII-managed or not.

1.d.2. Modify DSS to link UII to stow location.

1.d.3. Train personnel on procedure changes.

Target capability dates:

2.b. Link package pRFID data and UII data in DSS database

Per DOD guidance, materiel being purchased by the government under contract should have pRFID media applied at the case or pallet level. Individual items may also have pRFID tags affixed, and ASN data will include the tag identifier. pRFID provides the capability to associate a "license plate" tag with other relevant data such as the nomenclature, stock number, etc. UII data should be included in this data association within DSS. This will allow UII data to be displayed when the pRFID tag is read, preventing the need to do a physical scan of the package(s) to determine the UIIs of the contents.

Actions Needed:

2.b.1 Modify DSS to show associations of UIIs in packages with the license plate pRFID tag on the package. Allow DSS to return UIIs in responses to pRFID tag reads.

2.b.2. Develop processes for using pRFID scans in lieu of physical handling of material and barcode scanning to confirm or locate a single UII.

2.b.3. Train personnel on processes

Target capability dates:

2.c. Report UIIs of on-hand assets to owner/managers and reconcile UIIs by DC

The IIM requirements document says the DCs must have the capability to inventory and reconcile by UII. In order to reconcile, it is first necessary for the DC to advise the ICPs and other owner/managers of the UIIs it holds in on-hand inventory. At this time, when new vendor deliveries are processed, the DSS at the DC passes a transaction to the ICPs showing the addition to inventory and passing the UIIs. This process can continue in the short term, but as more IUID material is processed, passing individual transactions in real time may not be the best way. We suggest that the UII data from each DC DSS be included in an enterprise view within DLA's Enterprise Business System (EBS, part of the DLA ERP). This way, ICPs or other users with permissions, can scan by stock number and see the quantity and all UIIs held at each DC. As new stock is received, or issues decrement UIIs, the overall view will be updated in near real time. This precludes routing individual messages to each addressee linked to management of a given NSN.

ICPs or other owner/managers that wish to reconcile UII data within their systems would query EBS based on their preferences in order to perform the reconciliation. Disparities in data would then be addressed through channels to the appropriate DC. This process will also support visibility and reconciliation for legacy stocks held in inventory. As each is marked, the UII will be recorded in DSS and updated in EBS.

Actions Needed:

2.c.1. Continue current process of including UII data upon receipt of new stock

2.c.2. Modify EBS to allow a view of all UIIs for each IIM NSN, by DC location where the item is held (not to the level of location within the DC).

2.c.3. Modify DSS to include UII data in updates sent to EBS.
2.c.4. Provide permissions/access to EBS to the ICPs, owners, and managers

2.c.5. Clarify IIM policy to require ICPs, owners/managers to access EBS as needed to conduct a review of IIM assets on-hand and reconcile accordingly directly with the DC if discrepancies are noted.

2.c.6. Train personnel on new procedures.

Target capability dates:

Capability 3—Issue by UII

3.a. Issue a specific UII within a NSN set to fill an order

We believe that, at first, filling an MRO by UII will be the exception rather than the norm. This will change as more Service-owned and managed stock is marked and reported by UII, and as maintenance capability to manage by UII develops further. We envision several possibilities:

- Marked-stock UIIs will be recorded in DSS and EBS. When an MRO is filled, any item may suffice, and the UII of the one selected will be forwarded in the shipping information and ASN, and the inventory account decremented.
- Service-owned stocks are marked (including legacy inventory held by DLA) and when an order is filled, the DC must pull any of the UIIs as long as it is owned by the requesting Service.
- A specific UII is requested based on the attributes of the item (hours, condition, etc.) The MRO will be routed to the specific DC that holds the UII item for fill.

Actions Needed:

3.a.1 Develop ICP software to allow an MRO action to indicate these 3 choices.

3.a.2 Using owner/manager data and UII visibility within the DCs via EBS, develop capability for ICP processing of MRO to select fill source by owner/manager and/or by specific UII if requested during the requisition process.

3.a.3 Develop DC fill process to fill MRO by owner/manager. (This may necessitate segregation of stock by owner, or premium pull transaction to locate by-owner item from bulk storage.)

3.a.4 Develop DC fill process to fill MRO by locating a specific UII for pick and pull. (This also may necessitate segregation of stock by UII, or premium pull transaction to locate the item by-UII from bulk storage.) This process requires the previously mentioned changes to DSS to enable visibility of each UII and stow location within the DC.

3.a.5 Train personnel on new procedures.

Target capability dates:

3.b. Decrement UIIs from inventory upon issue

If DSS (and EBS view) shows all UIIs within a NSN set within the inventory at a DC, the UII's status will need to be changed within the database when the item changes from "on-hand" to "pulled/processed" and eventually "shipped."

Actions Needed:

3.b.1. Develop process to capture the UII of the item pulled from stock using pRFID, barcode scan, or read/verification.

3.b.2 Initiate system change to DSS to change the status of the UII while in processing and to decrement it from the on-hand inventory when shipped

Target capability dates:

3.c. Establish capability to link UII and pRFID data in parent-child relationships for consolidations in packaging

Each IIM item will be marked with a UII, and multiple UIIs may be packaged in a single package (layer 1). As items are consolidated for storage or for shipping, these packages may go into other packages, such as a triwall box (layer 2) and then a shrink-wrapped warehouse skid (layer 3). Packages must be marked to show all UIIs included in the subsequent layers; e.g. layer 3 includes all UIIs included in layer 2 and 1 packages. Passive tags may be attached to each layer, and their relationships must also be shown for consolidations and de-consolidations. This data must be seen in DSS, but is not necessarily required in EBS.

Actions Needed:

3.c.1. Determine process to insure UII and pRFID data is captured and linked as items are moved from one layer of consolidation to another.

3.c.2. Initiate system changes to DSS to record current UII/pRFID parent child relationships and to update relationships as items are processed from one configuration to another.

3.c.3. Train personnel on new processes.

Target capability dates:

3.d. Include UII data in transportation movement control documentation (TCMD) and labeling

At this time, the transportation node believes that all UII-related data should remain in the supply source database. UII information is not necessary for the control and movement of shipments. Still, any UII data associated with a shipment should be linkable in the source system to system that creates the shipping document so that a query of the transportation control number (TCN) will allow visibility of the UIIs in the shipment contents (TCN 123 = UIIs A, B, C & D). At some later point, policy may require that UIIs be passed within TCMD data. MILSTD 129 currently requires UII data to be placed within shipment 2D barcodes in the military shipping label. DSS system changes will be required to do all of the above.

Actions Needed:

3.d.1 Modify DSS to link TCN information to any subordinate UIIs (and pRFID tag data) in a shipment, whether a single item or a consolidated shipment.

3.d.2. Modify DSS to enable inclusion of UII data per MILSTD 129 when producing military shipping labels.

3.d.3 Train personnel on any new procedures.

Target capability dates:

Capability 4—Modify FLIS to provide UII mark location for each IIM NSN

Above, we mentioned a temporary way to have vendors/manufacturers provide details in the ASNs as to where the UII marks could be found on items they ship to the government under contracts. Eventually, however, IUID will require permanent technical data for each NSN that shows where and how an item should be marked. We believe that this information, once developed by technical engineers, should be included not only in tech data for the item, but also in the federal supply catalog data at FLIS. When an item is received, either new or a lateral from another DoD shipper, the IIM alert for the NSN will display and the marking information should either be displayed simultaneously or from a pull-down screen.

This information is required for receipt processing, inventorying by UII to include verification of marks, and will be critical prior to any effort within the DCs to begin marking legacy stock in inventory.

Actions Needed:

4.1 Determine which NSNs will be IIM-managed (OSD).

4.2 Task ICPs and functional technical experts for each NSN to develop and field instructions for marking the NSNs (OSD, DLA, Services)

4.3 Modify FLIS to include marking requirement information

4.4 Modify DSS IIM alert screen for each NSN to link to either display the marking information or link to a pull-down screen. Link same information to any query of the NSN so that personnel requiring info on the mark can find the location, and personnel performing marking can follow technical data.

4.5 Train personnel on new procedures.

Target capability dates:

Capability 5—Mark legacy stocks in inventory

The capability to mark stocks is contingent upon 1) access to technical information for each NSN to be marked; 2) procurement of marking equipment for each DC; 3) training for personnel; and 4) a concept for prioritization of which NSNs could/should be marked.

Actions Needed:

5.1 Determine prioritized set of NSNs to be marked at the DCs based on IIM requirements.

5.2 Determine when technical data for marking will be phased in to allow marking at the DCs.

5.3 Coordinate purchase and arrival of equipment in conjunction with availability of marking technical data.

5.4 Corporately, or at each DC, determine a concept for who will perform marking services. If this requires creation of new manpower positions and recruitment, factor lead times into target capability dates.

5.5 Determine funding for equipment purchase

5.6 Determine source of training for personnel

5.7 Purchase marking equipment for each DC

5.7 Train personnel on marking.

Appendix G

Logistics Item Unique Identification Task Force

Transportation Node
IUID Cost Analysis

Final Working Paper

December 22, 2009

**Prepared by the
Transportation Node Working Group
Item Unique Identification Task Force**

CONTENTS

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Transportation Node
IUID Cost Analysis

1. SUMMARY

IUID does not affect the Defense Transportation System (DTS) processes. Transportation tracks shipments, not items.

Normally, a Transportation Control Number (TCN) is assigned to DoD-sponsored shipments entering the DTS. The TCN is the single standard shipment identification number.

The DTS will provide the transportation identifier (TCN) to the DoD Components and AISs to support the linking or correlating shipments to IUID (maintain referential integrity, keeping the link of TCN to Requisition number to UID).

Depending upon the functional requirement and the chosen technical solution, the Integrated Data Environment (IDE)/Global Transportation Network (GTN) Convergence (IGC) can broker the required data through IDE, store IUID data within the Enterprise Data Warehouse (EDW), and provide business intelligence tools that can fuse the data from the supply shipment status with the transportation transactions to provide the users visibility of particular shipments and their associated IUIDs. While the estimated online date for IGC is 1st Quarter, Fiscal Year 2011, the availability of the IUID data is contingent upon provider systems having IUID functionality and the IUID data being populated within those systems. This varies from service to service and system to system. Initial capability and data could be available by FY11 while full utility may not be in-place until FY15. In addition, the delivery date of business intelligence tools to provide users visibility would depend upon the yet to be developed requirements for such applications.

Future environment–Passive RFID tag and bar-coded TCN on Military shipping label will be used for tracking. Dual capabilities required as not all DoD, commercial or coalition activities will have RFID capabilities.

Document numbers can be used by supply systems to link Transportation information to item information, to include IUID.

2. PROCESS TO BE UNDERTAKEN AND VALUED

N/A

3. APPROACH TO DETERMINE RETURN ON INVESTMENT

N/A

4. ASSUMPTIONS

Defense Logistics Management System (DLMS) and/or Defense Transportation Electronic Business (DTEB) EDI/XML compliance to enable end-to-end data visibility for Transactions (Advance Shipment Notice, Supply Shipment Status, Due-In Notice).

IUID capability to develop as DLA/Military Services' supply systems ability to receive, store, and pass IUID data for certain items matures.

Even though IGC will be online by 1st Qtr, Fiscal Year 2011, specific development work for the data broker, data warehouse and business intelligence tools would still be required. In addition, IUID functionality is dependent upon the capability of source systems to actually have data to provide. The estimated online date for IUID functionality and data population varies from FY11 to FY15, driven primarily by EPR delivery schedules.

As the shipment moves through the transportation nodes and undergoes consolidation and deconsolidation actions, transportation shall not change the integrity of the TCN to requisition relationship documented in the supply shipment status.

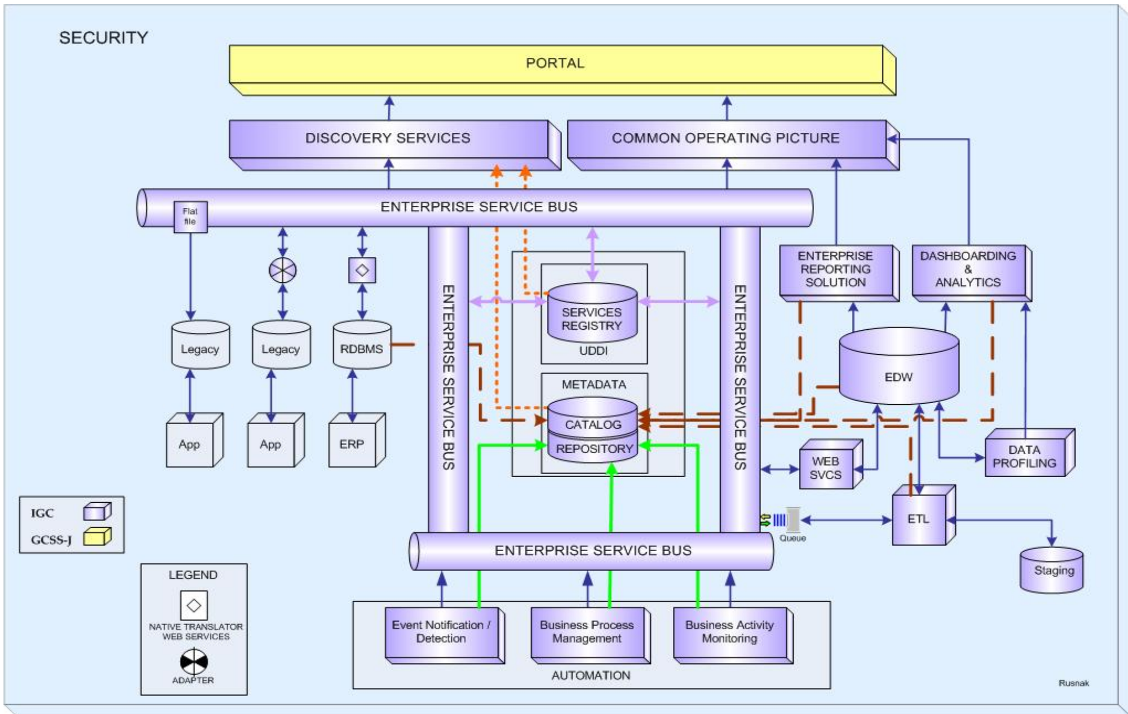
5. EXECUTION

a. IT/AIS Requirements

An information taxonomy analysis showed that cargo affected by the IUID initiative would be identified by Transportation Control Numbers (TCNs). It is the responsibility of the shipping entity or supplier to relate the TCN to the items being shipped. This linkage will provide the IUID relationship to TCN.

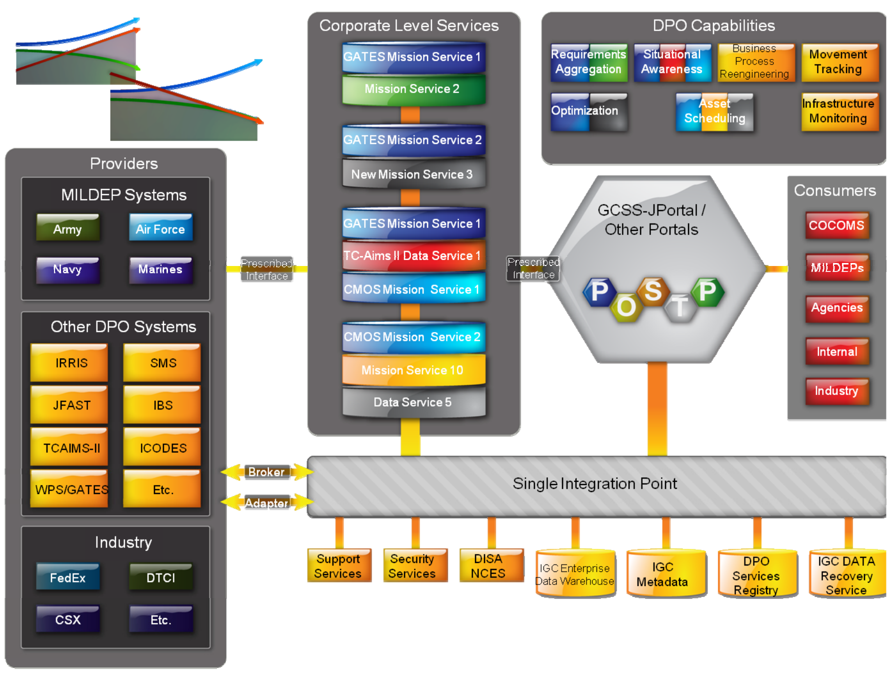
The DTS will provide the transportation identifier (TCN) to the organizations and AISs except for some vendor/sustainment related shipments (which are outside of the DTS) to support the linking or correlating of shipments to IUID. In the future, DoD Component Supply Chain/ERPs/AISs will be able to subscribe to the IGC Enterprise Service (Service Oriented Architecture–SOA) to provide IUID visibility to IGC. This is depicted in the IGC Service Oriented Architecture in the Figure 1.

Figure 1. IGC Services Oriented Architecture



The Corporate Services Vision for the DoD Enterprise will include Front-End Services, Business Intelligence, Decision Support, In-Transit Visibility, Data Services, Brokering, Web Services, Metadata, Business Services, Application/Program, Infrastructure. See Figure 2 below.

Figure 2. DPO Capability Delivery Through Services



b. Time to Execute/Receive Benefit

N/A

c. Policy & Guidance Changes

No changes required.

6. COSTS

Cost of an IUID Enterprise Service

If the DTS is required to process IUID information, only those systems interfacing directly with shippers should be modified to process IUID information. Under the Corporate Services Vision, one system would host an enterprise IUID service, and other systems and applications would use this service to associate their existing identification methodology with IUID. Assume that IGC would host the service, and IGC, DPS, GATES, GFM, and IBS will process IUID information. These 5 systems are the only TWCF systems that pass Electronic Data Interchange 856A/315N transactions and those most likely to process IUID information.

- The key assumption is that only 5 TWCF-funded systems would need to be modified. Validating this assumption would require effort from architects and engineers after we have a validated requirement and know what the IUID will be used for.
- Since IGC will host the most complex data analysis and host the IUID service for the enterprise, assume it would cost as much as the highest TTN estimate: $2,100,000.
- The other four are assumed to cost an average $731,000 each.
- Non-TWCF systems (CMOS, FACTS, AMS-TAC, and TCAIMS II)
- This would total $2,100,000 + 8 * $731,000 = $7,948,000 for the 9 systems (TWCF and non-TWCF) that would actually need IUID information.

If these nine systems are modified to implement an enterprise IUID service, the total cost is estimated at $7,948,000.

USTC has estimated that modifying all TWCF systems to process IUID would cost an estimated $27.8M.

7. BENEFITS

N/A

8. REQUIREMENTS PASSED TO OTHER NODES

The Supply Community has a pre-existing requirement to link the TCN to Intensive Item Managed (IIM) serially tracked items, which in the future will be IUID. The transportation 856A transaction has a dependency upon the supply 856S transaction. The availability of the IUID data is contingent upon provider systems having IUID functionality and the IUID data being populated within those systems.

9. ISSUES

Funding and required DTS systems' modifications.

10. CONCLUSION

If the data is captured by the modified supply source systems and provided via the DTS to IGC–the Transportation Node will have the status of assets from end-to-end, including IUID. Modifications to Transportation Systems to support IUID are not necessary to support referential link (TCN) because there is already a linkage that allows visibility of IUID info throughout DTS. IGC will tell you the status of assets from end-to-end–including IUID–if the data is captured by the source supply systems and provided to IGC.

Modifying all TWCF systems to process IUID would cost an estimated $27.8M. Analyzing the IUID policy in the context of the JDDA-E indicates that no systems need to be modified because the IUID policy does not affect DTS processes. This course of action would result in a cost avoidance of the entire $27.8M.

If the transportation domain is required to process IUID, only nine key systems should be modified. This would cost $7.9M, and result in a cost avoidance of $19.9M compared to modifying all systems.

Appendix H

Logistics Item Unique Identification Task Force

Base/Forward Supply Node IUID Cost Analysis

Final Working Paper

February 17, 2010

Prepared by the
Base/Forward Supply Working Group

CONTENTS

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- Jerry Zamer — U.S. Navy, AIT
- Greg Beecher — U.S. Air Force, A4/ID
- Dan McLaughlin — Defense Logistics Agency

Base/Forward Supply Node
Cost Analysis

1. BACKGROUND

1.1 Implementation of IUID has been mandated as part of a larger strategy to improve the effectiveness and efficiency of DoD supply chain management. Other components of this strategy are passive and interactive radio frequency identification (RFID) technology. The use of RFID is intended to reduce the human interaction time and errors (e.g., physical movement and manual data entry), thus reducing overall manpower requirements and speeding the flow of materiel through the supply chain. IUID usage is focused at improving data accuracy and ensuring data quality. This will have a “ripple” effect on weapon system sustainment and inventory management at both the National and “retail” echelons of supply.

1.2 The IUID Task Force (TF) definition of the B/FSN is: Actions at a local inventory site to provide materiel to customers. This can include local supply activities in support of depot activities.

1.3 Each of the DoD components operates a unique network of B/FSN facilities with customized automated information systems (AIS) and developmental automated identification technology (AIT). This document will focus on estimating the AIT cost of implementing IUID capabilities at the B/FSN for all DoD components. Estimated AIS costs for implementing IUID within the B/FSN have been captured by other IUID TF nodes, primarily within the In-Service and Logistics Analysis Node. Ground rules provided by the IUID TF for all nodes to use in their cost analysis effort are provided at Appendix A.

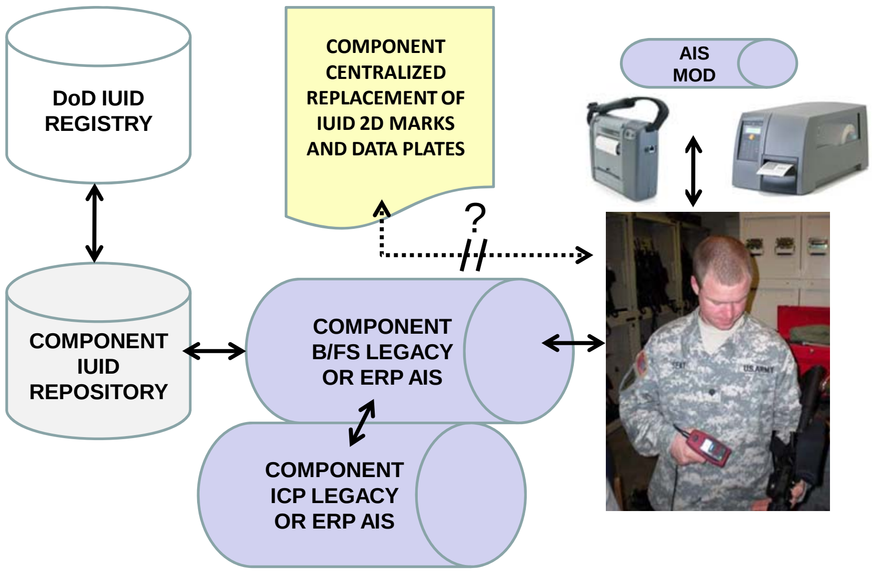
1.4 The B/FSN IUID functional requirements as developed by the three value chains are provided at Appendix B. The most significant of these are from the Intensive Item Management (IIM) value chain, which are provided in flowchart format at Appendix C. The flowcharts highlight the anticipated requirement to both scan and print shipping labels with two dimensional UID marks. This requirement implies the need for hand-held terminals (HHTs), printers and service unique AIS interface at each B/FSN location.

1.5 Installation-level property book system IUID requirements are considered within the purview of the B/FSN and are discussed in this cost analysis.

2. BASE AND FORWARD SUPPLY NODE OPERATIONAL CONCEPT

2.1 UIDs will be “scanned” via HHTs that are linked to the components’ B/FSN AIS (e.g., property book and “retail” supply systems). The AIS is linked via wide area workflow to a centralized IUID repository managed by each component (that is in turn linked to the centralized DoD IUID registry). The B/FSN AIS will also be linked to the service’s National echelon supply system to maintain asset visibility, inventory reconciliation and valuations between the two systems. Each B/FSN location will be provided with IUID label printers to replace missing and damaged labels as required. Item marking and data plate production will be centralized within each component at an industrial facility. The details of how missing data plates and marks will be handled by the B/FSN echelon within each service has not been determined, but should not impact the high-level cost estimate in this document.

2.2 This operational concept is illustrated as follows:



3. BASE/FORWARD SUPPLY NODE BUSINESS PROCESSES

3.1 B/FSN warehouse functional and systemic operations that expected to be impacted by the introduction of IUID functionality include:

3.1.1 **Receiving:** When a UII managed item is received at a B/FSN activity, the 2D data matrix on the item, or on the exterior packaging, will be scanned and compared to the advance shipment notice (ASN) received from the source of the materiel. The scanned UII information will update the owning components' centralized IUID repository. For example, the item location/ownership (unit/UIC/DODAAC) will be updated as will the item's status in the B/FSN inventory management system (e.g., "pending put-away", or "pending issue"). Discrepancy reports will be generated for UIIs that cannot be successfully processed.

3.1.2 **Inventory:** Materiel and equipment in storage will have a bin label identifying that the item is IUID relevant. The UII will not be printed on the bin label, but will be on the identification label associated to each individual item. Inventory of items in storage will require scanning to identify UII information on the label. The UII data on the item label will be compared with UII information in the AIS. Discrepancy reports will be generated for UIIs that cannot be successfully processed.

3.1.3 **Issue:** The catalog description information for the item will be printed on the pick ticket (release documentation) both in the clear and encoded. When the item's data matrix mark is scanned, the software will update from "storage" to "pending issue" for that unique item. When the customer picks up an IUID item, the UII 2D data matrix is scanned and the event data will update from “pending issue” to “issued” for that unique item and B/FSN inventory levels adjusted accordingly.

3.1.4 **Turn-in:** The UII managed items turned in to the B/FSN location must have required turn-in documentation to be input to the services’ IUID database. The scanned UII information will be compared to the advance shipment notice (ASN) received from the source of the materiel. If the ASN data is not found, the UII information will be matched in the service data repository and updated location and ownership will be posted to the data base.

3.1.5 **Shipment:** The B/FSN clerk will scan the UII, if the data scanned matches the release ticket, the shipment status will be updated in the services’ centralized IUID database and the B/FSN inventory management system.

3.2 Examples of B/FSN property book IUID functional and systemic requirements include:

3.2.1 Capability to perform automated inventories with the IUID marking.

3.2.2 Ability to scan MILSTRIP receipt documents at the property book or tactical unit level.

3.2.3 Automate document processing. For example, creating lateral transfer, asset adjustment and found on installation transactions via HHT.

3.2.4 Use scan of UID mark to automatically add serial numbers, registration numbers and lot number data as applicable.

4. ASSUMPTIONS

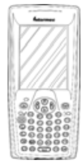
4.1 A central program manager (PM) will plan, design, deploy, train, sustain and manage configuration control of IUID capabilities within each DoD component. Basis of issue (BOI) decisions for AIT deployment will vary between services and their PMs.

4.2 The IUID AIT managed by these PMs will be standardized between the components and will link to existing or planned component-unique B/FSN systems and also the centralized (and standardized) IUID central data base maintained by the Defense Logistics Information Service in Battle Creek, MI.

4.3 The cost of IUID automated information systems (AIS) will be consolidated and priced separately from this B/FSN cost analysis. As noted in the background section above, the bulk of these costs are itemized in the IUID TF In-Service and Logistics Analysis Node cost estimate.

4.4 Applicable ground rules provided by the IUID TF are at Appendix A.

4.5 Cost factors used to estimate "retail" supply and property book AIT cost estimates for the B/FSN are illustrated as follows:



Hand Held Terminals: $1,003 each*

Basis of Issue: 1 per property book location
6 per retail supply location

Label Printers: $678 each**

Basis of Issue: 1 per property book location
2 per retail supply location

THERE IS NO AIT OR BOI STANDARD WITHIN DoD…THEREFORE B/FS COST ESTIMATE IS JUST THAT…AN ESTIMATE

- HHT COSTS BASED ON INTERMEC 751G COLOR MOBILE COMPUTER WITH WIRELESS TECHNOLOGY, DIGITAL IMAGER AND MICROSOFT WINDOWS CE.NET OPERATING SYSTEM. THERE ARE LOWER COST SCANNERS THAT WILL PROVIDE BASIC UII FUNCTIONALITY E.G. TETHERED VICE WIRELESS HANDHELDS. BULK BUYS WILL ALSO LOWER UNIT COSTS.

** PRINTER COST FROM ARMY PROPERTY BOOK PROCUREMENT FROM PM-JAIT

5. PROPERTY BOOK COST ESTIMATE

MILLIONS OF DOLLARS

	ARMY	NAVY	AIR FORCE	USMC	DLA	ALL
LOCATION COUNT	13,111				923	
HHT COST	$13.2				$.462	
PRINTER COST	$8.9				$.313	
ESTIMATED TOTAL	$22.1				$.775	

NOTES:
- ARMY COST BASED ON $1003 HHT BOI OF 1 PER SITE AND $678 PRINTER BOI OF 1 PER SITE ARMY AIT COSTS COVERED BY PROPERTY BOOK UNIT EXPANDED (PBUSE) SYSTEM UPGRADE
- DLA COST BASED ON 1/2 HHT AND PRINTER FOR EACH LOCATION (USING SAME UNIT COST AS ARMY
- NAVY, AIR FORCE AND MARINES DID NOT RESPOND TO DATA CALL

6. RETAIL SUPPLY COST ESTIMATE

MILLIONS OF DOLLARS

	ARMY	NAVY	AIR FORCE	USMC	DLA	ALL
LOCATION COUNT	603	372	233		NA	
HHT COST	$3.6	$3.6	$4.7		NA	
PRINTER COST	$.82	NA	NA		NA	
ESTIMATED TOTAL	$4.4	$3.6	$4.7		NA	

NOTES:

- **ARMY COST BASED ON $1003 HHT BOI OF 6 PER SITE AND $678 PRINTER BOI OF 2 PER SITE**
- **NAVY BOI IS 9.67 HHT PER LOCATION (TOTAL OF 3600 HHT @ $1003 EACH). NO PRINTER COSTS.**
- **AIR FORCE BOI IS 9.4 HHT PER LOCATION (TOTAL OF 2190 HHT) WITH NO PRINTER REQUIREMENT AIR FORCE HHT UNIT COST IS $2154 AND COVERED BY EXPEDITIONARY COMBAT SUPPORT SYSTEM**
- **THIS NODE NOT APPLICABLE TO THE DLA**
- **NO DATA CALL INPUT FROM THE MARINES**

7. BENEFITS

7.1 Each of the IUID TF value chains have detailed benefits analysis across all 10 nodes which are included in the overall project documentation.

7.2 Reference the background provided in paragraph 1 above, when integrated with emerging enterprise resource planning, in-transit visibility and radio frequency identification (RFID) capabilities, IUID will provide users with a more accurate and reliable view of worldwide inventory—both in-transit and on-hand. A more accurate and timely accounting of B/FSN assets will also enhance support the tactical commanders and provide logistics sustainment managers with new capabilities to improve B/FSN inventory management.

7.3 IUID implementation is also expected to improve the efficiency of the B/FSN functions listed in paragraph 3 above. The efficiencies will be realized via the reduced man-hours required to accomplish each stock control and inventory management task.

For example, the Property Accountability value chain provided this anecdotal example of IUID manpower savings from within the Defense Property Accountability System (DPAS):

DPAS Office Study

Inventory Method	Minutes per item	Minutes for 6 million items	Hours it equates to	Cost
Paper	15 minutes	90 million	1,500,000 hours	$97,500,000
Barcode Scanner	3.75 minutes	22.50 million	375,000 hours	$24,375,000
Savings	11.25 minutes	56.25 million	937,500 hours	$73,125,000

Results

- **15 minutes average to complete a manual inventory of one item (Includes set up and admin time to complete inventory e.g., locate marking / dismantle item to scan reach bar code)**
- **Estimated 75% labor efficiency using AIT/AIS technology On average, it saved over 10 minutes per item**
- **Estimated labor rate of $65 per hour and the number of equipment end items above $5,000 that would need to have a UII, which is being estimated at 6 million**
- **Results would equal a savings of over 73 million dollars per inventory on manpower costs for all the DoD Components to implement IUID policy**

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7.4 The very volume of manpower-intensive transactions that occur at the B/FSN suggest that IUID implementation there will result in significant time savings as were documented in the DPAS study above. A time and motion study is out-of-scope for this cost analysis, but annual transaction counts gathered for both the Navy and Army (shown below) attest to the large potential manpower savings impact that IUID implementation will have on this particular node.

	Counts in millions					
	Receive	Inventory	Issue	Turn In	Ship	Total
Army	7.026	0.636	4.881	0.463	7.935	20.941
Navy	1.482	0.741	1.334	0.296	1.186	5.039
Total	8.508	1.377	6.215	0.759	9.121	25.98

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- OSD IUID Task Force Intensive Item Management, Property Accountability and Product Lifecycle Management Value Chain Benefit Analyses
- Discussion with Mr. Russ Carter, Chief Life Cycle Logistics Division, Program Management Office, Global Combat Support System-Army
- Discussion with Mr. Robert Thurston, Chief, Logistics Enterprise Systems Support Division, U.S. Army Combined Arms Support Center
- Product Manager, Joint Automatic Identification Technology AIT-III Contract W91QUZ-04-D-0009 @ www.eis.army.mil
- "Logistics IUID Task Force, Report to JLB for Presentation 23 March 2010", by Mr. Greg Kilchenstein, Office of the Assistant Deputy Undersecretary of Defense for Maintenance Policy and Programs, version 5, dated 8 February, 2010

APPENDIX A. BASE/FORWARD SUPPLY APPLICABLE IUID TASK FORCE GROUND RULES AND ASSUMPTIONS

1. Use 2010 President's Budget as baseline for existing component AIS/AIT programs.
2. AIT equipment is available based on budget. Use standard average rates on AIT cost chart:
   - $10K for direct part mark verifier
   - $8K for label verifier
   - $2.3K for label and mark scanner (B/FSN cost analysis used an estimate of $1003 for each HHT based on recent DLA procurement, and the assumption that unit prices will
   - continue to decline as scanning and marking technology matures).
   - $102K for label and part markers, verifier, personal computer and software.

1. Use of AIT processes could achieve up to 80 percent reduction in level of effort for data capture and entry as opposed to manual processes.
2. Assume the [data capture] error rate is near zero as opposed to manual data entry processes, eliminating the need for future corrections.
3. Business processes must be changed to accommodate automated data entry.
4. Parts will not be direct marked at the B/FSN. Capability to print and replace missing IUID labels (on NSNs already registered in the central IUID data base) will be required.
5. Items not previously registered for marking in the IUID central will not be marked at the IUID mode.
6. Average labor rates are $86.7K per year for a DoD civilian employee and $84.3K per year for active duty military.
7. Use of automated data entry will result in and 80 percent reduction in level of effort for data capture and entry as opposed to manual processes; the error rate is near zero as opposed to manual processes.

APPENDIX B. BASE AND FORWARD SUPPLY IUID REQUIREMENTS SUMMARY BY VALUE CHAIN

I. Intensive Item Management Value Chain Requirements

(Note: many are common to all three IUID value chains)

Receive

ADDITIONAL BUSINESS PROCESSES:

1. When prompted by the system flag, the receiving activity will collect UII(s) via AIT from outside of unit packaging via PDF 417.
2. If UII(s) are not available on the exterior packaging, the receiver will open box and verify UII(s) on the item using the UII in the ASN. Then re-label the packaging, including the verified UII.
3. Receiving activity will look for evidence of tampering and/or damage. If yes, then open packaging to collect UII(s) from the item(s), perform causative research, repackage item(s), and apply a new label to the packaging. If the package cannot be opened, alternate procedures will be developed.
4. If no UII is available in the MSL or ASN, and/or the receiving activity finds UII mismatches, the receiving activity will execute supply discrepancy instructions.
5. Following receipt, receiving activities will specify item storage information to the local stock control system.

Additional System Requirements:

1. The system will provide receiving activity a flag (based on NSN in 856S) indicating that intensive management is necessary for that item, prompting receiving activity to collect UII(s) via AIT from outside of unit packaging.
2. If UII is pre-populated by ASN in the receiving system, the collected UII(s) will be systemically compared to the ASN UII.
3. If UII is missing or if UII mismatches occur between 856S and materiel received, the system will prompt supply discrepancy actions.
4. The system will prompt receiving activity to check for evidence of tampering or damage.
5. The system will send an update to the applicable ICP indicating receipt of UID items via a 527R transaction, which must include UII(s) for all items received and supply condition.
6. When prompted by receiving activity (when package label does not exist), the system will print new packaging label with UII(s) in PDF 417 format.

Physical Inventory

Additional Business Processes:

1. Upon receiving a Physical Inventory Request (846P) from the Owner/Manager (ICP), the storage activity will initiate scheduled and special NSN physical inventories.
   a. Installation-level activities storing (1) classified and sensitive items that are secret or above and not part of an end item (CIIC code 5, E, F, G, H, K, L, S, & T), (2) Category 1 Non-Nuclear Missiles and Rockets, (3) Category II, III, and IV Arms, or (4) NWRM that is not part of an end item shall perform a 100 percent physical count by UII at least semi-annually.
   b. Military Services or DLA may prescribe more frequent inventories and/or inventories by 100 percent physical count, as required. Must act on local stock control system alerts for inventory performance requirement.
1. Inventory Procedures:
   a. Collect UII(s) using AIT from outside of unit packaging via PDF 417 to update/confirm inventory record.
   b. If UII(s) are not available on the exterior packaging or if user finds UII mismatches, perform causative research.
   c. If there is evidence of tampering/damage for classified/sensitive items, open package and take 100 percent physical count of package contents.
   d. Verify, by physical location, all UII(s) and condition code against the accountable record. Report UII discrepancies to the Owner/Manager via 947I.
   e. Causative research is required on all discrepancies found as a result of the inventory. Adjustments to the accountable record as a result of the causative research must be approved at the Flag Officer/Senior Executive Service level regardless of dollar value.
   f. Repackage and re-label exterior packaging, as required.
   g. Notify Service/Agency owner of unmarked legacy items discovered in inventory process for disposition instructions.

Additional System Requirements:

1. Upon receipt of 846P from the ICP, system will prompt storage activity to initiate scheduled, special, and spot physical inventories.
2. Storage activity will respond to transaction history requests from ICP.

Issue

Additional Business Processes:

1. When prompted by system, issuing activity will use AIT to collect UII(s) from outside of unit packaging via PDF 417.
2. If UII(s) are not available on the exterior packaging, the issuing activity will use AIT to collect the UII from the item and place a new label with UII on packaging.

3. Notify Service/Agency owner of unmarked legacy items discovered in the issue process for disposition instructions.
4. Issuing activity will look for evidence of tampering and/or damage. If yes, then open packaging to collect UII(s) from the item(s). Item will then be repackaged. If the package cannot be opened, pursue alternate procedures.
5. Storage activity will decrement inventory in local stock control system by UII.

Additional Systems Requirements:

1. System will send issue transactions (945A/867I) to ICPs including the UII(s) in response to MRO from customer.
2. Upon receipt of MRO, system will provide issuing activity a flag (based on NSN in 856S) indicating that intensive management is necessary for that item, prompting issuing activity to collect UII(s) via AIT from outside of unit packaging.

II. Property Accountability Value Chain Unique Requirements

1. IUID will interface with the entities' property book accountability system of record.
2. The property book prevents updates and modifications to the UII.
3. When an item is disposed of, the property book must list the UII as inactive.
4. and prevent future use.
5. The specific materiel item is scanned when received and when shipped.
6. The services' IUID registry is kept up-to-date with the current status (of a UII item)
7. Maintain current status (materiel equipment validation and property book).
8. Maintain current custodian of asset (materiel equipment validation and property book).

III. Product Lifecycle Management Value Chain Unique Requirements

1. Controlling counterfeit parts.

Appendix I

Logistics Item Unique Identification Task Force

Depot Maintenance Node
IUID Cost Analysis

Final Working Paper

April 6, 2010

Prepared by the
Depot Maintenance Node Working Group

CONTENTS

Figures

Tables

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All contributed to this effort.

Steve Erickson and Rod Rowley were the principal authors of this document, and Matt Orochena was the principal developer of the cost model.

Depot Maintenance Node IUID Cost Analysis

1. SUMMARY

The Depot Maintenance Node Working Group is one of ten working groups established under the Item Unique Identification (IUID) Task Force. It was formed with a two-fold task. The first was to establish functional requirements for IUID marking and applications in commercial and organic depot maintenance operations. The second was to estimate the cost of establishing IUID marking capabilities in organic depot maintenance activities and the cost of marking selected materiel items using organic and commercial depot maintenance capabilities.

This document provides a summary of the depot maintenance cost analysis, which is designed to support the creation of an overall value proposition analysis for IUID that is being conducted by the full task force.

The working group established functional requirements for marking, tracking, and using unique item identifier (UII) markings within depot maintenance (requirements are listed in the task force appendices). The requirements were subsequently validated by the task force value chains and incorporated in an overall task force summary of requirements. The working group then analyzed the set of validated functional requirements for depot maintenance to identify significant cost components. By agreement with the task force, the working group's scope was limited to cost estimation. By further agreement, the working group did not address the potential cost to modify automated information systems (AISs) to make use of the information available through IUID applications. The working group did, however, develop estimates for the recurring and non-recurring cost of automated information technologies (AITs), including training and equipment costs, to implement UII operations within depot maintenance.

Even though the working group did not quantify the potential benefits of using IUID applications in the depot maintenance production environment, it did consider the full implementation of IUID marking, which would support the automation of many necessary processes that are currently either fully or partially manual; and process automation could result in a net decrease in depot maintenance costs. Although these applications would support the "track and use" functions for IUID applications in depot maintenance operations, they are not addressed further in this document. The value chain benefits analysis, conducted within the task force, extends to depot maintenance activities and accounts for such benefits.

Current IUID marking policy, contained primarily in DoD Instruction (DODI) 8320.04, June 16, 2008, requires the following categories of items be marked:

> 5.3.1. All items for which the Government's unit acquisition cost is $5,000 or more;
>
> 5.3.2. Items for which the Government's unit acquisition cost is less than $5,000, when identified by the requiring activity as DoD serially managed, mission essential, or controlled inventory;
>
> 5.3.3. When the Government's unit acquisition cost is less than $5,000 and the requiring activity determines that permanent identification is required;
>
> 5.3.4. Regardless of value, (a) any DoD serially managed subassembly, component, or part embedded within an item, and (b) the parent item that contains the embedded subassembly, component, or part.

The working group focused a major portion of its effort on estimating the cost to establish capabilities and mark items. The group developed estimates (refined with inputs from the services and DLA) of the number of installed and in-stock items that currently meet the marking criteria, including weapon systems, systems and equipment, embedded items (i.e., items that meet the marking criteria and are already installed on higher assemblies), and service-managed in-stock items.

The working group estimated there are 148.5 million items for which the Depot Maintenance Node must develop cost elements. When combined with the Distribution Center Node estimate of 186 million consumable in-stock DLA items, the total number to be marked throughout DoD is approximately 334.4 million. Of the 148.5 million items considered by depot maintenance, 8.3 million are end items, 49.6 million are reparable items, and 90.4 million are consumable items.

The initial estimate of total quantities of applicable items to be marked throughout DoD is as follows:

DLA in-stock items (consumables)	**186.1M**
End items	8.3M
In-service reparable items (installed and in stock)	49.6M
Service-possessed consumable items (installed and in stock)	90.4M
Total initial estimate	334.4M

The Depot Maintenance Node was responsible for estimating the portion of the total inventory of eligible items that would be marked in commercial and organic depots. The computation is as follows:

Total initial estimate	**334.5M**
Less DLA in-stock (addressed in distribution center node)	(186.0M)
Net to be marked by depots and by other means (reparable and consumable, installed and in stock)	148.5M
Less quantities the services plan to mark by other means	(26.6M)
Less quantities already in the DLIS IUID registry[1]	(9.0M)
Net to be marked in organic and commercial depots (applicable to Models A and B described below)	112.9M

At a cost of $62 million, the military services plan to mark an estimated the 26.6 million items using a means other than depot maintenance. The Navy, for example, plans to conduct marking operations aboard ships while underway, using the ship's crew for manpower. For Models A and B (described later), the quantities to be marked in depots included installed quantities of critical safety, classified, sensitive, and pilferable items as well as reparables.

The number of items that will actually be marked in depots will be somewhat smaller than the initial target population, as a result of washout and item replacement rates explained later.

The working group prepared three models to estimate the cost of fulfilling the marking requirement within depot maintenance. All three models supported a sensitivity analysis for the overall effort, assessing relative changes in cost, quantities, and time to mark that could result from changes in policies and operating assumptions.

The working group developed a set of assumptions for use in its models. For example, the models assumed 5 percent of the total reparable inventory would be replaced each year due to condemnation, consumption, or new item replacement. The models also assumed weapon system replacements would occur at a rate of 4 percent per year. The total effect on reparable inventory is to reduce the portion of the unmarked inventory by 9 percent per year. The same replacement rate was assumed for consumable items. A complete listing of the assumptions is contained in the enclosed Depot Maintenance Node Analysis found at the end of this document.

The first model (Model A) was designed to comply with current Defense policy for IUID marking, and thus would mark all applicable items (in the case of the Depot Maintenance Node, reparable items valued above $5,000 as well as applicable embedded expendable materiel) over a 6 year period (2010 to 2015). A fundamental problem that could not be overcome with this model was the effect this marking rate (marking all DoD inventory within 6 years) would have on equipment and unit readiness—it is not feasible to sustain this marking rate without removing serviceable, ready equipment from inventory to undergo the marking process. It is also implausible that the total inventory of materiel would generate at DoD organic and contract depots in a

[1] Approximately 9M items are already marked and registered in the Defense Logistics Information Service (DLIS) IUID Registry.

6 year period. Nevertheless, the model computes the volume and marking cost of complying with the current policy for the total applicable inventory.

The second model (Model B) was designed to comply with current policy on applicability (that is, which items to mark), but it was not limited in terms of time. Instead, the model was constrained by the organic depot throughput capacity in terms of number of items produced in organic depots per year. The total annual production also takes commercial sources into account. This model would complete the marking requirement in a little more than 17 years (2027). The model would actually mark fewer items than Model A, because of the effect washout and item replacement would have on the legacy population.

The third model (Model C) assumed a set of changes to current marking policy that would substantially reduce the number of consumable items to be marked, while still meeting the Defense objectives for overall marking. The net result would mark nearly 27 million items over a little more than 10 years (2020). Once again, in addition to the reduction in the target population for marking, the number to be marked was reduced by the washout and item replacement assumption. The marking rate was also constrained by the organic depot maintenance throughput capacity, with allowance for commercial accomplishment.

A comparison of the recommended changes in policy that were evaluated for Model C follows:

Table 1. Policy Recommendations

Current Policy	Recommended Policy
Mark all applicable items by 2015 and end items by 2010.	Apply UII to applicable legacy items IAW updated policy. Use UII for lifecycle management NLT 2015.
Mark all sensitive, classified, and controlled items.	Apply IUID management to intensively managed & tracked items (IIM, new and legacy): Small arms, NWRM, sensitive, and classified. Pilferable and CSI over $5K.
Mark all new acquisition and legacy items over $5K, and all mission essential, serially managed, and GFP items.	Apply UII to these new acquisition and legacy items: • End items • Mission essential items • Reparable items • Serially managed items • GFP • Non-intensively managed consumables by RA discretion.
All other items at discretion of requiring authority (RA).	No change–achieve management goals and benefits in orderly, cost-effective manner.
Services and DLA budget for implementation costs.	Services and DLA prioritize non-recurring engineering for IUID in budgets.

Notes: GFP = government furnished property; NWRM = Nuclear Weapon Related Materiel.

A fundamental assumption for Models B and C was that marking would occur opportunistically; that is, whenever component parts and end items might be accessible for marking operations.

Once the military services begin organic marking operations in earnest, it is likely that opportunistic marking will represent an increasing share of total marking operations as the services press toward full-capability implementation.

Total items to be marked by organic and commercial sources were split based on the proportion of funding reported in the 50-50 report for fiscal year 2008. Thus, the models assumed organic sources would accomplish 54.2 percent of the requirement, and commercial sources 45.8 percent.

A summary comparison of the three models is provided in Table 2.

Table 2. Model Comparison

	Model A	Model B	Model C
DM node costs	$2,818 M	$1,653 M	$1,098 M
Service marking costs	$62 M	$62 M	$62 M
Total cost to mark	$2,880 M	$1,715 M	$1,160 M
Items to be marked in DM	82 M	46 M	27 M
Items to be marked by services	27 M	27 M	27 M
Total items marked	109 M	72 M	54 M
Years to mark	6	10+	12+

Note: DM = depot maintenance.

The models also assumed all new items produced would be marked as applicable.

2. PROCESS TO BE UNDERTAKEN AND VALUED

The working group developed three cost estimate models to develop capabilities in the organic and commercial depots and mark items at a rate that would

A. comply with current Defense policy using organic and commercial sources;

B. comply with current Defense policy, but mark at a rate commensurate with the current organic depot throughput (also accounting for commercial accomplishment); or

C. modify policy to reduce marking requirements and mark at a rate commensurate with current depot throughput (while also accounting for commercial accomplishment).

For this analysis the group identified the following as recurring costs:

- Cost to mark items (recurs annually until all legacy items are marked).
- Cost to maintain and replace IUID equipment.

The group also identified the following as non-recurring costs:

- Initial costs to purchase equipment (marking stations, verifiers, and readers/scanners).
- Initial cost to train depot maintenance personnel.
- Cost of depot process reengineering.

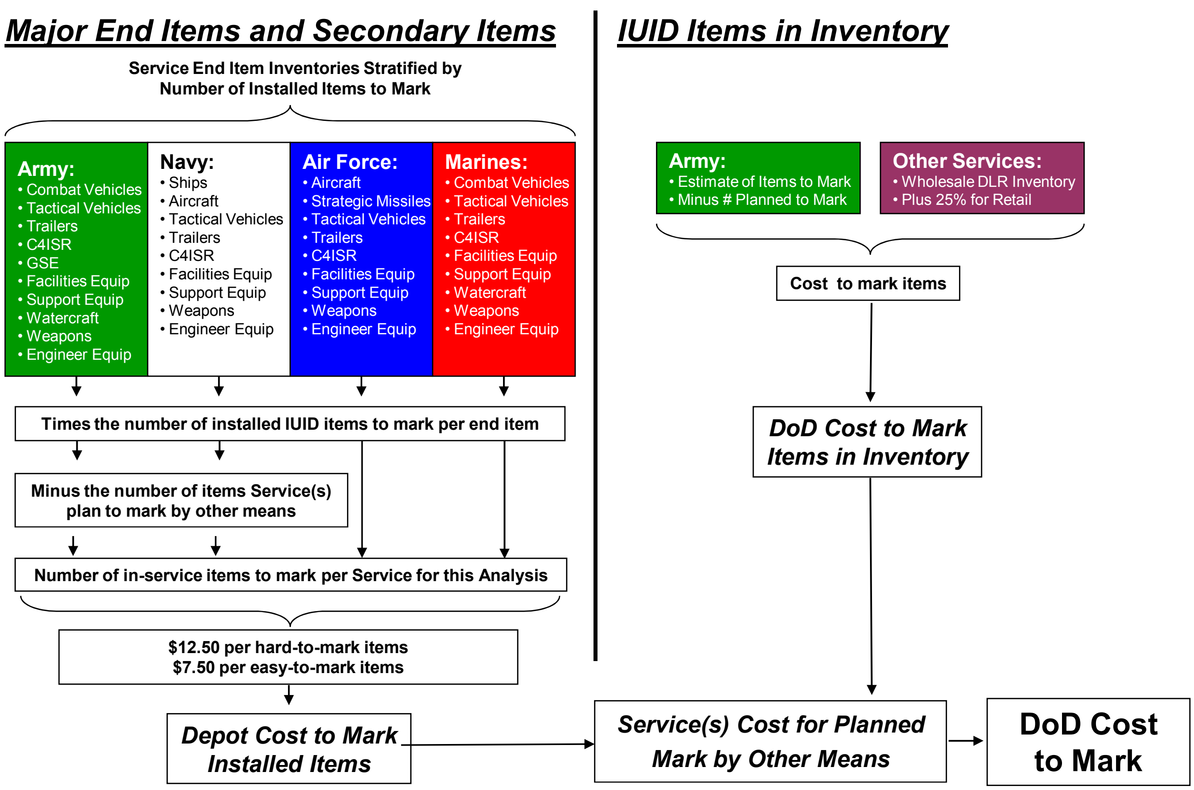
In each of the three cost estimate models, the non-recurring cost to establish capability is significantly less than the recurring cost to mark items.

3. APPROACH TO DETERMINE RETURN ON INVESTMENT

The working group focused on estimating marking costs, with the understanding that the product life-cycle management (PLM) value chain would address the major benefits of IUID to depot maintenance. This section describes the process the group used to arrive at the estimated costs to establish capability and mark items. All of the details, facts, assumptions, estimates, and calculations used are listed in the enclosed spreadsheet, Depot Maintenance Node Analysis, attached to the electronic versions of this document. The spreadsheet may be reproduced in the event paper copies of this document are published.

Figure 1 provides an overview of the approach the working group used to develop the estimate.

Figure 1. Analytic Approach to Estimate the Cost to Mark Items



Note: DLR = depot level reparable.

a. Estimate the Number of Items to Mark

To arrive at a cost estimate for marking items, the working group first needed to estimate the number of applicable items to be marked. The working group used as much service-provided data as possible, and then applied additional facts, assumptions, and informed estimates to complete the population estimate. Examples of these estimates include the number of items in wholesale and retail supply inventories, as well as items embedded in weapon systems and end items.

The working group's approach to estimating items in inventory included the use of wholesale inventory stratification data, military service data (when available), and supply chain parametric estimates (e.g., retail inventory is approximately 25 percent of wholesale inventory). The resulting estimate indicated there are roughly 148 million service-possessed in-stock and installed items (including weapon systems, reparables, and applicable consumables in conformance with Defense policy). The total number of items to be marked (under current policy) is 334 million if applicable items in DLA stock are included. As indicated earlier, the services plan to mark approximately 26.6 million of the installed/embedded items by another means and have developed cost estimates to mark those items; the working group incorporated those estimates into this analysis. The working group's analysis focused on the estimated cost to mark the remaining 122 million items (148 million − 26 million) using Models A and B in support of current policy. The working group also assessed the impact of revised policy in Model C, which involved developing an estimate of the cost to mark 66 million items (81 million identified under the recommended revised policy less a proportionate amount of the 26.6 million the services plan to mark by other means). The working group's methodology and computations are described in more detail below.

b. Use Models to Estimate Non-Recurring Costs

Recurring costs are estimated in Section 3.c below.

After estimating the number of items to mark, the working group was able to develop a non-recurring cost estimate. Principle cost elements included the cost to purchase and install equipment, conduct initial training for a depot maintenance workforce, and engineer the capability into the depot repair cycle. The working group did not compute similar cost estimates for commercial support; it assumed original equipment manufacturers were already marking new items. However, the group did estimate a substantially higher cost to mark items from commercial sources.

1. Model A

In each model, non-recurring costs are based on the annual volume of items to be marked by organic depots. Therefore, it was necessary to begin with an estimate of that marking volume. In Model A, the number of items to be marked was decremented annually by the washout rate and new system replacement rate (a total of 9 percent). The decremented quantity for each year was divided by the remaining number of years to mark. For example, in year 1 the initial quantity of nearly 122 million items was decremented and the remainder was divided by 6 years. This provided the number of items to mark in year 1. Year 2 would begin with the remaining items after year 1, which was then decremented and divided by 5 years to derive the number of items to mark in year 2.

Once the decrementing process was completed, the net quantity to be marked per year could be made a constant (14.8 million per year) to minimize equipment requirements, as reflected in equipment cost estimates. Quantities to be marked were split between commercial and organic sources. Table 3. illustrates the computation for the 6 years, with net marking quantities.

Table 3. Model A—Annual Marking Calculations

FY	Initial Quantity	Decremented Quantity	Quantity to be Marked
2010	121,917,064	110,944,528	18,490,755
2011	92,453,774	84,132,934	16,826,587
2012	67,306,347	61,248,776	15,312,194
2013	45,936,582	41,802,290	13,934,097
2014	27,868,193	25,360,056	12,680,028
2015	12,680,028	11,538,825	11,538,825
Total Production			88,782,485
Average Production/yr			14,797,081
Organic Depot Portion (54.2%)			8,020,018

5% washout and 4% weapon system retirement per year.

From the average organic production per year, it was possible to determine how many marking stations, verifiers, and scanners would be required in organic depot maintenance production facilities. In accordance with the *Depot Maintenance Capacity Handbook* (DoD4151.18-H), the equipment requirements were developed based on a single-shift, 8-hour day, 5-day week, and therefore have built-in surge capacity should it be required. The resulting quantity estimate led to an estimated non-recurring cost to purchase the equipment (using typical prices). The same estimates also formed the basis for calculating recurring equipment costs, as addressed below.

Equipment quantities also drove non-recurring depot maintenance training requirements. Multiple assumptions and pricing variations for each model are annotated in the enclosed spreadsheet, Depot Maintenance Node Analysis. Recurring training requirements were assumed to be included in the per-item marking cost.

The working group estimated the cost to reengineer depot maintenance facilities and processes to accommodate the marking capability to be $800 per national item identification number (NIIN), which equates to a workday for an industrial engineer at a composite labor rate of $100 per hour. The services estimated a total of 363,556 NIINs to be marked.

The total non-recurring cost estimate for Model A was as follows:

- Marking stations purchase $38 million
- Verifiers purchase $13 million
- Readers/scanners purchase $8 million
- Initial training $5 million
- Non-recurring engineering $291 million
- Total non-recurring $355 million.

2. Model B

Similar to Model A, the same number of items to be marked was used as the starting point for Model B. The quantity was decremented annually by the washout rate and system replacement rate for a total of 9 percent per year. But Model B was constrained by the organic depot throughput rate (provided by the services), so throughput determined the number of items to be marked each year and the number of marking stations, verifiers, and readers/scanners required to support the annual marking effort. Commercial throughput volume was constrained by the same proportion used in Model A. Table 4 shows how throughput was calculated for organic depots.

Table 4. Model B—Annual Marking Calculations

	Organic Capacity/Yr	Contract Capacity/Yr
Air Force	100,000	1,202,419
Army	1,009,400	
Navy	263,000	
Marine Corps	50,550	
Total Capacity/Yr	1,422,950	1,202,419
Plus 5% capacity	5%	
Adjusted Capacity/Yr	1,494,098	1,202,419

5% increase to account for marking already happening.

Again, the annual organic depot throughput capacity was employed to determine the number of marking stations, verifiers, and scanners required in the organic depots. The result formed the basis for estimating non-recurring costs; it also supported calculations for recurring costs (discussed later). The marking capability calculation also served as the foundation from which to determine non-recurring depot maintenance training requirements. Summary results are as follows:

- Marking stations purchase $7 million
- Verifiers purchase $2 million
- Readers/scanners purchase $1 million
- Initial training $0.9 million
- Non-recurring engineering $291 million
- Total non-recurring $303 million.

Detailed computations are contained in the enclosed spreadsheet, Depot Maintenance Node Analysis.

3. Model C

The initial quantity to mark in Model C was substantially reduced by the recommended changes in the assumptions mentioned earlier. The quantity to mark was decremented by 9 percent annually as it was for the other two models; however, because the marking capacity was designed to support the organic depot maintenance throughput rate, the non-recurring costs were the same as Model B.

c. Use Models to Estimate Recurring Costs

In the three models, recurring costs fell into two categories: the cost of marking items, and the cost of equipment repair, replacement, and consumables.

Marking costs were further defined in terms of the ease by which the mark could be made. Easy-to-mark items were estimated to cost $7.50 per mark, while hard-to-mark items were estimated to cost $12.50 per item. The Air Force provided separate marking cost estimates, which were incorporate in the models. The overall composite cost to mark was $12.14 per item. Costs to mark by commercial sources were estimated at $50 per mark for all three models; the estimate includes non-recurring costs and profit elements. The Services provided estimates of the relative percentage of easy and hard marks based on item work breakdown structures. Direct materiel costs (plates, labels, marking media, consumables) and overhead are included in the per-item cost estimates. Each mark was estimated to take 15 minutes on average. Easy-to-mark rates were assumed to include the benefits of a learning curve for marking operations.

As outlined earlier, the *quantities* of items to mark were split between organic and commercial depot maintenance, based on the percentage of funding expended for fiscal year 2008 as reported in the 50-50 Report. However, the *cost* to mark is substantially different between organic ($12.14) and commercial ($50) sources. As a result, the total cost to mark in each model was significantly higher for commercial sources, even after organic non-recurring costs were included.

Recurring costs for equipment repair, replacement, and equipment consumable costs were calculated by establishing replacement factors for each category of equipment. Once again, detailed results are contained in the enclosed spreadsheet, Depot Maintenance Node Analysis. The spreadsheet analysis for recurring equipment costs is annualized; total cost for each model is the annual cost times the number of years marking operations will occur.

A summary of the recurring costs to mark is presented in Table 5.

Table 5. Recurring Costs

	Organic marking	Commercial marking	Equipment	Total
Model A	$539M	$1,891M	$38M	$2,468M
Model B	$308M	$1,022M	$20M	$1,350M
Model C	$181M	$601M	$13M	$795M

4. ASSUMPTIONS

The complete listing of assumptions used in this analysis is located in a tab labeled "Assumptions" in the enclosed spreadsheet, Depot Maintenance Node Analysis, found at the end of digital copies of this document, or enclosed with paper copies. The values in the assumptions are cross-linked to the computations in the remainder of the spreadsheet. Sources for the assumptions are annotated as call-outs within the tab.

5. EXECUTION

The working group described how IUID will be implemented in terms shown below.

a. Phasing (Schedule)

The models complete the entire initial marking requirement in either 6 years, complying with current Defense policy (Model A); 10+ years with revised policy (Model C); or 17+ years with throughput rates matched to depot capacity (Model B).

b. AIT/AIS Requirements

AIS requirements to be determined separately. AIT (reader, marker, and verifier) requirements were included as a part of this estimate.

c. Time to Execute/Receive Benefit

Benefit calculations were not part of the scope of this node analysis, but they are included in the task force roll-up analysis.

d. Policy and Guidance Changes—the recommended changes to regulations and other policy

The node analysis did take prospective recommended policy changes into account for Models B and C, as described earlier. The formal recommendations for policy changes are contained in the Task Force report.

6. COSTS

a. Dollars (expressed in constant current-year amounts)

(1) Infrastructure/Facilities/Sustain—Not addressed

(2) Equipment

(a) Marking, verifying, and registering

Model A non-recurring: $55 million for 1,212 marking stations
Model A recurring: 38 million

Model B non-recurring: $11 million for 244 marking stations
Model B recurring: $20 million

Model C non-recurring $11 million for 244 marking stations
Model C recurring $13 million

(b) AIT—the costs of readers, verifiers, and scanners were included in the above recurring and non-recurring estimates

(3) AIS—Not addressed

(4) Non-recurring engineering (NRE)/technical data—Not addressed for reengineer associated with placement of marks on individual items or NIINs. Depot installation NRE, including changes to process flows, was estimated at $800 per NIIN.

Model A non-recurring: $291 million for 364,000 NIINs

Model B and C non-recurring: Same as Model A because all three models start with the same number of reparable NIINs

(5) Marking

(a) New—Assumed all new items marked as part of production

(b) Legacy

Model A recurring: $2,430 million

Model B recurring: $1,330 million

Model C recurring: $782 million

b. Manpower (annual full time equivalent, or FTE)

(1) Training

Model A non-recurring: $4.4 million

Model B non-recurring: $0.9 million

Model C non-recurring: $0.9 million

Annual training assumed to be incorporated in production costs.

(2) Discrepancy resolution and data cleansing resolution costs—Part of verification and reading flow

(3) Marking and Tracking—Not addressed, with the exception of reader purchases, part of AIT/AIS costs, and costs to repair

(4) Program Management—Not addressed in this node

7. BENEFITS

Addressed primarily in PLM value chain analysis.

8. REQUIREMENTS PASSED TO OTHER NODES

Depot maintenance receives requirements and technical instructions from other nodes, and delivers serviceable marked items once they are repaired.

Application of IUID markings in the depot repair production process requires AIS/AIT applications that are the responsibility of other nodes.

9. ISSUES

The major cost driver to mark all applicable items was the quantity to be marked. The nodes and value chains had to agree on the assumptions that determined quantity requirements.

A suggestion for a further reduction in Service-managed consumable items is being addressed separately from this node report.

10. CONCLUSION

Model B was substantially less expensive than Model A, but it required changes to current marking policy to allow for a longer implementation time. Model C was substantially less expensive than Model B, but it required further policy changes, as recommended.

ENCLOSURE

The cost model, including assumptions, is an enclosure entitled Depot Maintenance Node Analysis. Within the spreadsheet, reference sources for assumptions are annotated as call-outs.

Depot Maintenance
Node Analysis

Logistics Item Unique Identification Task Force

Field Maintenance Node
IUID Cost Analysis

Final Working Paper

February 19, 2010

Prepared by the
Field Maintenance Node Working Group

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Figures

Tables

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Field Maintenance Node IUID Cost Analysis

1. SUMMARY

As one of ten nodes in the Item Unique Identification (IUID) Task Force, the field maintenance (FM) node was tasked to conduct an analysis and develop cost estimates to satisfy IUID requirements in FM activities and processes. This analysis is a portion of a value proposition analysis being conducted by the Task Force.

The FM node working group's analysis concluded that the investment cost to the Department of Defense (DoD) was an estimated $217 million. This provides for training and equipping the workforce to accomplish all of the FM IUID requirements. The recurring cost to DoD is $40 million. This provides for the repair and replacement of equipment and for consumables. The group determined these are the only actual costs for FM.

While not an actual cost, the group developed a method to estimate the value of time spent doing IUID tasks in FM. We estimate the value of this time for all of DoD to be $720 million annually. If not doing these IUID tasks, FM personnel would spend this time doing something else; therefore, this is not an actual cost and is best expressed as the value of using existing labor to perform IUID tasks. Additionally, when the value of this time is compared to the value of the time saved by implementing IUID, as projected by the Product Life-cycle Management (PLM) value chain, the group believes that the net result would be that the time saved is at least equal to the time invested.

The current cost of FM (material and labor) across DoD is $47 billion dollars. The estimated initial cost to train and equip FM is 0.5 percent of the current cost and the estimated recurring cost is a less than 0.1 percent the current cost.

The PLM value chain estimated a 4 - 6 percent reduction in maintenance costs from the implementation of IUID or approximately $3 - 5 billion. With FM IUID investment cost estimated to be $217 million and recurring costs of $40 million the analysis indicated this is a valuable proposition to undertake.

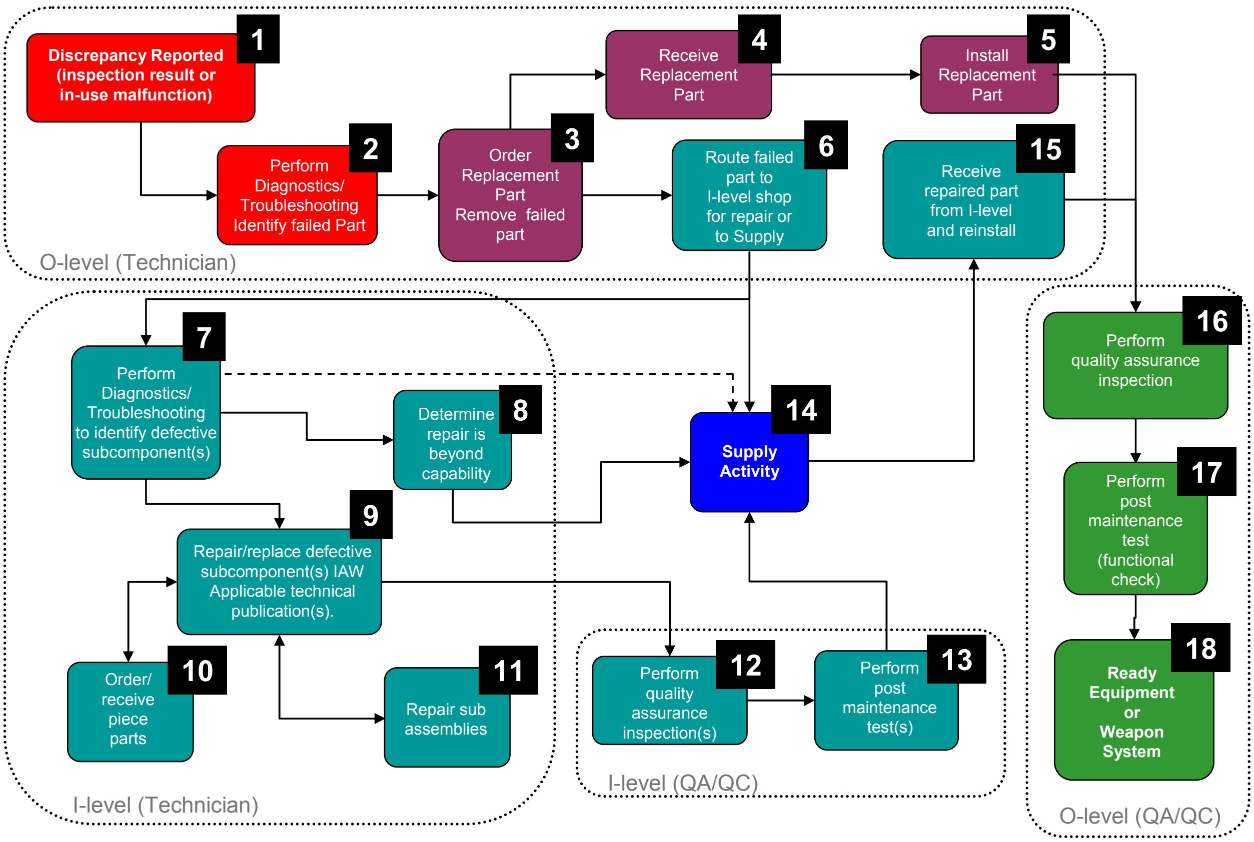
2. PROCESS TO BE UNDERTAKEN AND VALUED

The first task for the group was to identify what would change in FM as a result of full IUID implementation. The group used a two step process to accomplish this task. First FM processes were analyzed and then the IUID requirements determined by the value chains were analyzed. These steps are described in detail in the following paragraphs. The results were a set of six FM IUID tasks and the estimated time to accomplish each task. These six tasks were applied in specific increments to the two sub-elements of FM: organizational-level (O-level) and intermediate-level (I-level) maintenance.

a. Understand How IUID Items flow through the FM Process

Analysis of the field-level maintenance process resulted in a top-level process map that identified eighteen steps in FM. The process begins when an equipment discrepancy is reported and ends when the equipment is once again ready. These steps are grouped at O- and I-level as shown in Figure 1.

Figure 1. FM Repair Process



b. Understand the FM IUID Requirements

The IUID Task Force validated thirty-four IUID requirements for FM. These requirements describe what actions must be accomplished at FM when a uniquely identified item (UII) is encountered. The group's analysis of these requirements led to two conclusions: 1) many of the requirements from each requirement area (mark, track, use, and AIT/AIS) are similar; and 2) most of them can be combined into a smaller set of tasks. The group determined that five of the thirty-four requirements (186, 187, 211, 212, and 215) do not translate into an activity or task that must be accomplished within the FM process. The remaining twenty nine tasks (based on their similarity) were aligned into six FM tasks that must be accomplished to satisfy the IUID requirements. Each task was analyzed and assigned a number of minutes required to complete that task for one encounter with a UII. Some tasks occur simultaneously and thus do not require additional time and others reduce the time required to accomplish that task as compared to current processes. In these two instances the tasks were not assigned any time. In considering the six tasks, the group agreed the minimum would be an additional three minutes every time a

FM technician encounters a UII. Table 1 displays the six FM IUID tasks aligned with the twenty-nine IUID requirements.

Table 1. FM IUID Tasks

FM Task	Sub tasks	IUID Requirement	Task Time
1. Identify IUID Item O- & I-level	a. Requirement for item to be marked b. Presence of mark c. Condition of mark d. Accept, scan, read, capture, store and share UII	185 – presence and condition of mark 190 – presence and condition of mark 191 – positive identification of the item 192 – capture and store UII 193 – share UII 213 – accept UII 214 – scan UII	3 min
2. Capture IUID Item Accountability O- & I-level	a. Location b. Custody c. Visibility	188 – location and custody 191 – custody 194 – accountability 195 – accountability 200 – location 201 – location and custody	0 min*
3. Capture IUID Item Attributes Only I-level	a. Status b. Configuration c. Usage d. Condition e. History	188 - status 189 – configuration 197 – configuration, status and usage 200 – condition, status and history 202 – configuration, status and usage	5 min
4. Perform Unit Level Inventories O- & I-level		196 – inventory (equipment)	0 min*
5. Conduct precision maintenance Only I-level	a. IUID item history, configuration, status, installation, usage, and condition b. Access technical data to determine repair requirements c. Identify IUID items under warranty d. Utilize IUID item enabled diagnostics and prognostics e. Perform IUID item reliability analysis	205 – support precision maintenance 205a – configuration, status and installation 205b – IUID enabled diagnostics and prognostics 205c – access technical data 206 – identify IUID items under warranty 207 – determine repair requirements 208 – reliability analysis 209 – repair resource requirements	4 min
6. Use Automation O- & I-level	a. Registry access (validate and create end item UII) b. Automated data input c. Technical data access d. Parts requisitioning process e. Maintenance planning	198 – automated data input 199 – technical data access 203 – registry access (validate end item UII) 204 – registry access (create end item UII) 209 – maintenance planning 210 – parts requisitioning process	0 min*

* These tasks occur simultaneously with other tasks or result in a reduction in current process times and require no time.

3. APPROACH TO DETERMINE RETURN ON INVESTMENT

The FM node was tasked to develop IUID implementation cost estimates; therefore, our focus was on developing plausible cost estimates. These cost estimates and the method used to develop them are described in the section 6 below.

4. ASSUMPTIONS

a. In general, FM will not mark items. For the purposes of the IUID Task Force's value proposition analysis (VPA), the depot node is determining the cost to mark all items.

b. Scanners are the only IUID equipment required for FM.

c. FM automated information systems (AIS) will easily integrate with IUID equipment. We envisioned a plug-and-play device that will interface directly with portable maintenance aids (PMA) or FM AISs.

d. Recurring training will be included in ongoing initial and refresher training. The cost of conducting this training on a recurring basis is not material when considering the overall cost of FM in the DoD.

e. FM IUID tasks differ at organizational (O-level) and intermediate (I-level) maintenance. O-level maintenance can be characterized as on-system maintenance that results in a quick turn-around of ready equipment to the user while I-level maintenance generally involves off-system maintenance that entails more thorough disassembly of components, modules and assemblies for repair and return to the supply system. Therefore more time will be spent performing FM IUID tasks at I-level than at O-level.

f. The frequency of UII encounters differs between aviation and ground maintenance. Often aviation and missile maintenance involves one person conducting weapon systems inspections that will include a substantial number of UIIs, e.g. preflight inspections of aircraft. In contrast, ground and other maintenance involves activities that require more than one person, take longer periods of time, and include a lesser number of UIIs, e.g. removing and replacing an engine on an M1A2 tank.

g. The FM workforce will not increase or decrease as a result of implementing IUID. The size of this workforce is determined by other means that IUID does not have a bearing on. Therefore, the annual cost of this workforce in terms of labor will not change due to IUID implementation.

5. EXECUTION

In general, IUID would be implemented in FM at a point when there are a significant number of UII and marked items being distributed to and in circulation within FM. This could be referred to as a critical mass of UIIs. Determining this critical mass and thus the timing to implement IUID at FM is largely dependent upon the rate at which legacy items are marked and somewhat dependent upon the rate at which newly procured items are marked and distributed to FM. As the number of items in circulation within FM increase from these two sources, a critical mass would be achieved at which point equipping and training the workforce to process UIIs would be beneficial. Implementing IUID prior to reaching this critical mass of UIIs circulating in FM would be ineffective. Implementation at a point later than this critical mass would be inefficient.

a. Phasing (Schedule)

Implementation in FM should occur at a point in time when a significant number of legacy and new procurement items are marked. Thus, FM implementation is dependent mostly upon the services plan to mark items and should be phased to coincide with these marking plans.

b. AIT/AIS Requirements

The services have plans to incorporate IUID capabilities in their maintenance management automated information systems (AIS). Tables 2 through 5 provide detailed information about each of the AISs.

Table 2. Army FM AIS

Army System	Description	Capability	Comments
GCSS Army	Emerging Army Enterprise solution for maintenance and logistics management.	IUID technology will be incorporated when released.	System now in development, with FLM capabilities scheduled for completion in 2012.
Standard Army Maintenance System (Enhanced) SAMS-E	Bridging system for Field (SAMS-1E/2E) and Installation Level (SAMS-IE) maintenance operations.	AIT technology incorporated at installation level (SAMS-IE), but not IUID capable.	IUID implementation is planned for future baseline releases. Requirements in development stage.
Unit Level Logistics Aviation Enhanced (ULLS-A(E)	Army Aviation Maintenance Support System	Requirement has been approved no current capability	(Currently awaiting funding)

Table 3. Navy FM AIS

Navy System	Description	Capability	Comments
ERP	Navy Enterprise shore solution for maintenance and supply	Will incorporate IUID capabilities future release.	Future is for Aviation NALCOMIS and Ships MFOM to tie into ERP.
OMMS-NG	Organizational Maintenance Management System - Next Generation	Not planned to incorporate as MFOM replaces	Not planned to incorporate as MFOM replaces
CDMD-OA	Configuration Data Manager Database Open Architecture	IUID Compliant	Direct Feed to MFOM
MFOM	Maritime MAINT Afloat & Readiness Reporting	IUID Compliant	Large scale ship demonstration ECD Sep 09 10 out of 14 ships' complete UII marking conducted as part of normal tag-out process during planned, corrective, and operational maintenance activities
NALCOMIS	Naval Aviation Logistics Command Management Information System - Provides aviation maintenance and material management with information for daily maintenance decisions	Currently not UID enabled.	Dependent upon Navy ERP interface requirements.
MEASURE	Automated system for uniform recall and reporting	Software development and testing for UID data collection in final phases.	Full IOC date TBD. Upon completion of requirement analysis and prototypes.

Table 4. Air Force FM AIS

Air Force System	Description	Capability	Comments
IMDS/POMX	Automated point of maintenance system that allows technician to scan UII and enter work being performed. Capability exists in connected and extended disconnected mode.	Use, will scan UII.	Currently linked only to field level maintenance and base by base due to server requirements. Deployment can be accelerated after EDCL v 2.0.
GO81	Field Level Maintenance Management System mainly used by Air Mobility Command Units.	Unknown	None
AFEMS	Air Force equipment accountability system.	Yes, currently inventory pilot being finalized at Wright Patterson, McDill AFB will be completely inventoried by UII from 11/9–2/10.	Includes inventory of Ground Support Equipment, test equipment.
Aircraft Unique Systems	ALIS is the F-35 specific maintenance/logistics management system and IMIS is the F-22 specific maintenance/logistics management system.	Unknown	None

Table 5. Marine Corps FM AIS

Marine Corps System	Description	IUID Capability	Comments
GCSS MC	USMC Logistics Chain Management (LCM) solution, based on ORACLE eBusiness Suite 10i.	R1.1: Has UII Data element associated with each serialized item record in Install base. R 1.2: AIT capture, WAWF Interface, UID Registry Update.	R1.1 Fielding FY10. R1.2 Planned for FY13.
TDS (IUID Temp Data Store)	Capture and Store USMC UII Pedigree and Mark data until migration to GCSS-MC.	Currently: Populate/Update UID Registry, Accept pedigree/mark data from any marking activity. Future: WAWF Interface.	Not transactional for maintenance or configuration changes.
MIMMS	Field Maintenance Management AIS until migration to GCSS-MC.	None.	Being replaced by GCSS-MC beginning FY10.

c. Time to Execute to Receive Benefit

The best time to execute is when the critical mass of UIIs has been achieved in FM. Determining when this will occur requires knowledge of the total number of items to be marked and the schedule for items to be marked, both legacy and new procurement. Since current policy requires all new procurements to be marked (when the acquisition cost is greater than $5,000) then the unknown factor is the timing of marking legacy items. Delaying implementation in FM until the marking of legacy parts is well underway is advised. FM implementation that occurs in the second or third year of legacy part marking is perhaps when the critical mass of UIIs would be available within FM activities. Benefits from FM implementation would then be immediate throughout the logistics system.

d. Policy and Guidance Changes

The services have made substantial progress at including IUID requirements and procedures in policy and guidance for FM with the Marine Corps leading the way. Table 6 provides specific information about each of the services' progress in this area.

Table 6. FM Policy and Guidance

	Policy	Capability	Planning
U.S. Army	Army IUID Strategy released Sep 2008.AR 750-1 (Army Materiel Maintenance Policy) incorporates IUID requirement, but requires review.	Marking and reading capabilities currently in planning and development stages.	HQDA Implementation Plan released July 2009Army has released Service CONOPS, not specific to FLM yet.
U.S. Navy	SECNAVINST Policy–In routing for SECNAV approval/signature.	NAVAIR: purchased 8 marking carts, deployed complete Jul 2009 NAVSEA: completed 10 out of 14 ships, ECD Sep 2009SPAWAR: purchased 12 marking carts NAVFAC: equipment aboard MPSRON 3 will be marked by USMC ECD Jun 2010 BUMED: legacy marking of ~6,000 items complete on both hospital ships	Marking Guide–Under development; builds on extensive test experience at NSWC Corona NAVAIR- Developing strategy with AIS owners for planning infrastructure and software upgrades to support field level use.
U.S. Air Force	Policy exists in the AFI 63-1 & AFI 63-101 only.	New parts acquisition and the depots are capable and are marking parts.	The USAF will continue to mark items primarily through the depots and through new parts acquisition.
U.S. Marine Corps	DC I&L has signed an initial IUID Policy for the Marine Corps	USMC is marking items and collecting data, but is not using the data yet.	USMC has multi-year plans in place to mark items and use IUID data

6. COSTS

a. Determine FM IUID Cost Components

Once the group completed the analysis of FM processes and IUID requirements the next task involved identifying the cost components. We identified the following costs components that must be considered:

- the non-recurring cost to train FM personnel on IUID procedures;
- the non-recurring cost to equip FM to satisfy all IUID requirements;
- the recurring cost of repairing and replacing IUID equipment; and
- the recurring cost of additional labor-hours (if any) when encountering UIIs.

The group approached each of these cost components differently but some data is shared across components or drives factors in other components. The approach used for each cost component is described in the following paragraphs. All of the factors, assumptions and calculations used in this analysis are available separately and are included in electronic versions of this report.

(1) Non-Recurring Training Cost

Every FM location will require some number of FM personnel to be trained initially. Recurring training costs will be marginal as they should be included during initial and recurring training of FM personnel.

To estimate the non-recurring cost of training the group first determined the approximate number of FM personnel and locations. Service input indicated that there are some 16,000 FM activities across the services at locations around the world. Some locations have only a few personnel while others have hundreds. The group determined locations that have a small number of personnel will likely not receive on-sight training while the locations with a large number of personnel will likely need multiple classes. The group concluded that the number of classes required to train FM personnel is equal to the number of FM locations. The group used an estimated cost of one class to be $1,000. The total estimated cost of training is $16 million.

(2) Non-Recurring Equipment Cost

The second cost component involved determining what equipment FM personnel need to meet all IUID requirements. The group concluded that scanners are the only IUID equipment required for FM. The group assumed that the services' AIS/AIT will be configured to readily accept and process UII data. Each service provided a unit cost of scanners and a basis of issue. The basis of issue considers either the number of FM personnel or locations within each of the services. Table 7 provides the unit cost, basis of issue equipping factor, the number of personnel or locations, and the total cost by service. The total estimated cost to DoD is $201 million. $66 million of this was captured by another node's analysis and was subtracted from the total leaving $135 million reported by the filed maintenance node.

Table 7. Scanner Costs

	Army	Navy	Air Force	Marine Corps
Unit Cost	$2,154	$1,520	$2,400	$2,250
Equipping factor	1 per 7 maintainers	72 per location	72 per location	3 per 4 maintainers
Workforce or Locations	224k workforce	490 locations	199 locations	28k workforce
Services Total Costs	$66M	$54M	$34M	$47M
DoD Total	$201M			
Portion included in other nodes	$66M			
Amount reported by the FM Node	$135M			

(3) Recurring Equipment Cost

The group estimated that scanners have a replacement factor of 20 percent. Electronic obsolescence and potentially harsh operating environments were some of the factors considered. The group applied this factor to the total non-recurring equipment cost ($201 million) and estimated the recurring equipment cost at $40 million annually.

(4) Recurring Labor-hour Value

One of the group's assumptions is that the FM workforce will not experience growth or reduction due to IUID requirements and therefore the labor-hours to perform IUID requirements should be expressed as a value of using existing labor–not as a cost. As described below, the group calculated the value of this labor to be approximately $720 million annually. Most of this is the value of time spent to determine that an item should be a UII, check for the presence and condition of the mark, and to scan, capture, store, and share the UII. One of the projected benefits of IUID is that it reduces the time FM personnel spend doing other tasks. The group concluded that the time saved will equal or exceed the time required to perform IUID tasks. The value of this labor was calculated by using an estimate of the annual hand-on labor-hours that would be expended when encountering UIIs and current hourly pay rates. Calculating this value required the five steps below which are explained in detail in the following paragraphs.

a) Determine the number of FM personnel across DoD.

b) Calculate annualized hours spent doing hands-on maintenance.

c) Calculate the annualized number of UII encounters during hands-on maintenance.

d) Calculate the annualized hours spent doing IUID tasks using the FM IUID Task times.

e) Calculate the value of these labor-hours using current labor rates.

b. Identify the Number of FM Personnel

The group identified the number of FM personnel in each of the following personnel categories because of their different pay rates. [1]

- Active duty or full-time National Guard and Reserve,
- drilling National Guard and reserve, and
- civilian.

Because aviation and missile maintenance differ from ground and other maintenance, these categories were further divided into aviation and missile maintenance, and ground and other maintenance workforces.

c. Estimate the Time Spent Doing Hands-on Maintenance

Using the workforce categories and civilian full time equivalent (FTE) hours[2] the group calculated the available annual maintenance labor-hours. Using a set of assumptions the group reduced the workforce estimates to only personnel that would encounter UIIs[3] and the time they spend each year doing hands-on maintenance[4]. This allowed the group to estimate the annual hands-on maintenance labor-hours available in each of the workforce categories described above. Because O- and I-level tasks are inherently different a correspondingly different amount of time is required to perform IUID task at the O- and I-levels. Therefore, it was necessary to calculate the hands-on maintenance labor-hours into O- and I-level because the FM tasks performed at each level differ.[5] The results are annualized estimates of hands-on maintenance labor-hours for each category as shown in Table 8.

Table 8. Annual Hands-on Maintenance Labor-hours (millions)

	Active Duty & Full-time Guard/Reserve	Drilling Guard/Reserve	Civilian
O-Level Aviation & Missile Maintenance	112.3	5.8	1.1
I-Level Aviation & Missile Maintenance	12.5	0.6	21.3
O-Level Ground & Other Maintenance	247.5	16.1	3.2
I-Level Ground & Other Maintenance	27.5	1.8	61.2

[1] Source: LMI analysis of Defense Manpower Data Center data

[2] The Office of Management and Budget Circular A-76 states civilian FTE is 1,776 hours. National Guard and Reserve personnel drill 312 hours per year.

[3] Field Maintenance Node's estimate is that 20 percent of the workforce includes managers, supervisors and other personnel in administrative positions.

[4] According to a General Accounting Agency report (GAO/NSIAD-99-31) maintenance personnel typically spend 73 percent of their available time doing hands-on maintenance.

[5] Field Maintenance Node's estimate is that the ratios of O- to I-level personnel for military and civilian personnel are 9:10 and 5:100 respectively.

d. Estimate the Number of UII Encounters

The group assumed that aviation and missile maintenance personnel would encounter one UII during every hour of hands-on maintenance and that ground and other maintenance personnel would encounter two UIIs every shift (or eight hours). Using these assumptions and the annualized estimates of hands-on maintenance labor-hours the group calculated the number of UIIs each category would encounter annually.

e. Apply FM IUID Task Times

The next step in this analysis applied specific FM IUID tasks (described in paragraph 2b above and portrayed in Table 1) to each of the categories at specific rates. For example, in O-level aviation and missile maintenance 100 percent of UII encounters require three minutes of time while only 60 percent of the encounters at I-level aviation and missile maintenance require only three minutes, the remaining 40 percent require 12 minutes. The results of these calculations are annualized hours required to perform FM IUID tasks for each of the categories previously described.

f. Apply Labor Rates

The group used the annualized IUID labor-hours to determine the value of this labor by applying hourly labor rates[6] to each personnel category. The sum of each of these values in each category provided the total value of this labor which is estimated to be $720 million.

(5) Discrepancy Resolution and Data Cleansing Resolution Costs

Time for discrepancy resolution and data cleansing is included in the recurring labor value estimate above. Other studies indicate a there is a net reduction in costs related to data entries as a result of automated inputs. The Navy found an 11 percent reduction in data errors and 98 percent reduction in man hours spent gathering part location data[7]. A Marine Corps serial number tracking study indicated an 18 percent reduction in data errors[8]. The group concluded that there is only a marginal delta increase in time if any.

(6) Marking and Tracking

FM will not be marking. Time to track UIIs is included in the recurring value of labor estimate above.

(7) Program Management

Included in the recurring value of labor estimate above.

[6] Hourly rates were determined by dividing per capita rates for each category of personnel ($84,341 for active duty and full time or drilling guard and reserve, and $86,699 for civilians) by civilian FTE hours (1,776).

[7] NAVSUP Supply Chain Council Award for Supply Chain Operations Excellence, February 2003.

[8] USMC Automated Armories Presentation, Product Group 13, Study September 2008 - September 2009, Maj Brian Spooner

7. BENEFITS

The FM node members concur with the PLM value chain's estimate of an overall reduction of 4 - 6 percent of the current cost of FM.

8. REQUIREMENTS PASSED TO OTHER NODES

a. When FM encounters an item needing repair that is under warranty it will disposition the item in accordance with the warranty procedures for that item. At the point that the item is identified as being under warranty FM should not incur further UII related costs. Additional costs are incurred by other nodes as the item is processed for warranty support.

b. Reparable UIIs that cannot be repaired at the FM level will be retrograded through the supply system. At the point that these items are turned-in to supply FM should not incur further UII costs. Additional costs are incurred by other nodes as the item is retrograded to the appropriate repair activity.

9. ISSUES

None.

10. CONCLUSION

IUID can reduce FM costs substantially. As a major player in the PLM value chain benefits estimate, FM will accrue a major portion of the estimated $3 - 5 billion in annual benefits. These benefits far exceed the investment of $217 million to establish IUID capability and $40 million annually to sustain the capability. Therefore, IUID is a valuable proposition to FM.

FM IUID Costs

Appendix K

Logistics Item Unique Identification Task Force

Operational Field Activities Node
IUID Cost Analysis

Final Working Paper

December 8, 2009

Prepared by the
Operational Field Activities Node Working Group

CONTENTS

LIST OF AUTHORS

LTC James Hooper, Joint Staff Directorate of Logistics

Operational Field Activities Node
IUID Cost Analysis

1. SUMMARY

- The Operational Field Activities Node consists of the operational units that put/take a part/item on or off of a system and use that system; these are the Soldiers/Sailors/Airmen/Marines that are the end users of IUID-marked items

- This node does not include supply and maintenance activities

- Benefits of IUID implementation at this node are extremely difficult to quantify; more efficient and accurate asset visibility is the primary benefit; there are no estimated cost savings in terms of man-hours or budget expenditures

- Costs of IUID implementation at this node include the estimated cost of IUID compliant data entry devices (scanners; rough order of magnitude cost to DoD for only this node is $21.5 million); Service-specific logistics automated information systems (AIS) must be modified to enable IUID data entry, tracking, and verification, however, this task crosscuts many Nodes and Value Chains–and will be analyzed in a separate DoD IUID Task Force effort

- Execution, at this node, will be dependent on changes to Service supply and maintenance policy and more so on changes/modifications to AIS; all Node and all Value Chain execution plans will impact this node

- No major issues identified with IUID implementation at this specific node

2. PROCESS TO BE UNDERTAKEN AND VALUED

a. The Operational Field Activities Node:

- Involves marked items that are "in-use"

- Operational units that put/take a part (marked item) on or off a system and use that system

- Includes actions taken by units to inventory, operate, or prepare to operate, equipment and weapon systems.

- Does not include field level maintenance activities, depot maintenance, or supply activities (separate Nodes)

b. Description of node: this node encompasses the requirements and actions of the end user of IUID-marked items; namely: inventory of organizational equipment and supplies, scanning of

IUID data, identification and disposition of IUID-marked items per Service materiel manager instructions, and notification of appropriate authority or activity of items requiring marking that are receipted, but unmarked.

c. Examples Army or USMC platoon or company/troop/battery (including organic organizational supply support), or Navy Ship Supply Department (not all functions, some fall under the Base/Forward Support or Field Maintenance Nodes).

3. APPROACH TO DETERMINE RETURN ON INVESTMENT

a. See assumptions in paragraph 4. annotated with *

b. Costs: ROI analysis for this node is difficult to quantify. While we can estimate the costs in terms of funds required to equip the Operational Field Activities Node with the equipment required to read and verify IUID marking, it is difficult to quantify (at this time) the Service costs to upgrade or modify existing supply and maintenance AIS. These AIS are not specific to this node and will crosscut many other nodes and value chains. Furthermore, the costs in terms of man-hours required (due to reading/verification of IUID markings) is also difficult to estimate, since the users at this particular node are all active-duty military members and man-hours are generally not calculated in terms of dollars per hour of task-specific labor.

c. Benefits: IUID provides a ready means of providing asset visibility to assist the Operational Field Activity node users in location and disposition of specific IUID marked items as directed by materiel managers at all levels of the DoD and specific Services. It does not, however, show a specific, measurable benefit(s) to the users in this node.

4. ASSUMPTIONS

a. Population of items includes all items identified by the three IUID Task Force Value Chains:

(1) Property Accountability

- General and Military Equipment

- Items valued $5000 or greater or Sensitive and Classified

- Embedded items including government furnished property or government leased property

(2) Intensive Item Management

- National War Reserve Materiel (430 NIINs)

- Classified Items (68K NIINs)

- Critical Safety Items (25K NIINs)

- Sensitive Items (8K NIINs)

(3) Product Life Cycle Management

- Life limited, time controlled, flight/operational critical items

- Maintenance related items

- Items requiring technical directive tracking by part number

- Reparable items including sub-components

- High cost ($\geq$ $5K) and high demand consumables

- Warranty items

(4) All other consumables $\geq$ $5K and not included in these three value chains

b. Costs or funding for marking of materiel

(1) Materiel receipted at the Field Activities Node will either be IUID marked or be identified as requiring a mark. *

(2) The Operational Field Activities Node (the node includes the operational users only, not supply or maintenance activities) will not mark items. *

(3) Regardless of the estimated marking cost of $3K per aviation legacy (not marked during the production/procurement process) item, $1K per other legacy item, and $50 per data plate, the Operational Field Activities Node does not incur this cost, as items will not be marked at this node. *

(4) There may be some cost associated with providing activities in the Operational Field Activities Node (i.e. Army unit supply rooms, Navy Supply Departments) the capability to verify IUID markings with the IUID registry. This will be dependent on how each Service can modify its' supply and maintenance AIS to accommodate IUID mark verification. This cost will be estimated below in very rough terms as capability provided for each ~150 Service members supported by a unit supply or maintenance activity (not to be confused with functional supply or maintenance specific units, which are covered in other nodes). For example, an Army supply room supports, generally speaking, units of about 150 Soldiers; a Navy Supply Department on a ship with a supported crew of ~150-200 Sailors will be 3-4 personnel (about the same as the Army supply room). *

(5) There may be some cost associated with shipment of items receipted that are not properly marked to activities (other nodes) that will mark the items in question.

(6) Cost in terms of time or man-hours. There are two reasons for which cost in terms of time or man-hours will be extremely difficult to measure. The first is that users in this node are all active-duty DoD members and man-hour costs are not routinely measured for tasks such as scanning a data label. The second is that the time spent scanning an IUID label, at the individual

unit-level will not be significant enough in terms of time saved or time used to contribute to a cost-benefit analysis. *

c. Benefits at the Operational Field Activities Node

(1) The DoD IUID Task Force estimates that use of AIT processes could achieve up to 80% reduction in level of effort for data capture and entry as opposed to manual procedures. At the Operational Field Activities Node, this time savings or potentially a time cost (depending on how receipt/issue procedures change with the inclusion of IUID), are not significant enough to warrant business case analysis. The typical Operational Field Activities Node will have <10 personnel receipting dozens, but not hundreds or thousands of IUID-marked items each day. Benefits in terms of time or man-hours saved will not be realized at this node. *

(2) Error rates are reduced as opposed to manual data entry.

(3) The Operational Field Activities Node will be responsible for verifying that receipted items are marked appropriately, ideally using an automated method to verify IUID registry during normal Service-specific receipt procedures.

(4) Benefits in terms of asset visibility or ease of ability to track critical items through use of IUID marking will be difficult to quantify. *

5. EXECUTION

Since items receipted at the Operational Field Activities Node will already be marked or be identified as requiring a mark (and marked by an activity in another node), execution will be dependent on plans made in other supporting nodes.

a. Phasing (Schedule): N/A at this node.

b. AIT/AIS Requirements: Will be Service-specific within this node. Supply and maintenance AIT/AIS may require modification to enable verification of IUID marking. This effort will cross-cut many other nodes and value chains.

c. Time to Execute/Receive Benefit: N/A

d. Policy & Guidance Changes: Service-specific supply and maintenance policy will change to incorporate procedures for receipt and disposition of IUID marked items and items that are receipted that require marking.

6. COSTS

Describe the costs in terms of resources as shown:

a. Dollars

(1) Infrastructure/Facilities/Sustain: N/A to this node.

(2) Equipment

(a) Marking/verifying/registering: See AIT, paragraph 5. b.

(b) AIT: TBD but will require software modifications or upgrades and potentially require hardware upgrades to ensure Operational Field Activities have the capability to read IUID labels. Some Services have this capability in existing systems, Army for example with the CK61 Optical Imager and over 13K on-hand. See comments in AIT, paragraph 5. b.

(c) Estimated cost: Scanner for IUID labels and marks is the most likely hardware used at the Operational Field Activities Node. Estimated cost is $2.3K per unit and requirement is estimated at 9300 units (based on 1/150 personnel and 1.4 million active duty personnel) for a total requirement of roughly: $21.4 million.

(3) AIS–per the DoD IUID Task Force: a separate effort will be used to consolidate costs for all nodes as it is likely that several nodes will need the same AIS changed.

(4) NRE/tech data: N/A at this node.

(5) Marking: N/A, as there will be no requirement to mark at this node.

b. Manpower: see Assumptions, paragraph 4. b. (6) above.

7. BENEFITS

There is one benefit that will accrue from using IUID in this node. Asset visibility or ease of ability to track critical items through use of IUID marking will help using units more efficiently inventory items and identify specific items for item manager disposition instructions (i.e. Army Safety of Flight message, USAF Time Compliant Technical Order). This benefit is difficult to quantify.

8. REQUIREMENTS PASSED TO OTHER NODES

None.

9. ISSUES

None.

10. CONCLUSION

While there are benefits of IUID implementation at this node, they are limited and difficult to quantify. Costs include: the cost of hard and software to read and validate IUID marks as items are receipted at the individual unit-level (estimated at $21.4 million minus limited existing capability); and the cost to modify or change supply and maintenance AIS/AIT. These modifications will impact multiple Nodes and Value Chains and will be analyzed in a separate DoD IUID Task Force effort. Execution, at this node, will be dependent on changes to Service supply and maintenance policy and on changes/modifications to AIT systems; all Node and all Value Chain execution plans will impact execution timeline and tasks in the Operational Field Activities Node.

Appendix L

Logistics Item Unique Identification Task Force

In Service Engineering and Logistics Analysis Node IUID Cost Analysis

Final Working Paper

March 1, 2010

Prepared by the
In Service Engineering and Logistics Analysis Node Working Group

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In Service Engineering and Logistics Analysis Node IUID Cost Analysis

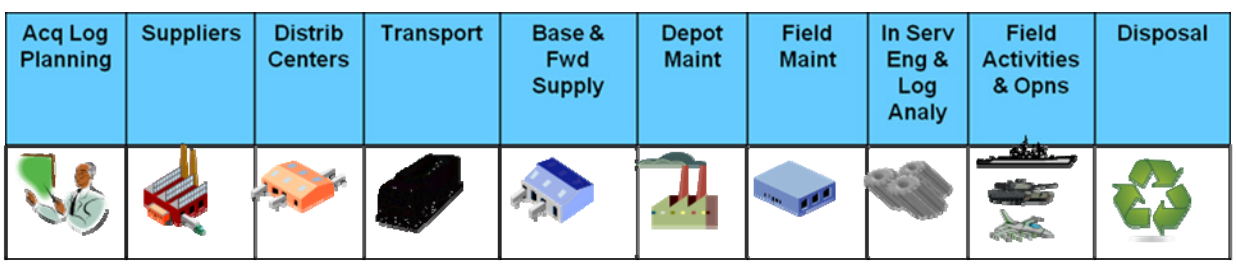
1. SUMMARY

The In-Service Engineering and Logistics Analysis node Item Unique Identification (IUID) total investment cost analysis resulted in an approximate overall expense of $1,289,566,800 to the Department of Defense (DoD). An individual breakdown of expense by military service and the Defense Logistics Agency (DLA) is also contained in this document.

The findings for this cost analysis are the result of each military service, plus DLA, best estimates to support the DoD IUID Task Force. The node members identified several critical requirements to complete the analysis and abided by the ground rules set forth by the IUID Task Force leadership. Each military service, DLA, and DoD representatives, participated in the process to complete the cost analysis. Each service also took into consideration any and all service unique requirements in order to accurately complete the task.

2. PROCESS TO BE UNDERTAKEN AND VALUED

The In-Service Engineering and Logistics Analysis node was identified by the IUID Task Force as 1 of 10 nodes required to develop a cost analysis for IUID. It is defined as: the engineering processes to analyze/define logistics requirements for management of weapon systems and subsystems.



In order to conduct an accurate cost analysis of IUID within the scope of the In-Service Engineering and Logistics Analysis node, while adhering to the IUID Task Force ground rules and assumptions, the node decided it must identify three critical requirements.

1. Each military service and DLA must determine their total number of NIIN's (National Item Identification Number) that meet the IUID marking requirement
2. Each military service and DLA must determine an average cost to conduct the Non-Recurring Engineering (NRE) per NIIN
3. Each military service must determine a cost to implement logistic support programs to analyze and utilize data

3. APPROACH TO DETERMINE RETURN ON INVESTMENT

The In-Service Engineering and Logistics Analysis node approaches the IUID return on investment from the perspective that the additional benefits of IUID implementation throughout the DoD supply chain will result in improved and integrated processes to conduct engineering analyses and performance assessments.

1. This ROI will occur through investment in: engineering change packages, SH252's, TO changes, pubs updates and engineering evaluations
2. The benefits of this investment will include: cost savings due to increased asset visibility, enhanced supply chain velocity, predictive maintenance, accurate item identification, excess inventory reduction, and many others.

4. ASSUMPTIONS

The following assumptions apply to the In-Service Engineering and Logistics Analysis node cost analysis:

- Evaluate cost & benefit consistent with existing policy
- IUID policy is to IUID any item delivered to DoD from contract that is $5K+ or above. Not further defined
- Evaluate by Node and consider or comment on Service unique areas
- Evaluation pertains to both organic and contract activities
- PMs / ICPs / Services may be more aggressive in IUID than this TF analysis – while this may be the case – it would not materially change this analysis
- Implementation will be properly executed -- errors will be dealt with individually and be marginal
- Population specifics provided by each service will also apply
- Legacy items (not marked under contract) will include Non Recurring Engineering (NRE) and marking costs.
    - $3K per aviation NSN, $1K per all other NSNs
    - NOTE: sole source OEM may be significantly higher but this is an exception

5. EXECUTION

IUID implementation throughout the DoD will occur over the course of several years. Initially, the DoD will focus efforts on assets of high dollar cost with a low rate of mean time between failure. Implementation focus will gradually shift toward a concentration on assets with a low dollar cost and a high rate of mean time between failure. Each service must also prepare for IUID implementation by meeting DoD IUID compliance requirements for their Automated Information Systems (AIS). Legacy AIS's and future Enterprise Resource Planning (ERP) systems must be prepared to comply with IUID requirements. Services should expect to see the full benefit of IUID as their respective ERP systems go live; and when DoD inventories reach a critical mass that allows for them to be managed via IUID. IUID implementation will have entered the execution phase once service ERP systems go live. Changes to regulations and other policy must be made accordingly to successfully implement IUID.

6. COSTS

As mentioned in Section 2, each service had to identify 3 critical requirements in order to conduct an accurate cost analysis of IUID.

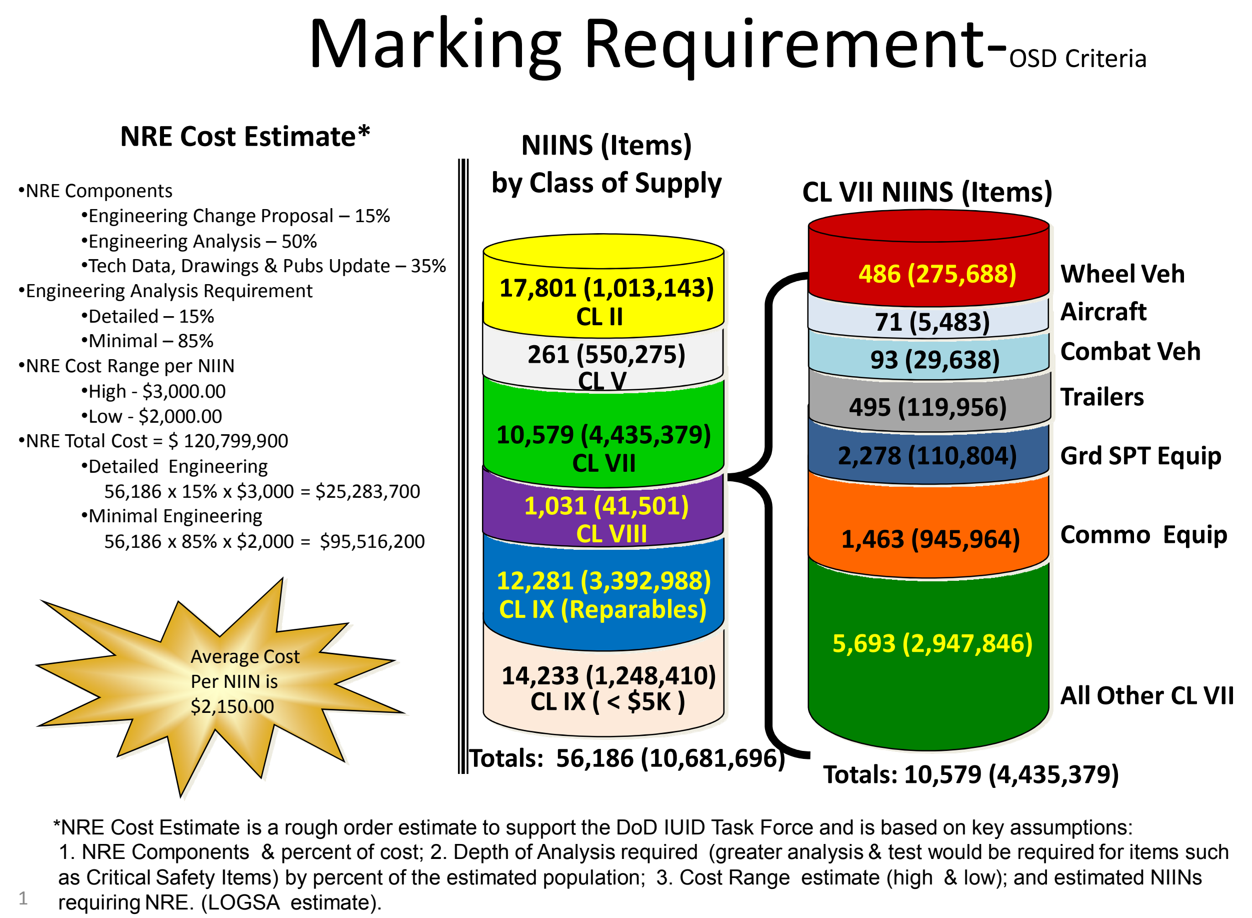
First, each military service and DLA had to determine their total number of NIIN's that meet the IUID marking requirement. Each military service and DLA developed a barrel chart to identify their total NIIN's requiring marking. The Navy was unable to produce a barrel chart, but sufficiently identified their total NIIN's requiring IUID marking.

Second, each military service and DLA had to determine an average cost to conduct the NRE per NIIN. In order to determine average cost, each service looked at a variety of factors including; engineering change package, SH252, TO change, pubs updates and engineering evaluation- to include organic vs. commercial engineering, minimum vs. detailed engineering, time to select constructs, mark type and location, and identifying IUID candidates. Each service also factored in its own service unique requirements to determine average NRE cost per NIIN.

Third, each military service had to determine a cost to implement logistic support programs to analyze and utilize data. In order to determine this cost, services examined costs to support improvement processes such as Condition Based Maintenance, Reliability Centered Maintenance, and System Lifecycle Integrity Management. Services also had to identify whether IUID modification of AIS's should be included in costs. DLA did not determine a cost to implement logistic support programs.

The 3 critical requirements to identify the node cost analysis are broken down here by military service and DLA:

Army

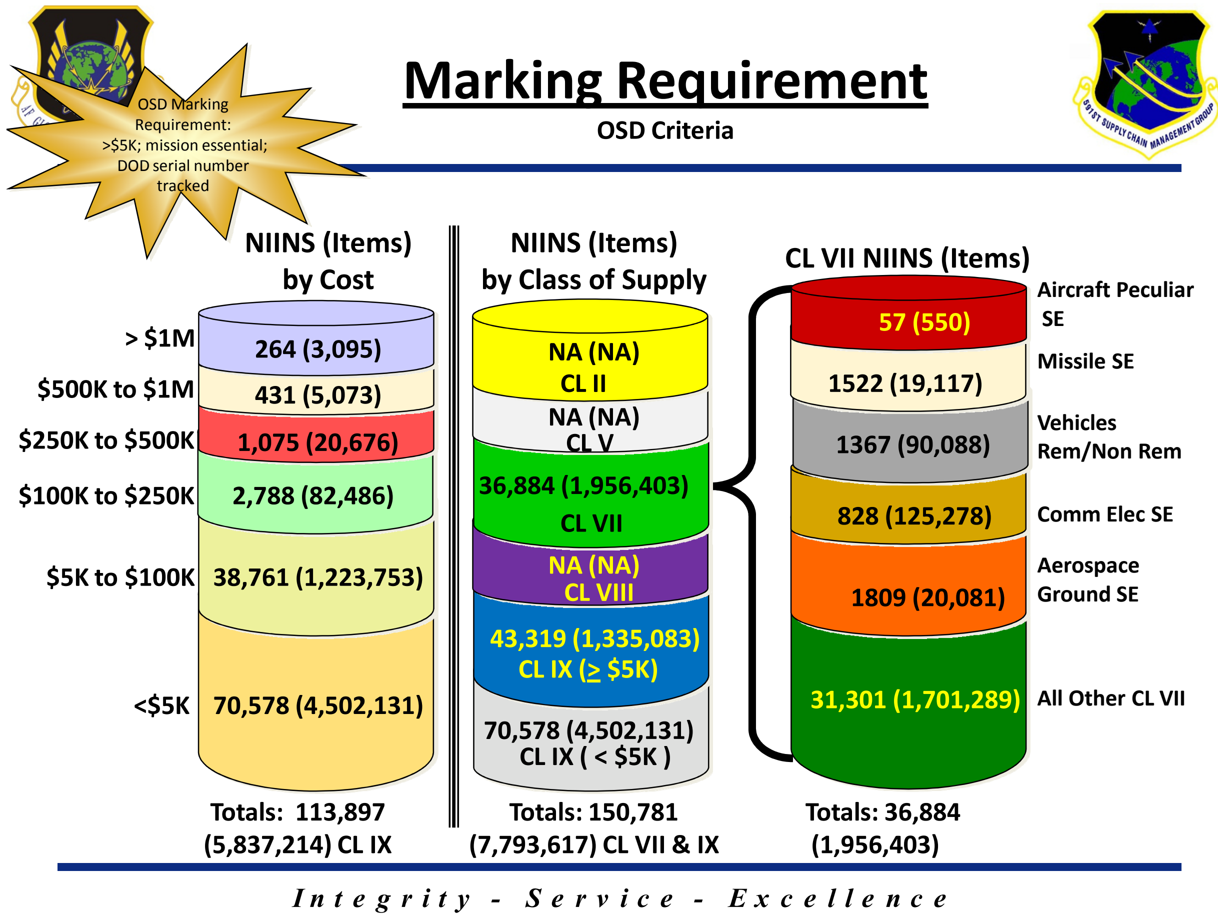


Total NIIN's (56,186) X Average NRE Cost per NIIN ($2,150) = **$120,799,900**

Logistics Support Programs Costs- **$96,114,000;** the Army examined IUID functionality for 5 existing/bridging systems, including both hardware and software requirements, which will utilize analytical data. Software costs for the Army approximated to $3,000,000, the bulk of the costs resulted from hand-held device hardware costs.

Army Total Cost- $216,913,900

Air Force



Total NIIN’s (150,781) X Average NRE Cost per NIIN ($2400) = **$361,874,400**

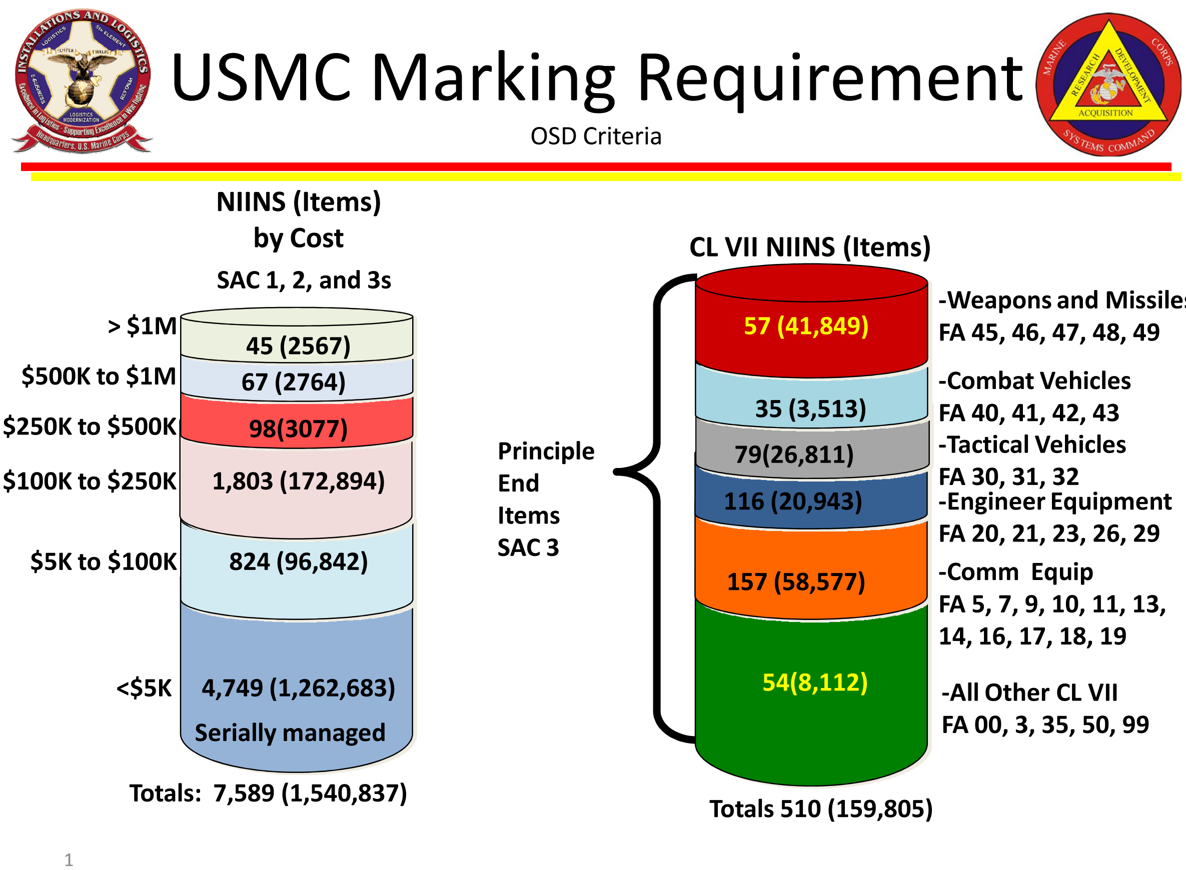
Logistics Support Program Costs- **$7,500,000;** includes costs for System Lifecycle Integrity Management recurring engineering, collective mind, and contractor support. The Air Force determined costs to modify AIS’s for IUID were not necessary for this analysis.

Air Force Total Cost: $369,374,400

Marine Corps

*Marine Corps barrel chart does not include aviation NIIN's. Aviation NIIN's are included in the Navy charts.

*Marine Corps logistics support program costs are included in the Navy's costs.



Total NIIN's (7,589) X Average NRE Cost per NIIN ($2500) = **$18,972,500**

Marine Corps Total Cost: $18,972,500

Navy

*The Navy was unable to produce a barrel chart equivalent to the charts the other services produced, but sufficiently identified their total NIIN's requiring IUID marking.

*Navy total NIIN's also include Marine Corps aviation NIIN's.

*Navy logistics support program costs also include Marine Corps costs.

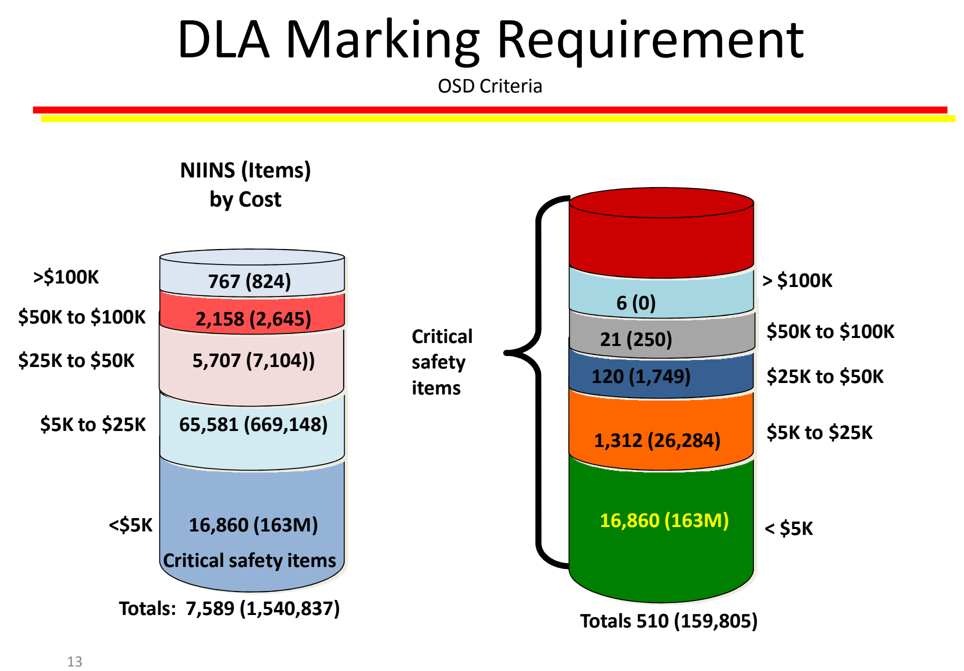
Navy Marking Requirement- 149,000 NIIN's (NAVICP 138,000; COMFISCS 4,000; MSC 7,000)

Total NIIN's (149,000) X Average NRE Cost per NIIN ($2,502) = **$372,798,000**

Logistics Support Program Costs- **$84,000,000;** the Navy has 56 AIS's requiring IUID modification at a cost of $1.5 million per AIS. The Navy determined this cost by reviewing large vs. minor effort costs to modify AIS's. A high effort cost included new tables and significant new features to conduct analysis. A minor effort cost included adding an IUID key to systems that already had logistic support program functionality.

Navy Total Cost: $456,798,000

DLA



Total NIINs over $5K (74,213) X Average NRE Cost per NIIN ($2500) = $185,532,500

Total CSI NIINs under $5K (16,860) X Average NRE Cost per NIIN ($2500) = $42,150,000

In service engineering to update technical requirements for DLA managed items is accomplished by Service design control activities, not DLA, if items are weapon system coded and/or classified as critical application.

DLA did not include any logistic support program costs.

DLA Total Cost: $227,682,500

<u>OVERALL COST TO DoD (sum of total service costs): $1,289,566,800</u>

7. BENEFITS

Benefits that will accrue from using IUID in the In-Service Engineering and Logistics Analysis node are as follows:

- Improved Ability to Monitor System
  - Improved data collection
  - Improved data storage
- Improved performance assessment
  - Improved data retrieval
  - Improved data validation
- Improved feedback analysis
  - Improved analysis results
  - Improved reporting system-automated and standardized
  - Greater alerts and triggers

8. REQUIREMENTS PASSED TO OTHER NODES

The In-Service Engineering and Logistics Analysis node should remain synchronized with the Acquisition Logistics Planning node. Transactional data will accumulate within both nodes; pertinent requirements and information should be shared and verified accordingly.

9. ISSUES

The In-Service Engineering and Logistics Analysis node identified two key issues with IUID implementation. First, inaccuracies during historical data migration could occur during IUID implementation. Second, proper logistics analysis tools are currently not mature enough to conduct accurate analyses with high confidence in the results.

10. CONCLUSION

The In-Service Engineering and Logistics Analysis node Item Unique Identification (IUID) total investment cost analysis resulted in a approximate overall expense of $1,289,566,800 to the Department of Defense (DoD). As previously mentioned, an individual breakdown of expense by military service and DLA is also contained in this document.

The In-Service Engineering and Logistics Analysis node concludes that the expected benefits of IUID implementation throughout the DoD supply chain are worth the estimated costs identified and explained in this analysis.

Appendix M

Logistics Item Unique Identification Task Force

Disposal Node IUID Cost Analysis

Final Working Paper

February 26, 2010

Prepared by the
Disposal Node Working Group

CONTENTS

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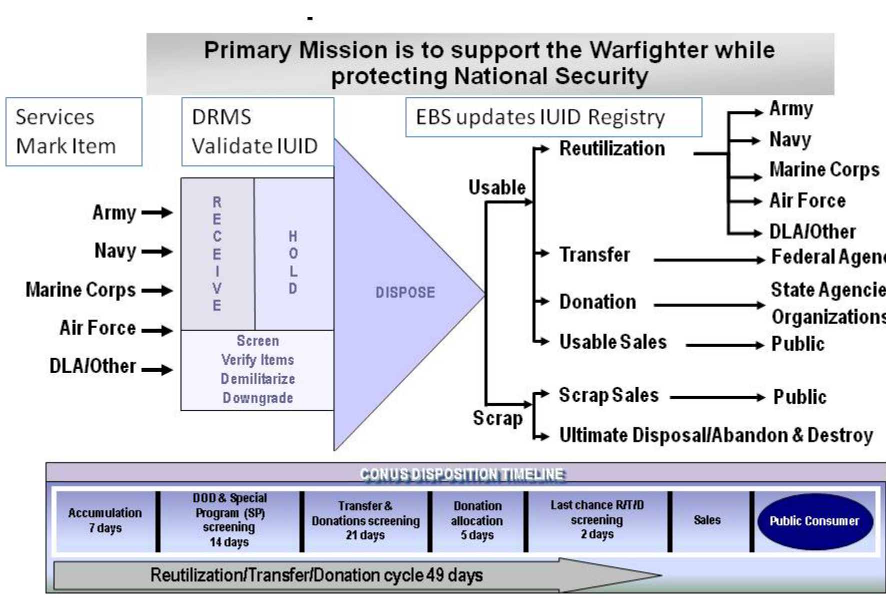
Disposal Node IUID Cost Analysis

1. SUMMARY

a. The Defense Reutilization and Marketing Service (DRMS) is a primary level field activity of the Defense Logistics Agency (DLA). Under the direction of the DLA Director, DRMS provides centralized DoD disposal management of excess and surplus military property supporting US military forces worldwide, Federal Agencies, State Agencies, and Foreign Military Sales.

b. DRMS utilizes the DRMS Automated Information System (DAISY) as its property accounting system. An initiative entitled, Reutilization Business Integration (RBI) is slated to replace DAISY by 2012. RBI will utilize the DLA's Depot Distribution Standard System (DSS) and DLA's Enterprise Business System (EBS). DSS has the capability to accommodate IUID technology. DSS and EBS will need tailoring for specific DRMS requirements that are unknown at this time. DRMS should be able to use barcode equipment that will be utilized for RBI to read IUID labels. However, it requires additional resources for manual verification of receipt and disposal of IUID marked items.

Figure 1. DRMS Disposal Overview



2. PROCESSES TO BE UNDERTAKEN AND VALUED

a. Through RBI, DRMS will utilize DSS and EBS for receipt tracking of IUID items. Field activities must ensure property is appropriately marked and registered upon turn-in to the DRMO. EBS will update the IUID registry upon final disposition of the asset (reutilization, transfer, donation, sales, destruction, or other ultimate disposition action).

b. DRMS will receive notice of inbound excess property via the services' Intransit Control System (ICS) through the pre-positioned material receipt record.

c. DRMS will physically receive property and verify accuracy of the Disposal Turn-In Document (DTID), DD1348-1A. Property will process through the Reutilization, Transfer and Donation (R/T/D) screening cycle until final disposition or disposal action.

d. Determination of appropriate disposal path and performance of disposition actions will be per DoD 4160.21-M, “Defense Materiel Disposition Manual”. Demilitarization (DEMIL; the act of destroying the military offensive or defensive advantages inherent in certain types of equipment or material) will be performed per DoD 4160.21-M-1, “Defense Demilitarization Manual”. Turn-in, storage, and disposal of hazardous material will be in accordance with DoDI 4715.4, “Pollution Prevention”.

3. APPROACH TO DETERMINE RETURN ON INVESTMENT

The level of reutilization by field activities and associated savings to the federal government will help gauge the overall return on investment within the scope of IUID management.

4. ASSUMPTIONS

a. There is no IUID requirement for Precious Metal Recovery or for Environmental turn-in, storage, and disposal of hazardous material.

b. There is no requirement for DRMS to mark items.

c. Generating activities will ensure property is appropriately marked and registered prior to turn-in to the DRMO.

d. DRMS will receive notice of inbound excess property via the services' ICS through the pre-positioned material receipt record.

e. DRMS will utilize DSS and EBS for IUID tracking.

f. DSS will advertise the IUID status of an item when its NSN is called up.

g. DRMS inventories will be visible through an enterprise view in EBS.

h. EBS will update the IUID registry upon final disposition of the asset.

i. The planned, phased barcode equipment purchase by DRMS—first for inventory, then for receipt after RBI implementation—will be capable of reading the 2D IUID barcodes. DSS, the platform DRMS is working towards, is capable of interacting with the IUID Registry, which should pass over to DRMS and individual DRMOs.

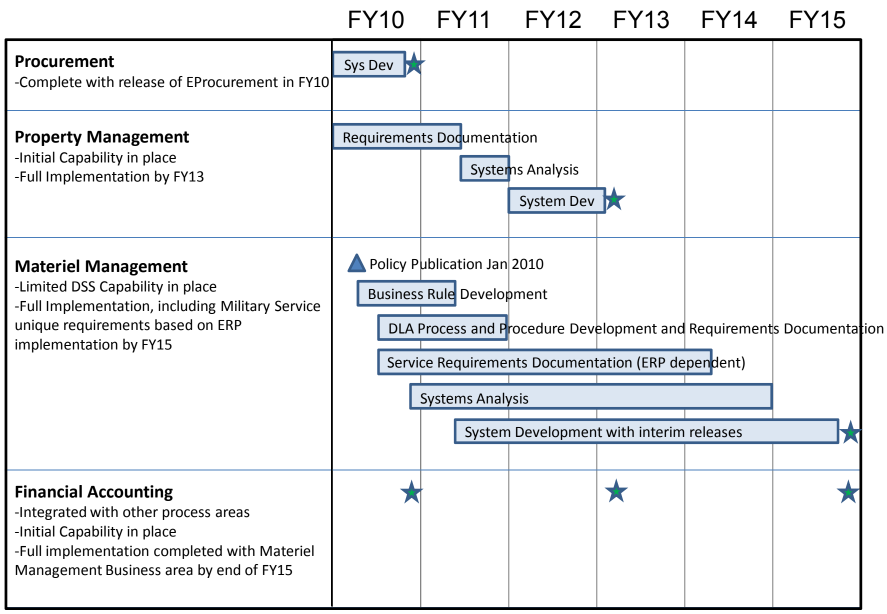
j. Actual costs for equipment and personnel will be different from those in this analysis.

k. Additional benefits or hindrances to the Disposal or other nodes will become more apparent over time.

5. EXECUTION

a. Phasing (Schedule): Schedule is contingent upon changes to DSS and EBS. Through aggressive engagement with relevant OSD policy makers, military partners, and proactive internal activities, DLA will implement DoD IUID policy and business rules across the agency's enterprise of defense business systems by the end of FY15.

Figure 2. DLA IUID Implementation Timeline



b. AIT/AIS Requirements: AIT Equipment that will be used for RBI will be utilized for IUID management. DSS and EBS will need to be modified to accommodate DRMS requirements.

c. Time to Execute/Receive Benefit: Unknown at this time.

d. Policy & Guidance Changes: DRMS-I 4160.14, "Operating Instruction for Disposition Management" and DoD 4160.21-M, "Defense Materiel Disposition Manual" will be updated to reflect the pertinent changes that apply to receiving and disposal of IUID items.

6. COSTS

a. Infrastructure/Facilities/Sustainment: No additional costs are foreseen.

b. Equipment: 25 additional scanners at a cost of $2.3K per unit totaling $57.5K.

c. AIS: DSS and EBS will need to be modified to accommodate DRMS requirements. Associated costs are unknown at this time.

d. Manpower (Annual FTE). Workload is expected to increase related to manual verification of IUID items at receipt and disposal.

1) Number of FTEs

a) Roughly 34% of transactions involve Local Stock Numbered items (LSNs) that require additional research

Figure 3. Transactions Requiring Additional Research

FY2008 DTID* NO COUNT	LSN* Counts	LSN %
3,005,164	1,010,387	33.62%

*DTID = Disposal Turn-In Document: LSN = Local Stock Number

b) Roughly 33.3K hours/year devoted to research of NIIN and LSN groupings

Figure 4. Transactions Requiring Additional Research

FY2008 NSN/LSN COUNT	NIINs	LSNs	Hours*	FTEs*
162849	144611	18238	33221	17

*10 min per NIIN: 30 min per LSN: 40 hr week: 50 week year

c) 17 additional FTEs at an average rate of $86.7K totaling $1.48M

2) Training is estimated to cost $3.6K (creation of a study period to educate the workforce).

e. Discrepancy resolution & data cleansing resolution costs: Unknown at this time.

f. Marking & Tracking: None anticipated.

g. Program Management: Unknown at this time.

7. BENEFITS

a. Categories:

1) Resources: With the detailed item identification provided by IUID and expected enterprise view of asset availability across multiple systems, it is anticipated that customer reutilization levels out of the DRMOs will increase.

2) Dollars: With the increased reutilization a large savings could be realized to the federal government.

3) Manpower: IUID should provide reutilization customers with more accurate item information and reduce requested DRMO personnel involvement in customer item research activities.

4) Training: N/A

5) Efficiency: Accurate item identification across the logistics enterprise.

b. Risk:

1) Political: Per the Arms Export Control Act (AECA) and Foreign Assistance Act (FAA), the US Government has a continual responsibility, from time of title transfer until eventual disposal, to ensure defense articles and services sold and/or transferred to foreign countries are being used for their intended purposes. Additional political risks to this node include foreign military sales (FMS), which would gain enhanced accountability though use of IUID.

2) Security: N/A

3) Environmental/safety/health: N/A

c. Readiness:

1) Improved inventory mgmt:

   a) Increased asset accountability and visibility.

   b) Accurate item identification.

   c) Increased potential for systems interoperability.

2) Planning and forecasting: N/A

3) Availability–OST, throughput, frequency, visibility, traceability: The ability of a unit to locate a specific item with UII-related attributes (hours since rebuild, specific lot number, etc.) could allow better use of the item for specific applications, thus increasing readiness of the affected weapon system.

d. Quality–materiel and data: UIIs, when correctly assigned upon item manufacture, provide the granularity and accuracy of item information necessary to correctly manage this population of items throughout the life-cycle.

e. Weapon System/Equipment Performance: See Para 7.c.3 (above).

f. Accountability: Increased levels of accountability are expected across the logistics enterprise, in particular for field activities.

g. Regulatory, policy, statutory: After DRMS reception and before final disposition, certain DEMIL Code B and sensitive DEMIL Code Q assets are retained in long-term storage (LTS) for reasons including national security and reutilization potential. This policy is not viewed as having an adverse impact to IUID implementation, overall costs or operating environment. Benefits to LTS for IUID implementation include those already mentioned in Para 7 of this analysis as well as mitigation of potential political or security risks associated with decisions to retain items in LTS.

8. REQUIREMENTS PASSED TO OTHER NODES

a. Field Activities will take actions to properly mark property prior to DRMO turn-in.

b. Potential costs passed to other nodes for marking of reutilized and FMS assets:

Figure 5. Potential Reutilized and FMS Asset Marking Costs

FY2008 REUTILIZATION VALUE	# NSNs	# EACHES	TOTAL COST @ $10/EACH
Less than $5K	134,599	6,219,534	$62,195,340
$5K to $24,999	10,581	39,444	$394,440
$25K to $49,999	3,214	5,303	$53,030
$50K to $99,999	2,511	3,391	$33,910
$100K < X	1,235	1,897	$18,970
ALL	152,150	6,269,582	$62,695,820
FMS VALUE	# NSNs	# EACHES	TOTAL COST @ $10/EACH
Less than $5K	5,203	516,749	$5,167,490
$5K to $24,999	472	895	$8,950
$25K to $49,999	120	164	$1,640
$50K to $99,999	404	469	$4,690
$100K < X	83	85	$850
ALL	6,282	518,362	$5,183,620

9. ISSUES

There are only two issues at the present time: funding and system changes to DSS and EBS to accommodate DRMS IUID requirements.

10. CONCLUSION

DRMS will utilize DSS and EBS to track and update the IUID registry upon receipt and disposal of IUID items. System changes will need to occur to DSS and EBS to accommodate DRMS IUID requirements. Additional FTEs and AIT equipment will be needed to support the IUID effort. Benefits from accurate item identification, asset accountability, and visibility are expected across the logistics enterprise.

REFERENCES

- DoD 4140.1-R, "DoD Supply Chain Materiel Management Regulation" (http://www.dtic.mil/whs/directives/corres/pdf/414001r.pdf)

- DoD 4160.21-M, "Defense Materiel Disposition Manual" (http://www.dla.mil/dlaps/dod/416021m/guide.asp)

- DoD 4160.21-M-1, "Defense Demilitarization Manual" (http://www.dla.mil/dlaps/dod/416021m1/guide.asp)

- DoDI 4151.19, "Serialized Item Management (SIM) for Materiel Maintenance" (http://www.dtic.mil/whs/directives/corres/pdf/415119p.pdf)

- DoDI 4715.4, "Pollution Prevention" (http://www.dtic.mil/whs/directives/corres/pdf/471504p.pdf)

- DoDI 8320.04, "Item Unique Identification (IUID) Standards for Tangible Personal Property" (http://www.dtic.mil/whs/directives/corres/pdf/832004p.pdf)

- Defense Reutilization and Marketing Service (DRMS) General Order No. 22-09 (http://www.dla.mil/DLAPS/mf/drms.pdf)

- DRMS-I 4160.14, "Operating Instruction for Disposition Management" (https://www.drms.dla.mil/gov/publications/4160.14/4160.14.shtml)

- HQ DLA Enterprise-Level Item Unique Identification (IUID) Implementation Plan For Defense Business Systems (DRAFT as of 15 Dec 09)

- Intensive Item Management IUID Benefit Analysis (DRAFT as of 16 Dec 09)

Appendix N

Logistics Item Unique Identification Task Force

Validated IUID Logistics Requirements

Final Working Paper

October 23, 2009

Prepared by the
Logistics Requirements Working Group

Consolidated node requirements. Reqmts date: 25 Sep 09, Value Chain Validation as of 20 Oct 09. Adjusted based on adjudication of coding as of 23 Oct 09, jkern@lmi.org, 703-338-9328.

			NODES										VALUE CHAIN			SERVICE/ AGENCY					PA	PA COMMENT	IIM	IIM COMMENT	PLM	PLM COMMENTS
	REQUIREMENT	CATEGORY	ACQ LOG PLANNING	ACQ & SUPPLIERS	DISTRIB. CENTERS	TRANSPORT	BASE & FWD SUPPORT	DEPOT MAINT.	FIELD MAINT.	IN SERV ENG & LOG ANALYSIS	FIELD ACTIVITIES & OPNS	DISPOSAL	PA	IIM	PLM	AF	A	MC	N	DLA	(1-5)		(1-5)		(1-5)	
1	**Comply with governing instructions and directives, to include:**	Mark	X										X	X	X						**1**		1		1	Tablulation of this node is misleading. Acquisition Planning requirements for mark, track, use and AIT/AIS are actually requirements to "plan" for these functions, not the actual accomplishment of them. . Do not believe that marking, tracking or AIT equipment iare required at this node to provide capability. Some planning decisions may require AIS entries to document them.
1a	a) DoDI 5000.02 Operation of the Defense Acquisition System	Mark	X										X	X	X						**1**		3		1	
1b	b) DoDI 8320.04 Item Unique Identification (IUID) Standards for Tangible Personal Property	Mark	X										X	X	X						**1**		1		1	
1c	c) DoDI 5000.64 Accountability and Management of DoD-Owned Equipment and Other Accountable Property	Mark	X										X	X	X						**1**		3	PA requirement (not IIM)	1	
1d	d) DFAR 211.274 Item Identification and Valuation Requirements	Mark	X										X	X	X						**1**	Also addressed in DFARS 252.211-7003 Item Identification and Valuation	1		1	
1e	e) DoD Directive 8320.03 Unique Identification (UID) Standards for a Net-Centric Department of Defense	Mark	X										X	X	X						**1**		3		1	
1f	f) DoD 4140.1-R DoD Supply Chain Materiel Management Regulation	Mark	X										X	X	X						**3**	4140.1-R is L&MR not PA	1	IIM requirement (not PA)	2	
2	**Draft/Submit IUID Implementation Plan (MS A Summarized in SEP, MS B Annex to SEP, MS C Annex to SEP) consistent with MIL-STD-130N:**	Mark	X										X	X	X						**2**	This requirement is in accordance with DoDI 8320.04	3		1	
2a	a) Identification of items to be marked i) New Acquisitions ii) Legacy Items iii)Special Tooling (3 Aug 2009 AT&L memo)	Mark	X										X	X	X						**1**		3		2	
2b	b) Marking strategies i) Responsible organizations ii) Trigger Events	Mark	X										X	X	X						**2**		3		2	Should add iii) Mark Sustainment+W57
2c	c) Engineering data requirements i) Marking methods ii) Location on item iii) Technical Data requirements	Mark	X										X	X	X						**2**		3		2	
2d	d) Budget i) Cost estimates (ROM) ii) POM submittals	Mark	X										X	X	X						**2**		3		2	
2e	e) Contracting srategies	Mark	X										X	X	X						**1**		3		2	
2f	f) Cross program/service AIS integration (refer to subsequent AIS chart)	Mark	X										X	X	X						**1**		3		2	
2g	g) Quality assurance plan	Mark	X										X	X	X						**2**		3		2	
2h	h) Disposition of items from registry during demil contracts	Mark	X										X	X	X						**1**		3		1	
3	**Inclusion of MIL-STD 129 marking requirements in plans/contracts**	Mark	X										X	X							**2**	**PA Added this requirement**	1			Concur that PLM does not need marking for this requirement
4	**Contractor owned/managed items**	Mark	X										X								**1**	**If this refers to GFP**	2			
5	**Account for the life cycle cost of the mark (to include the mark itself, equipment, and people)**	Mark	X												X										2	
6	**Planning for historical/archived tracked data management (enables audit trails and item/transaction research and analysis)**	Track	X										X	X	X						**1**		2	Transition Plan	2	
7	**Planning for the methods and manpower to track**	Track	X										X	X	X						**1**		2	Transition Plan	2	

				NODES									VALUE CHAIN			SERVICE/ AGENCY					PA	PA COMMENT	IIM	IIM COMMENT	PLM	PLM COMMENTS
	REQUIREMENT	CATEGORY	ACQ LOG PLANNING	ACQ & SUPPLIERS	DISTRIB. CENTERS	TRANSPORT	BASE & FWD SUPPORT	DEPOT MAINT.	FIELD MAINT.	IN SERV ENG & LOG ANALYSIS	FIELD ACTIVITIES & OPNS	DISPOSAL	PA	IIM	PLM	AF	A	MC	N	DLA	(1-5)		(1-5)		(1-5)	
8	Planning for budgeting to track (for item unique tracking)	Track	X										X	X	X						1		2	Transition Plan	2	
9	Planning physical vs. virtual (allow tracking of legacy assets prior to physical marking)	Track	X										X								2			Transition Plan		Concur that PLM does not need marking for this requirement
10	Planning for track of program unique GFP	Track	X										X								1			Transition Plan		
11	Impact on the life cycle cost due to track (including equipment and personnel)	Track	X												X									Transition Plan	1	
12	Planning that identifies the functions and activities that will benefit from the use of IUID to include:	Use	X										X	X	X						1		2	Transition Plan	1	
12a	a) Counterfeit parts	Use	X										X	X	X						1		2		1	
12b	b) Serialized Item Management	Use	X										X	X	X						1		2		1	
12c	c) Asset/Inventory/Equipment Management	Use	X										X	X	X						1		2		1	
13	Planning that identifies the IUID information requirements for those functions and activities that will use IUID	Use	X										X	X	X						1		2	Transition Plan	1	
14	Planning for the methods and manpower to use IUID within each applicable function and activity	Use	X										X	X	X						1		2	Transition Plan	1	
15	Special security issues during information use on some items	Use	X											X									2			
16	Plan/coordinate for the use of IUID as an enabler for:	Use	X												X									Transition Plan (PLM)	1	
16a	a) Maintenance Planning and Engineering	Use	X												X										1	
16b	b)Configuration Management	Use	X												X										1	
16c	c) TOC Management	Use	X												X										1	
16d	d) Sustainment KPP / Materiel Availability	Use	X												X										2	
16e	e) RAM Planning and Analysis	Use	X												X										1	
17	Planning to integrate into the AIT/AIS architecture	AIT/AIS	X										X	X	X						1		2	Transition Plan	1	
18	Mandatory use of AIT for PA unless demonstrably proven through cost benefit or other analysis that implementation would not be practicable (DODI 5000.64 para 6.1.2).	AIT/AIS	X										X								1					
19	Planning to determine most effective and efficient AIT/AIS	AIT/AIS	X										X		X						2	PA Added this requirement		Transition Plan	2	
20	Planning to limit obsolescence issues for AIT/AIS	AIT/AIS	X										X		X						2	PA Added this requirement		Transition Plan	2	
21	Plan/coordinate for the use of IUID as a "Skeleton key" to data contained in various ERPs	AIT/AIS	X										X		X						2	PA Added this requirement		Transition Plan	2	
22	Mark assets in accordance with DFARS clause 252.211-7003 and DODI 8320.04 for New and Legacy	Mark		X									X	X	X						1		1	Commercial and ICP	1	
23	Mark and report GFP in accordance with DFARS clause 252.211-7007 (and pending clauses)	Mark		X									X	X	X						1		3	Commercial and ICP	1	
24	Adherence to Mil-Std-130 for mark content and quality	Mark		X									X	X	X						1		1	Commercial and ICP	1	
25	Adherence to Contractual requirement for quality assurance	Mark		X									X	X	X						2		1	Commercial and ICP	1	
26	Update tech data with marking placement	Mark		X									X	X	X						2		1	Commercial and ICP	1	
27	Make tech data available to marking activities	Mark		X									X	X	X						2		1		1	
28	ICPs are the resource sponsor for marking assets through Procurement and Component Repair	Mark		X									X	X	X						1		3		1	Class VII procurement generally not ICP.
29	Standardize discrepancy reporting procedures for marking-related discrepancies	Mark		X									X	X	X						2		1		2	

	REQUIREMENT	CATEGORY	ACQ LOG PLANNING	ACQ & SUPPLIERS	DISTRIB. CENTERS	TRANSPORT	BASE & FWD SUPPORT	DEPOT MAINT.	FIELD MAINT.	IN SERV ENG & LOG ANALYSIS	FIELD ACTIVITIES & OPNS	DISPOSAL	PA	IIM	PLM	AF	A	MC	N	DLA	PA (1-5)	PA COMMENT	IIM (1-5)	IIM COMMENT	PLM (1-5)	PLM COMMENTS
				NODES									VALUE CHAIN			SERVICE/ AGENCY					PA	PA COMMENT	IIM	IIM COMMENT	PLM	PLM COMMENTS
30	Update FLIS to reflect NSNs requiring IUID	Mark		X									X	X	X						2		1		2	
31	Marking of assets > $5K	Mark		X									X								1	Excludes Inventory and OM&S covered by the DoDI 4140.1-R				
32	Marking for commercially owned assets within Performance Based Logistics (PBL) contracts if required by DoD	Mark		X											X										2	
33	Check for duplicates in OSD Registry upon submission of Receiving Report vice after acceptance	Mark		X									X	X							2	PA Added this requirement	1	Commercial and ICP		
34	Ensure MIL-STD-129 IUID package marking in IUID clause	Mark		X										X							2	PA Added this requirement	1	Commercial and ICP		
35	Ensure UII on all levels of packaging	Mark		X										X									1	Commercial and ICP		
36	Marking Methodology (DFARS):																									
36a	a) Marking to OSD Policy – (Geographically)	Mark		X														X						Distinction between 36a, c, e and f is unclear		
36b	b) Durability of Marks/Adhesives (both field/supplier)	Mark		X														X								
36c	c) Marking to OSD Policy & Engineering authority	Mark		X											X	X									1	Contracts to comply with DFARS clause 252.211-7003. (Rating changed from 5 to 1)
36d	d) Phased plan based on priority	Mark		X											X		X						1	Transition plan; base on intensive items first	1	Legacy items are prioritized if funding is inadequate (Rating changed from 5 to 1).
36e	e) Selective Marking to OSD Policy	Mark		X															X				1	Intensive items first		
36f	f) Marking based on Services Requirements	Mark		X																X						
37	Register UII and pedigree data in the OSD Registry & within Service system of record for UII	Track		X									X	X	X						1		1		1	
38	UII does not change over the life of the asset	Track		X									X	X	X						1		1		1	
39	Use the UII as the asset identifier and system key	Track		X									X	X	X						1		1		1	
40	Read, store, and share UII data for physical inventory and all material movements	Track		X									X	X	X						2		1	Partially correct - IIM requirement is to use UII for physical inventory but no requirement to "share" UII for all material	1	
41	Receipt and Acceptance by UII	Track		X									X	X	X						1		1		1	
42	Update OSD Registry upon transfer of custody to another Component or commercial vendor and upon expiration of	Track		X									X	X	X						2		3	Partially correct - Only pertains to expiration, not to custody/transfer	1	
43	Submit electronic requests for payment (invoices & receiving reports) via WAWF IAW DFARS 252.232-7003	Track		X									X	X	X						1		1	Commercial and ICP	1	
44	Ensure unique transportation tracking number to maintain integrity of referential link to UII in shipment	Track		X									X	X	X						1		1	Commercial and ICP	1	
45	FLIS flag indicating IUID level of intensity	Track		X									X	X	X						3		1		1	
46	UII must be a valid, active field in property book	Track		X									X								1					
47	UII shall be recorded in only one property accountability system of record at a time	Track		X									X								1			Too restrictive		
48	GFP assets removed from property book when GFP item is installed in end item	Track		X									X								4	GFP Item is not removed from property book. However, UII is retired or made inactive to allow access to historical data..				
49	Update OSD Registry with Parent/Child relation changes	Track		X									X		X						1	errors on new procurement via WAWF for PA		No requirement for parent/child changes	1	
50	Maintain strict accountability for most intensively-managed items	Track		X										X	X								1		2	
51	Advanced Shipping Notice (ASN) (EDI 856) required between government and contractors	Track		X									X	X							2	Does this include requirement for Property Shipping Notices (PSN) also?	1	Commercial and ICP		
52	Nuclear Weapons Related Material (NWRM) tracking	Track		X												X			X				1			

			NODES										VALUE CHAIN			SERVICE/ AGENCY					PA	PA COMMENT	IIM	IIM COMMENT	PLM	PLM COMMENTS
	REQUIREMENT	CATEGORY	ACQ LOG PLANNING	ACQ & SUPPLIERS	DISTRIB. CENTERS	TRANSPORT	BASE & FWD SUPPORT	DEPOT MAINT.	FIELD MAINT.	IN SERV ENG & LOG ANALYSIS	FIELD ACTIVITIES & OPNS	DISPOSAL	PA	IIM	PLM	AF	A	MC	N	DLA	(1-5)		(1-5)		(1-5)	
53	Receiving WAWF UII Data (856 ASN) in USMC LOGAIS	Track		X														X					2			
54	Validate UII	Use		X									X	X	X						1		1		2	
55	Asset visibility	Use		X									X	X	X						1		1		2	
56	Differentiate assets within a Stock Number	Use		X									X	X	X						1		1		2	
57	Track and monitor warranties via UII	Use		X									X	X	X						2		3		1	
58	Improved item data integrity via automated machine-readable data capture vice manual input	Use		X									X	X	X						1		2		2	
59	Include UII in transactions to support other nodes/communities (e.g. maintenance)	Use		X									X	X	X						2		2		2	
60	Use of UII to identify deficient / discrepant items	Use		X									X	X	X						2		1		2	
61	Use UII in the repair and return of a specific asset within a stock number to satisfy customer requirements	Use		X									X	X	X						2		2	PLM	2	
62	Transfer of GFP through WAWF, GFP reporting	Use		X									X								1					
63	Maintain association of Parent/Child relationships by UII and associated values	Use		X									X		X						1		2	In logistics systems for most intensive items	1	Requirement could apply to PLM as well. (Rating changed from 5 to 1)
64	Capture Gov't unit cost when item undergoes process that increases useful life or capability	Use		X									X		X						1				2	
65	Associate asset to operational environment via UII	Use		X											X										2	
66	Improved Economic Disposal decisions using UII to identify aged and failure prone assets	Use		X										X	X								1		2	
67	Reconciliation by UII at different levels	Use		X										X									1			
68	Use of IUID by suppliers for internal process improvement	Use		X										X	X								1	IIM reqmt	1	Rating changed from 5 to 1
69	Receive & inventory by UII for intensive item management	Use		X										X									1			
70	Identify which UII is being used	Use		X										X	X								1	Only for intensively managed items	1	Rating changed from 5 to 1
71	Read, Store and Share UII data	AIT/AIS		X									X	X	X						1		1	As required	2	
72	Determine data collection/manipulation requirements necessary to achieve benefits; i.e., reduced costs and/or improved readiness	AIT/AIS		X									X	X	X						2		3		2	
73	Government Logistics and Property systems interface with WAWF to electronically exchange UII data	AIT/AIS		X									X	X	X						1		1		2	
74	Property Management systems and practices for contractors to control GFP while in their possession	AIT/AIS		X									X								1					
75	OSD Registry interfaces with WAWF, EDI, UDF, XML, or Web entry	AIT/AIS		X									X								1					
76	Update OSD Registry upon transfer of custody to another Component and upon expiration of an asset	AIT/AIS		X									X		X						1				2	
77	WAWF capability for receipt and acceptance of new acquisition	AIT/AIS		X									X	X							1	Included in original PA requirements. (Rating changed from 5 to 1)	1			
78	AIT infrastructure at nodes	AIT/AIS		X																		Need further clarification on this	2			
79	At this time, Navy ERP functionality cannot be activated until all SAP is implemented and all interfacing AISs are IUID compliant	AIT/AIS		X															X					Transition plan; not a requirement		
79a	a) Navy ERP Implementation schedule cannot be disrupted	AIT/AIS		X															X					Transition plan; not a requirement		
80	Applies to Army's ERP implementation	AIT/AIS		X													X							Transition plan; not a requirement		
81	Limited Investment in legacy LOGAIS or Bridge AIS prior to GCSS-MC Capability (incl. future releases)	AIT/AIS		X														X						Transition plan; not a requirement		

	REQUIREMENT	CATEGORY	ACQ LOG PLANNING	ACQ & SUPPLIERS	DISTRIB. CENTERS	TRANSPORT	BASE & FWD SUPPORT	DEPOT MAINT.	FIELD MAINT.	IN SERV ENG & LOG ANALYSIS	FIELD ACTIVITIES & OPNS	DISPOSAL	VALUE CHAIN PA	VALUE CHAIN IIM	VALUE CHAIN PLM	SERVICE/ AGENCY AF	A	MC	N	DLA	PA (1-5)	PA COMMENT	IIM (1-5)	IIM COMMENT	PLM (1-5)	PLM COMMENTS
82	Inspect/Collect UIIs for all designated items (new or RDO)	Mark			X								X	X							1		1	As required		
83	Label packages; barcode with UII from ASN	Mark			X								X	X							2		1			
84	Take appropriate steps to notify owner/manager about non-UII marked items and act accordingly	Mark			X									X									1			
85	Link UII with TCN and Requisition Number for all shipments generated	Track			X								X	X							2		1			
86	consolidations and de-consolidations of shipment packaging	Track			X								X	X							3		1	in consolidations and de-consolidations, vice using UII		
87	Conduct 100% inventory by UII and/or random sample annually	Use			X									X									1	Depends on item		
88	Collect UII data from package PDF417 labels for use in inventory confirmation	Use			X									X									1			
89	Appropriate labeling of shipped items	Use			X									X									1			
90	Appropriate notification to customer of UII	Use			X									X									2			
91	May use UII to monitor condition and shelf-life of some items	Use			X										X								1		2	PLM may use but not hard requirement.
92	Update ICP of receipt by UII for most intensive, by NSN for least intensive	AIT/AIS			X									X									1			
93	Update WAWF of receipt	AIT/AIS			X									X									1			
94	Store UIIs of items in inventory	AIT/AIS			X									X									1	As required		
95	Print packaging labels in PDF417 with UII	AIT/AIS			X									X									1			
96	Prompt SDR actions	AIT/AIS			X									X									1			
97	Initiate inventory based on 846P	AIT/AIS			X									X									1	As required		
98	Verify, by physical location, all UIIs by condition code against the accountable record	AIT/AIS			X									X									1			
99	Report transaction history to include UII	AIT/AIS			X									X									1			
100	Debit inventory by UII for issued items	AIT/AIS			X									X									1			
101	Link UII with TCN and Requisition Number for all shipments generated (tie to TCN)	AIT/AIS			X								X	X							3		1			
102	consolidations and de-consolidations of shipment packaging	AIT/AIS			X								X	X							3		1	in consolidations and de-consolidations, vice using UII		
103	Link UII to condition monitoring and shelf-life	AIT/AIS			X										X										4	
104	Transportation tracks shipments, not items	Track				X							X	X	X						3		4	Statement of fact - not a reqt	3	Misleading. None of the VCs have a equipment requirement to track or use
105	Transportation Control Number (TCN) is assigned to all DoD sponsored shipments entering Defense Transportation System and is the single standard shipment identification number.	Track				X							X	X	X						3		1		3	
106	Future environment – Passive RFID tag and bar-coded TCN on Military shipping label will be used for tracking. Dual capabilities required as not all DoD, commercial or coalition activities will have RFID capabilities.	Track				X							X	X	X						3		3		3	
107	The DTS will provide the transportation identifier (Transportation Control Number) to the DoD Components and AISs to support the linking or correlating shipments to IUID (maintain referential integrity, keeping the link of TCN to Requisition number to UID)	Use				X							X	X	X						3		1		3	
108	Vendor compliance with Wide Area Workflow for shipments outside of DTS (Provides transportation visibility and linkage to IUID registry, other AISs)	AIT/AIS				X							X	X	X						3		1		2	

	REQUIREMENT	CATEGORY	ACQ LOG PLANNING	ACQ & SUPPLIERS	DISTRIB. CENTERS	TRANSPORT	BASE & FWD SUPPORT	DEPOT MAINT.	FIELD MAINT.	IN SERV ENG & LOG ANALYSIS	FIELD ACTIVITIES & OPNS	DISPOSAL	PA	IIM	PLM	AF	A	MC	N	DLA	PA (1-5)	PA COMMENT	IIM (1-5)	IIM COMMENT	PLM (1-5)	PLM COMMENTS
			NODES										VALUE CHAIN			SERVICE/ AGENCY					PA	PA COMMENT	IIM	IIM COMMENT	PLM	PLM COMMENTS
109	Defense Logistics Management System compliance to enable end-to-end data visibility for Transactions (Advance Ship Notice Supply Shipment Status, Shipment Consolidation)	AIT/AIS				X							X	X	X						3		1		2	
110	Document numbers can be used by supply systems to link Transportation information to item information, to include IUID	AIT/AIS				X							X	X	X						3		1		2	
111	Integrated Date Environment/Global Transportation Network Convergence (IGC) can fuse the data from the supply shipment status with the transportation transactions to provide the users visibility to IUID in particular shipments.	AIT/AIS				X							X	X	X						3		1		2	
112	In the future, DoD Component Supply Chain/ERPs/AISs will be able to subscribe to the IGC Enterprise Service (Service Oriented Architecture – SOA)	AIT/AIS				X							X	X	X						3		3		2	
113	UIIs will be assigned to unmarked items in accordance with service level procedures.	Mark					X						X	X	X						3		1	Need clarification - only Service, not OSD procedures?	3	Misleading. If item at this node requires a mark and doesn't have one, one should
114	If UII(s) are not available on the exterior packaging, the receiver will use the UII in the ASN to place new label with UII on packaging.	Mark					X						X	X	X						3		1		3	
115	Strategy is to mark III Marine Expeditionary Force (III MEF), then II MEF, I MEF and Marine Forces Reserve each a 90 day effort Shadowing GCSS-MC fielding.	Mark					X											X					4	This is a statement		
116	If the package has been damaged, then receiver should open packaging to collect UII(s) from the item(s). Item will then be repackaged. If the package cannot be opened, alternate procedures will be developed.	Track					X						X	X	X						2		1		3	
117	For the most intensively managed items, B/FS sites will receive by UII and update/maintain accountable and owner balances by UII.	Track					X						X	X	X						3		1		3	
118	For the most intensively managed items, B/FS sites will issue by UII, debiting accountable/owner balances by UII and identify the UIIs shipped to the requisitioner.	Track					X						X	X	X						3		1		3	
119	For least intensively managed items, the B/FS system will send quantity received by NSN to managing ICP.	Track					X						X	X	X						3		1		3	
120	Military Services or DLA may prescribe more frequent inventories and/or inventories by 100 percent physical count, as required. Must act on local stock control system alerts for inventory performance requirement. If UII(s) are not available on the exterior packaging or if user finds UII mismatches, causative research will be pursued.	Track					X						X	X	X						3		1		3	
121	all UII(s) by condition code against the accountable record. Results of UII	Track					X						X	X	X						3		1	Must verify UIIs against accountable record for intensively managed items	3	
122	Owner/managers must verify reported UII(s) and condition codes, comparing against their records. If mismatches are discovered, they will utilize new procedures to reconcile Reported UII(s) and/or condition codes on the B/FS location accountable record.	Track					X						X	X	X						3		1		3	

												VALUE CHAIN			SERVICE/ AGENCY					PA	PA COMMENT	IIM	IIM COMMENT	PLM	PLM COMMENTS
	REQUIREMENT	CATEGORY	ACQ LOG PLANNING	ACQ & SUPPLIERS	DISTRIB. CENTERS	TRANSPORT	BASE & FWD SUPPORT	DEPOT MAINT.	FIELD MAINT.	IN SERV ENG & LOG ANALYSIS	FIELD ACTIVITIES & OPNS	DISPOSAL	PA	IIM	PLM	AF	A	MC	N	DLA	(1-5)		(1-5)		(1-5)	
123	Tracking supply discrepancy report (SDR) and quality deficiency report items by UII.	Track					X								X								2		3	
124	The B/FS system will send update to ICP of which UII(s) have been received (i.e. 527R MRA) for most UII(s) have been received (i.e. 527R MRA) for most Intensively managed items.	Track					X							X									1			
125	For classified/sensitive items, if the package has been tampered, then receiver should open packaging to collect UII(s) from the item(s). Item will then be repackaged. If the package cannot be opened, alternate procedures will be developed.	Track					X							X									1			
126	If evidence of tampering/damage for classified or sensitive items, package will be opened and 100 percent physical count taken of contents.	Track					X							X									1			
127	Installation-level activities storing (1) classified and sensitive items that are secret or above and not part of an end item (CIIC code 5, E, F, G, H, K, L, S, & T), (2) category 1 non-nuclear missiles and rockets, (3) category II, III, and IV arms, or (4) NWRM that is not part of an end item shall perform a 100 percent physical count by UII at least semi-annually.	Track					X							X									1			
128	Activities storing classified and sensitive items that are below secret and not part of an end item shall annually perform a random statistical sample physical inventory count.	Track					X							X									1			
129	Disposal of item from property book must mark UII as inactive and prevent future use (PB)	Track					X						X								**1**					
130	Specific unit is scanned received and scanned when shipped. (MEV)	Track					X						X								**3**	Requirement removed				
131	IUID registry is kept up-to-date with current status of asset. (MEV)	Track					X						X								**3**	Requirement removed				
132	NWRM tracking	Track					X									X			X				1			
133	Maintain current status (MEV & PB)	Use					X						X								**1**	Requirement removed for MEV				
134	Maintain current custodian of asset (MEV & PB)	Use					X						X								**1**	Requirement removed for MEV				
135	Controlling counterfeit parts	Use					X									X										Checking IUID for shipments from
136	Configuration, warranty, safety and total ownership cost management	Use					X									X										Better accomplished in depot maint.
137	If UII is missing or UII mismatches occur between 856S and materiel received, the B/FS system will prompt supply discrepancy actions.	AIT/AIS					X						X	X	X						**2**		1		3	Misleading. If item at this node requires a mark and doesn't have one, one should be applied, but item owner should decide where and how.
138	When prompted (for physical inventories), collect UII(s) using AIT from outside of unit packaging via PDF 417 to update/confirm inventory record.	AIT/AIS					X						X	X	X						**3**		1		3	
139	The receiver will collect UII(s) via AIT from outside of unit packaging via PDF 417.	AIT/AIS					X						X	X	X						**3**		1		3	
140	IUID interface with entity's property book accountability system of record (PB)	AIT/AIS					X						X								**1**					
141	Property book prevents updates/modifications to UII (PB)	AIT/AIS					X						X								**1**					
142	Product Manager, Joint Automatic Identification Technology (PM JIT) is lead to imbed IUID within ERPs	AIT/AIS					X										X									

	REQUIREMENT	CATEGORY	NODES: ACQ LOG PLANNING	ACQ & SUPPLIERS	DISTRIB. CENTERS	TRANSPORT	BASE & FWD SUPPORT	DEPOT MAINT.	FIELD MAINT.	IN SERV ENG & LOG ANALYSIS	FIELD ACTIVITIES & OPNS	DISPOSAL	VALUE CHAIN: PA	IIM	PLM	SERVICE/ AGENCY: AF	A	MC	N	DLA	PA (1-5)	PA COMMENT	IIM (1-5)	IIM COMMENT	PLM (1-5)	PLM COMMENTS
143	**Business Case Analysis required for use of IUID in legacy systems**	AIT/AIS					X										X									Not required but should be done
144	**Identify marking requirement prior to induction**	Mark						X					X	X	X						**1**		3		1	
145	**Plan marking requirements in normal work scope**	Mark						X					X	X	X						**2**		3		1	
146	**Assign UII NLT induction/receipt and attach to travelers/tags**	Mark						X					X	X	X						**2**		3		1	
147	**Mark items per MIL-STD-130, authoritative documentation (e.g., tech data, work scope)**	Mark						X					X	X	X						**1**		1		1	
148	**Establish and execute QA requirements per MIL-STD-130**	Mark						X					X	X	X						**1**		3		1	
149	**Repair/replace lost or damaged marks**	Mark						X					X	X	X						**1**		1		1	
150	**Mark packaging per MIL-STD-129 and work scope**	Mark						X					X	X	X						**1**		1		1	
151	**Verify pack and item marking match prior to issue**	Mark						X					X	X	X						**2**		1		1	
152	**Establish depot maintenance capability to mark parts and packaging for applicable items in the depot repair cycle**	Mark						X					X	X	X						**1**		3		1	
153	**Mark DM capital equipment/tooling per DODI 8320.04**	Mark						X					X	X	X						**1**		3		1	
154	**Mark per Service/Agency-unique marking requirements, implementation strategies and plans**	Mark						X						X									1	Reqt to mark is #1 but the how to mark is 3		
155	**Mark GFP per MIL-STD-130, authoritative documentation**	Mark						X					X								**1**					
156	**Mark per Service/Agency-unique marking requirements, implementation strategies and plans**	Mark						X							X								1	Reqt to mark is #1 but the how to mark is 3	2	
157	**Access life cycle history information of inbound items prior to receipt**	Track						X					X	X	X						**3**		2		2	
157a	a) Tailor work requirement and align necessary resources i) Personnel, data, parts, funding, equipment, capacity, etc.	Track						X					X	X	X						**3**		3	Transition Plan	2	
157b	b) Perform warranty management by UII	Track						X					X	X	X						**3**		3		2	
157c	c) Scope special handling (matched assemblies, FMS, bad actor, etc.) via UII	Track						X					X	X	X						**3**		3		2	
158	**Acknowledge inbound receipt of physical assets via UII (if available)**	Track						X					X	X	X						**1**		1		2	
159	**Track item ID, location, status, findings/actions taken via UII through repair cycle**	Track						X					X	X	X						**2**		2		2	
159a	a) Support work-in-process inventory and disposal/demil	Track						X					X	X	X						**1**		2		2	
159b	b) Enables process and PLM analysis including repair cycle time/TAT	Track						X					X	X	X						**3**		3		2	
160	**Track DM capital equipment usage and condition by UII**	Track						X					X	X	X						**1**		3		2	
161	**Close out DM tracking at hand-off to next node (receipt verification)**	Track						X					X	X	X						**3**		3		2	
162	**Capture/store UII information per Service/Agency requirements**	Track						X						X									1			
163	**Maintain positive inventory control through repair cycle by UII**	Track						X						X									1			
164	**Track fabricated/modified items and incorporation of GFP by UII**	Track						X					X								**1**					
165	**Document demil/disposal actions by UII**	Track						X					X								**1**		1			
166	**Capture/store UII information per Service/Agency requirements**	Track						X							X								1		2	
167	a) RCM, CBM+, TOC reduction, warranty mgt, CM, safety, etc.	Track						X							X								3		2	
168	**Link item UII to LCM data by Service/Agency-specific ID mechanism**	Track						X							X								3		2	

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169	**Facilitate connectivity via UII to related databases**	Track						X							X										2	
169a	a) Single key to echelons, enterprise, partners, Services, agencies	Track						X							X										2	
170	**Tailor work requirement and align necessary resources**	Use						X					X	X	X						**3**		3		2	
170a	a) Conduct pre-induction supportability analysis	Use						X					X	X	X						**3**		3		2	

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170b	b) Define DM work requirement based upon: i) Configuration, technical data (IETM), directives, repair authorizations, condition, build record (BOM) ii) Discrepancy, sensor data, and diagnostic information iii) Prior maintenance actions and usage history iv) Selective induction based on item characteristics v) Manage warranted items and bad actors vi) Special considerations for FMS, cross-Service requirements	Use						X					X	X	X						3			3			2		
171	**Optimize repair processes using UII (precision maintenance)**	Use						X					X	X	X						3			3			1		
171a	a) Apply shop findings to adjust work requirements, build standards	Use						X					X	X	X						3			3			2		
171b	b) Manage MRO work flow including induction, location, delays, etc. i) Customer status/output projections for critical readiness items ii) Positive inventory control in the repair cycle, including WIP iii) Optimize overall cycle time	Use						X					X	X	X						3			3			2		
171c	c) Remove individual “bad actors” from the repair cycle	Use						X					X	X	X						3			1			1		
171d	d) Link personnel to work performed to ID training, other requirements	Use						X					X	X	X						3			1			1		
171e	e) Streamline management of life-limited and matched assembly parts	Use						X					X	X	X						3			1			1		
171f	f) Maximize DM capital equipment/tooling capacity, uptime	Use						X					X	X	X						3			3			1		
171g	g) Automate production reporting, expedite financial transactions	Use						X					X	X	X						2			3			2		
171h	h) Conduct cost, schedule and quality analysis	Use						X					X	X	X						3			1			2		
171i	i) Provide inputs to future workload planning	Use						X					X	X	X						3			3			2		
172	**Report/document DM assets by UII (WIP, capital equipment, tooling, etc.) supporting IIM/PIC, property book and recall**	Use						X					X	X	X						1			3			3		
173	**Query UII to identify previously disposed/demilitarized assets**	Use						X					X	X	X						2			2			3		
174	**Automate recording of disposal/demil actions to applicable system of record**	Use						X					X	X	X						1			1			3		
175	**Provide access to DM maintenance actions and findings for analysis (RCM, CBM+, RAM, bad actor, no fault found, etc.)**	Use						X					X	X	X						3			1			2		
176	**Provide repair cost and cycle time history to support total ownership cost reduction, readiness optimization and business process reengineering**	Use						X					X	X	X						3			3			2		
177	**Use UII to improve forecast requirements, asset management for spares, resources, output projections**	Use						X					X	X	X						3			1			2		
178	**Generate updated configuration management information to support PM’s modification programs**	Use						X					X	X	X						3			2			1		
179	**Support valuation and accountability functions by capturing modifications, fabrication/manufacture, service life extension, GFP incorporation, disposal actions by UII**	Use						X					X	X	X						1			2			2		
180	**Apply UII to support QDR/MDR/warranty programs**	Use						X					X	X	X						2			3			2		

			NODES										VALUE CHAIN			SERVICE/ AGENCY					PA	PA COMMENT	IIM	IIM COMMENT	PLM	PLM COMMENTS
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181	**Verify inbound receipt and outbound issue of UII items**	Use						X					X	X	X						**1**		1		3	
182	**Interrogate UII registry, related systems of record**	AIT/AIS						X					X	X	X						**1**		3		3	
183	**Use UII as key link for integrated access to multiple MIS and other systems to provide customized views of item status, history to include:**	AIT/AIS						X					X	X	X						**1**		1		2	
183a	a) Production management and quality assurance systems	AIT/AIS						X					X	X	X						**3**		3		2	
183b	b) Usage and repair history systems	AIT/AIS						X					X	X	X						**3**		1		2	
183c	c) Maintenance management information systems	AIT/AIS						X					X	X	X						**2**		3		2	
183d	d) Property and accountability systems	AIT/AIS						X					X	X	X						**1**		1		3	
183e	e) Configuration management systems	AIT/AIS						X					X	X	X						**1**		3		2	
183f	f) Supply and distribution information systems	AIT/AIS						X					X	X	X						**3**		1		3	
183g	g) Disposal systems	AIT/AIS						X					X	X	X						**1**		1		3	
183h	h) Technical data repositories/systems of record	AIT/AIS						X					X	X	X						**3**		1		2	
184	**Common AIT tools to read markings, connect to AIS**	AIT/AIS						X					X	X	X						**1**		1		2	
185	**Ability to readily validate that the UII is in place and operational when receiving or inspecting an item (Note: this requirement speaks to the need for some means of quickly identifying which parts should be IUID marked and where the mark should be…this is not the requirement for FM to validate the mark)**	Mark							X						X								1	Transition plan	3	Misleading. If item at this node requires a mark and doesn't have one, one should be applied, but item owner should decide where and how. Also this is more a track than mark reqmt.
186	**Include all repairable parts in IUID to provide visibility and support maintenance efficiency (FM does not have any other unique requirements related to which items are marked) (Most aviation parts are currently tracked by SN using existing infrastructure and systems)**	Mark							X						X										3	
187	**Furnish mark technology (i.e., tags) that is durable and presents no threat to equipment performance, maintenance efficiency, or safety.**	Mark							X						X									Transition plan	3	FM needs to ensure item properly marked, but if it isn't the owner of the item should determine where mark is applied to fix.
188	**Ability to track item location, custody, and status through the field maintenance process**	Track							X				X	X	X						**1**		2		1	
189	**Ability to record item configuration changes by UII in system of record**	Track							X				X	X	X						**1**		2		1	
190	**Ability to validate the mark is in place and operational and, when not, to take discrepancy actions IAW Service instructions**	Track							X				X	X	X						**1**		2		1	
191	**Ability to capture positive item identification, including 2-person signoff on custody transfer as necessary**	Track							X					X									1			
192	**Capture and store UII locally for uses as may be required**	Track							X					X									1			
193	**Provide UII to and from FM node to other nodes as may be required**	Track							X				X	X									2			
194	**Maintain strict accountability within storage and maintenance facilities by UII for most intensively- managed items**	Track							X					X									1			
195	**Receiver at field maintenance activity will collect UII via AIT and update the accountable record at the field level maintenance site.**	Track							X				X	X									1			
196	**Perform Unit-level inventory using UII.**	Track							X					X									1			

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197	**Ability to capture part configuration, status, and usage data sufficient to support determination of MEV and remaining useful life**	Track							X				X								**1**					
198	**Ability to easily enter accurate data generated in FM operations**	Track							X						X										1	
199	**Ability to retrieve essential maintenance information at the point of maintenance**	Track							X						X										1	
200	**Provide visibility of item location, condition, status, history, etc.**	Use							X				X	X	X						**1**		1		1	
201	**Ability to positively confirm item location and custody**	Use							X					X									1			
202	**Ability to capture part configuration, status, and usage data sufficient to determine MEV and remaining useful life**	Use							X				X								**1**					
203	**Use registry to validate accuracy of UII marked on end items (assumption: this will be done through he logistics system of record)**	Use							X				X								**1**					
204	**For end item UII not marked, take appropriate steps to create record in IUID Registry IAW Service instructions**	Use							X				X								**1**					
205	**Ability to support precision maintenance and performance management with history and technical information to include:**	Use							X						X										1	
205a	a) Configuration, status, and installation – to positively identify the item, link it to the higher assembly, and identify correct repair parts	Use							X						X										1	
205b	b) Discrepancy, sensor, and diagnostic information linked to UII to support rapid and accurate diagnosis including prognostics	Use							X						X										1	
205c	c) Link technical data (IETM), directives, and repair authorizations for accurate and precise repair capability and decisions	Use							X						X										1	
206	**Ability to identify warranty condition and disposition items accordingly**	Use							X						X										1	
207	**Ability to automatically provide repair requirements (technical directives, time changes/time-based actions, etc.)**	Use							X						X										1	
208	**Ability to support reliability analysis (Bad Actors, RCM, CBM+, etc.) with maintenance history tracking from across the logistics enterprise**	Use							X						X										1	
209	**Ability to identify repair resource requirements (personnel, tools, parts, etc.) for highly efficient maintenance planning**	Use							X						X										1	
210	**Ability to support automation of parts requisition process**	Use							X						X										1	
211	**Provide integration of MIS and other systems to provide customized views of item status, history, etc.**	AIT/AIS							X				X	X	X						**1**		1		1	
212	**Ability to connect to multiple AISs, especially in deployed/ Joint environments**	AIT/AIS							X				X	X	X						**2**		3		1	
213	**Ability to accept data matrix & bar code scans and validate UII**	AIT/AIS							X				X		X						**1**		1		1	Need to be able to read UII marks at FM. (Rating changed from 5 to 1)
214	**Scanners capable of scanning UII data matrix tag, regular bar codes plus accept keyboard entry**	AIT/AIS							X				X		X						**1**		2		1	Rating changed from 5 to 1.
215	**Provide integrated UII readers/PMAs for the workforce**	AIT/AIS							X						X								2		2	
216	**Engineering data required to mark/update**	Mark								X			X	X	X						**2**		2		2	Misleading. Equipment not required to mark at this node.

	REQUIREMENT	CATEGORY	ACQ LOG PLANNING	ACQ & SUPPLIERS	DISTRIB. CENTERS	TRANSPORT	BASE & FWD SUPPORT	DEPOT MAINT.	FIELD MAINT.	IN SERV ENG & LOG ANALYSIS	FIELD ACTIVITIES & OPNS	DISPOSAL	VALUE CHAIN PA	IIM	PLM	SERVICE/ AGENCY AF	A	MC	N	DLA	PA (1-5)	PA COMMENT	IIM (1-5)	IIM COMMENT	PLM (1-5)	PLM COMMENTS
217	**Focus on Serially tracked systems/items**	Mark								X					X								1		2	
218	**Kits/parent child node**	Mark								X			X		X						**2**				4	Could apply to PLM as well.
219	**Gather/assimilate nodal update**	Track								X			X	X	X						**3**	No very clear on this requirement	1		2	
220	**Serially tracked systems/items**	Track								X					X								1		2	
220a	a) Service Life Assessments (WSIP and Acquisition Planning)	Track								X					X										2	
220b	b) Risks/Hazards Analysis (System Safety Management)	Track								X					X										2	
220c	c) System/Item Configuration	Track								X					X										2	
221	**Remaining Useful Life (RUL)**	Track								X					X										2	
222	**Inventory management by UII**	Track								X				X									1			
223	**Systems of Record/Demil requirements**	Track								X			X								**2**					
224	**Linkage between AIS and/or ERP**	Use								X			X	X	X						**3**		1		2	
225	**Improved Maintenance , Usage Data Collection, including Business Intelligence metrics**	Use								X					X										2	
226	**Improved Configuration Status Accounting**	Use								X					X										2	
227	**More proactive inputs/feedback into Logistics, Maintenance, and Operations forecasting, planning, and scheduling; CBM+, RUL, RAM, WSIP**	Use								X					X										2	
228	**Updated general and specific weapon system/major end item Tech Orders (Cost Driver)**	Use								X					X										2	
229	**Service Level ERPs**	AIT/AIS								X			X	X	X						**3**		2	This is a statement	2	
230	**Possible update of Legacy Engineering Systems for IUID compatibility**	AIT/AIS								X					X									Transition plan	2	
231	**Enterprise BI predictive trending and Bad Actor identification capability**	AIT/AIS								X					X										2	
232	**Data Elements**	AIT/AIS								X					X										2	
233	**By definition, Operational Field Activities are the User of the marked item and are Operational units that put/take a part (marked item) on or off a system and use that system**	Mark									X		X	X	X							Agree with this comment	4	Statement	3	Misleading. If item should be marked and isn't, owner should fix, but mark does not necessarily need to occur at this node.
234	**We do not see a requirement for Operational Field Activities to conduct <u>regular</u> IUID marking of items; items should arrive already marked**	Mark									X		X	X	X							Agree with this comment	4	Discuss at meeting	3	
235	**Ability to assign globally unique UII – if required at the unit-level, recommend Base/Forward Supply or Field Maintenance, not the Operational Field Activity node**	Mark									X		X	X	X						**1**	Agree with this comment. It is not required that Field Activities does this. However, Field Activities should take steps to ensure that it is done.	2		3	
236	**Multiple actions required (Business Processes and Systems Requirements) to Receive, Inventory and Issue stocks (marked items) to support Intensive Item Management**	Mark									X			X									1			
237	**Tracking the use or turn-in of an IUID marked item will require some form of input (data entry) at the Operational Field Activities level (note that this is ~50 character data entry)**	Track									X		X	X	X						**1**		2		2	
238	**Transfers & disposals of IUID marked equipment or items must be tracked**	Track									X		X								**1**		1			
239	**Concern with transfers between Services due to Service-unique AIT/AIS for property accountability (i.e. Army: SARSS and PBUSE**	Track									X		X								**1**					
240	**Will all depend on interface of Service AIT/AIS and the IUID registry; ability to scan; ID location of end item by UII**	Track									X		X								**1**					
241	**Provision of data required to track , if necessary mark, IUID marked items**	Use									X		X	X	X						**1**		1		2	

	REQUIREMENT	CATEGORY	ACQ LOG PLANNING	ACQ & SUPPLIERS	DISTRIB. CENTERS	TRANSPORT	BASE & FWD SUPPORT	DEPOT MAINT.	FIELD MAINT.	IN SERV ENG & LOG ANALYSIS	FIELD ACTIVITIES & OPNS	DISPOSAL	VALUE CHAIN PA	VALUE CHAIN IIM	VALUE CHAIN PLM	SERVICE/ AGENCY AF	SERVICE/ AGENCY A	SERVICE/ AGENCY MC	SERVICE/ AGENCY N	SERVICE/ AGENCY DLA	PA (1-5)	PA COMMENT	IIM (1-5)	IIM COMMENT	PLM (1-5)	PLM COMMENTS
242	**Actions taken by Operational Field Activities as directed by Intensive Item Management or Property Accountability or Product Lifecycle Management value chains, for example:**	Use									X		X	X	X						**2**				2	
242a	a) Identification, removal and turn-in or disposition of specific items from use or from the supply chain at the unit level	Use									X		X	X	X						**2**		1		2	
242b	b) USAF Time Compliant Technical Orders, USA Maintenance Advisory Messages, USA Safety of Use Messages etc	Use									X		X	X	X						**3**		3		2	
243	**Must ID initial data entry systems and subsequent data systems to or through which IUID data must flow (e.g. acquisition system, supply system, transportation and distribution system, and demilitarization and disposal systems)**	Use									X		X	X	X						**1**		2	Transition plan	2	
244	**Requirements for action/execution by Operational Field Activities: Transfer, Verify, Research, Loss, Destruction documentation**	Use									X		X								**2**					
245	**Requirements for action/execution by Operational Field Activities: Receive, Inventory, Issue using UII**	Use									X			X									2			
246	**Requirements for action/execution by Operational Field Activities: Most requirements can be met in other nodes**	Use									X				X										3	Not clear what this means.
247	**Interoperability (systems able to talk to each other)**	AIT/AIS									X		X	X	X						**1**		3		2	
247a	a) Some systems only require UII capability to make them IUID compliant	AIT/AIS									X		X	X	X						**4**		3		2	
247b	b) Dependent on Value Chain requirements, some systems may require interoperability to make full use of IUID potential	AIT/AIS									X		X	X	X							Agree with this comment	2		2	
248	**Each Value Chain will have requirements for action by Operational Field Activities which will involve AIS/AIT**	AIT/AIS									X		X	X	X						**4**		4	Statement	2	
249	**IIM update to ICP by UII**	AIT/AIS									X			X									1			
250	**Inventory of IIM by UII**	AIT/AIS									X			X									1			
251	**No requirement for DRMO to mark items at this time**	Mark										X	X	X	X						**2**	Requirement to mark is only applicable with parts are being reutilized. See comment in item 258a	1	Agree	3	Misleading. No reqmnt to mark at this node.
252	**Generating activities must ensure property is appropriately marked upon turn in to DRMO**	Mark										X	X	X	X						**2**		1	Agree	3	
253	**Record receipt of items**	Track										X	X	X	X						**2**		1	As required	3	
254	**Reutilized / Transferred (R/T)**	Track										X	X	X	X										3	
254a	a) Update status in registry when item is R/T	Track										X	X	X	X						**1**		2		3	
255	**Donations/Sales/DEMIL:**	Track										X	X	X	X										3	
255a	a) Record transaction	Track										X	X	X	X						**1**		2		3	
255b	b) Mark UII as inactive and prevent future use	Track										X	X	X	X						**1**		2		3	
255c	c) ID disposal location by UII	Track										X	X	X	X						**2**		2	Location? Not sure what is meant by that	3	
256	**Receive and inventory materiel**	Use										X	X	X	X								1		3	
256a	a) Validate item kind, count, condition against documentation	Use										X	X	X	X						**1**	Specific requirement was to use registry to validate accuracy of UII marked	1		3	
257	**Update IUID Registry upon sale/disposal**	Use										X	X	X	X						**1**		1		3	
258	**R/T/D**	Use										X	X	X	X										3	

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258a	a) Reutilized / Transferred – Send UII to gaining agency	Use										X	X	X	X						**1**	A modification from the original requirement. Disposal Node should ensure marking of reutilized parts. (e.g., Disposal Node will provide UII for gaining node to apply the mark)	1		3	
259	**DEMIL**	Use										X	X	X	X										2	
259a	a) Change status of item to appropriate life cycle event (e.g., demilitarized)	Use										X	X	X	X						**1**		1		2	
260	**Requires use of AIT/AIS to read and report change of status (i.e., DEMIL) to the IUID registry**	AIT/AIS										X	X	X	X						**1**		1		2	