Department of Defense Guide to Uniquely Identifying Items

Assuring Valuation, Accountability and Control of Government Property

Version 3.0
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Office of the Under Secretary of Defense
(Acquisition, Technology & Logistics)

Preface

INTENDED USERS

This guide is intended for use by Department of Defense (DoD) contractors and their suppliers who apply item unique identification (IUID) Data Matrices[1] to new items during production, as directed in the contract.

This guide is also intended for use by the DoD Components and their agents, who are required to apply IUID Data Matrices on applicable legacy items in inventory and in operational use.

Within these user communities, the targeted audience is the user of automatic identification technologies, such as barcodes and barcode readers.

SUMMARY OF GUIDE CHANGES

This Version 3.0 of the Department of Defense Guide to Uniquely Identifying Items replaces all previous versions.

Summary of changes from Version 2.5 (Dated September 15, 2012) to Version 3.0:

a. Content changes were incorporated in the basic document:

(1) To clarify applicability of the IUID marking criteria in the current edition of Defense Acquisition Regulations Supplement (DFARS) 211.274-2 for new acquisition items delivered under contracts.

- The decisions trees in Figures 1 and 2 were updated.
- Changes were made to align with the content of current editions of referenced DoD issuances that were revised since the publication of Version 2.5.
- Strategies for minimizing the impacts of non-recurring engineering were included.

[1] For the purpose of this document, the term "IUID Data Matrix" is used to describe a Data Matrix symbol compliant with all DoD IUID policies and business rules. This is equivalent to the terms "UII Data Matrix Symbol", "IUID compliant Data Matrix", "IUID MRI mark", and "Data Matrix containing the UII data set" used in other IUID documents. A Data Matrix not meeting all DoD IUID policies and business rules is referred to as a "non-compliant Data Matrix". The term "Data Matrix" is used to describe a Data Matrix barcode which may or may not meet all DoD IUID requirements.

(2) All the definitions in Appendix A were validated against the latest version of their authoritative source.

(3) Appendix B references were updated to reflect the latest versions. DoD 4041.1-R was deleted and DoD Instruction (DoDI) 4140.01 and DoD Manual (DoDM) 4140.01, Volumes 1 through 11, were added.

b. GFP content was removed as it was redundant with the provisions in DoDI 4161.02, Accountability and Management of Government Contract Property.

c. Appendix D was revised to delete the use of serialization within the lot number within a part number.

d. Table 5 in Appendix D was revised to delete the Text Element Identifier (TEI) “LOT ”.

e. Table 7 was revised to delete the use of the four-element unique item identifier (UII) constructs for serialization within the lot number within the part number.

f. Sections were reorganized to remove redundancy and align content.

g. Changes were made to achieve consistent use of acronyms.

h. The use of the words "shall", "must", "should", "can", "may" and "will" were edited to ensure their usage accurately reflects policy.

i. Changes for compatibility with the changes reflected above, as well as various format corrections, were made throughout.

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1. The Environment

1.1. The Government Property Management Challenge

The Government Accountability Office (GAO) aptly describes the challenge faced by today's managers of Federal Government property: "GAO and other auditors have repeatedly found that the federal government lacks complete and reliable information for reported inventory and other property and equipment, and cannot determine that all assets are reported, verify the existence of inventory, or substantiate the amount of reported inventory and property. These longstanding problems with visibility and accountability are a major impediment to the federal government achieving the goals of legislation for financial reporting and accountability. Further, the lack of reliable information impairs the government's ability to (1) know the quantity, location, condition, and value of assets it owns, (2) safeguard its assets from physical deterioration, theft, loss, or mismanagement, (3) prevent unnecessary storage and maintenance costs or purchase of assets already on hand, and (4) determine the full costs of government programs that use these assets. Consequently, the risk is high that the 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"[2]. Further, the Congress has demanded greater fiscal accountability from managers of federal government property[3].

1.2. Item Unique Identification

In response to the need to improve fiscal accountability and government property management, the DoD has mandated IUID to enable item life cycle visibility, management, and accountability.

IUID requires the assignment of a globally unique UII to new acquisition and legacy items meeting DoD-specified criteria. This UII is encoded into an IUID Data Matrix and applied to the item, as well as registered with respective item information in the DoD IUID Registry.

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[2] GAO-02-447G, Executive Guide, Best Practices in Achieving Consistent, Accurate Physical Counts of Inventory and Related Property, March 2002, page 6.

[3] Ibid., page 5: The GAO observes that "In the 1990s, the Congress passed the Chief Financial Officers Act of 1990 and subsequent related legislation, the Government Management Reform Act of 1994, the Government Performance and Results Act of 1993, and the Federal Financial Management Improvement Act of 1996. The intent of these acts is to (1) improve financial management, (2) promote accountability and reduce costs, and (3) emphasize results-oriented management. For the government's major departments and agencies, these laws (1) established chief financial officer positions, (2) required annual audited financial statements, and (3) set expectations for agencies to develop and deploy modern financial management systems, produce sound cost and operating performance information, and design results-oriented reports on the government's financial position by integrating budget, accounting, and program information. Federal departments and agencies work hard to address the requirements of these laws but are challenged to provide useful, reliable, and timely inventory data, which is still not available for daily management needs."

1.2.1. The Definition of Item

For the purposes of this guide, an item is a single hardware article or a single unit formed by a grouping of subassemblies, components, or constituent parts[4].

1.3. THE OBJECTIVES

DoD Directive (DoDD) 8320.03, Unique Identification (UID) Standards for a Net-Centric Department of Defense, provides for UID data standards development and implementation of the Department's UID strategy. It establishes policy and prescribes the criteria and responsibilities for creation, maintenance, and dissemination of UID data standards for discrete entities to enable on-demand information in a net-centric environment, which is an essential element in the accountability, control, and management of DoD assets and resources. It also establishes policy and assigns responsibilities for the establishment of the Department's integrated enterprise-wide UID strategy and for the development, management, and use of unique identifiers and their associated authoritative data sources in a manner that precludes redundancy[5]. IUID is the fundamental element of the Department's strategy for the management of its tangible items of personal property. DoDI 8320.04, Item Unique Identification (IUID) Standards for Tangible Personal Property, has been issued for policy implementation.

DoDI 5000.64, Accountability and Management of DoD Equipment and Other Accountable Property, requires accountability records be established for all Government property with a unit acquisition cost of $5,000 or more and items that are sensitive or classified, regardless of acquisition cost. Property records and/or systems are to provide a complete trail of all transactions, suitable for audit[6].

DoDI 4140.01, DoD Supply Chain Material Management Policy, requires accountability and inventory control requirements for all secondary items of property and materiel received in the wholesale supply system.

A key component of effective property management is to use sound, modern business practices.

In terms of achieving the desirable end state of integrated management of items, the collective DoD goal shared by all functional processes involved in property management is to uniquely identify items, while relying to the maximum extent possible on international standards and commercial item markings and not imposing unique Government requirements. Unique identification of items will help achieve:

[4] DFARS 252.211-7003(a).
[5] Redundancy occurs when the same item is assigned multiple UIIs.
[6] Property accountability records and systems shall contain the data elements specified in DoDI 5000.64, Enclosure 3, paragraph 6.0, including part number, cost, national stock number, UII or DoD recognized IUID equivalent, and other data elements listed.

- Integration of item data across Federal and industry asset management systems, as envisioned by the DoD Business Enterprise Architecture (BEA)[7], to include improved data quality and global interoperability and rationalization of systems and infrastructure.
- Improved item management and accountability.
- Improved asset visibility and life cycle management.
- Clean audit opinions on item portions[8] of DoD financial statements.

1.4. ITEM MANAGEMENT

The acquisition, production, maintenance, storage, and distribution of items require complete and accurate asset records to be effective, and to ensure mission readiness. Such records are also necessary for operational efficiency and improved visibility, as well as for sound financial management. Physical controls and accountability over items reduce the risk of (1) undetected theft and loss, (2) unexpected shortages of critical items, and (3) unnecessary purchases of items already on hand.

1.5. THE PLAYERS

Program managers and item managers lead the coordinated efforts of various stakeholders. The principal functional stakeholders in item management are Engineering Management; Acquisition Management; Property and Equipment Accountability; Logistics Management and Accountability; and Financial Management. Asset visibility is crosscutting to these five functions. Their interests involve the following:

1.5.1. Engineering Management

DoDD 5000.01, Defense Acquisition System, requires acquisition programs be managed through the application of a systems engineering approach that optimizes total system performance and minimizes total ownership costs. A modular, open-systems approach is employed, where feasible. For purposes of item management, engineering plays a crucial role in the documentation of technical data that defines items and the configuration management of these items throughout their useful life.

1.5.2. Acquisition Management

The Federal Acquisition Regulation (FAR) Part 45, Government Property, prescribes policies for furnishing Government property to contractors including the use, maintenance, management and reporting of Government-furnished property and contractor-acquired property, and for the return, delivery, or disposal of Government-furnished property and contractor-acquired property.

[7] The BEA defines the processes, roles, data structures, information flows, business rules, and standards required to guide improvements in the Core Business Missions of the Department.

[8] These financial statement portions are (1) Property, Plant and Equipment and (2) Operating Materials and Supplies.

1.5.3. Property and Equipment Accountability

DoDI 5000.64[9] provides a comprehensive framework for DoD property accountability policies, procedures, and practices; and assists DoD property managers, accounting and financial officers, and other officials in understanding their roles and responsibilities relating to property accountability. It establishes accountability and management policy for tangible DoD-owned equipment and other accountable property; and contains concepts useful for asset management throughout the Department, particularly for property in the possession of individual military units and end-users. It excludes property and materiel for which accountability and inventory control requirements are prescribed in DoDI 4140.01, DoDM 4140.01 and Defense Logistics Manual (DLM) 4000.25-2[10].

1.5.4. Logistics Management and Accountability

DoDI 4140.01, Supply Chain Materiel Management Policy, specifies policies for materiel management. It is the Department's policy that:

- Materiel management is responsive to customer requirements during peacetime and war.
- Acquisition, transportation, storage, and maintenance costs are considered in materiel management decisions.
- Standard data systems are used to implement materiel management functions.
- The secondary item inventory is sized to minimize the Department's investment while providing the inventory needed to support peacetime and war requirements.
- Materiel control and asset visibility are maintained for the secondary item inventory.

DLM 4000.25, Defense Logistics Management System (DLMS), prescribes logistics management policy, responsibilities, procedures, rules, and electronic data communications standards for the conduct of logistics operations in the functional areas of supply, transportation, acquisition (contract administration), maintenance, and finance[11].

1.5.5. Financial Management

DoDI 7000.14, Department of Defense Financial Management Policy and Procedures, specifies that all DoD Components shall use a single DoD-wide financial management regulation for accounting, budgeting, finance, and financial management education and

[9] DoDI 5000.64 integrates the broad requirements of the Federal Property and Administrative Services Act of 1949, as amended (Act of 30 June 1949, 63 Stat. 372), and the Chief Financial Officers (CFO) Act of 1990 into an overarching property accountability policy for property, plant and equipment. This instruction complements the accounting and financial reporting requirements contained in DoD 7000.14-R.

[10] Military Standard Transaction Reporting and Accounting Procedures (MILSTRAP).

[11] The DLMS is a system governing logistics functional business management standards and practices rather than an automated information system.

training. That regulation is DoD 7000.14-R, Department of Defense Financial Management Regulations. It establishes financial management requirements, systems, and functions for all appropriated, non-appropriated, working capital, revolving, and trust fund activities. In addition, it directs statutory and regulatory financial reporting requirements.

1.5.6. Asset Visibility

Asset visibility is the cross-cutting capability that provides Combatant Commanders, the Military Services, and the Defense Agencies with timely and accurate information on the location, movement, status, and identity of equipment and supplies[12].

1.6. PROCESSES, ACTIVITIES AND ACTIONS

Item management involves many functional processes, activities, and actions. These elements are integrated and flow smoothly so that the needs of warfighters for items are satisfied when and where they occur. The functional processes, activities, and actions impacting item management are arrayed in Table 1 in summary format to show how they are related and interdependent.

Functional Processes	Activities	Actions
Develop	Requirements	Identify needs Identify suitable marking methods and procedures
Design	Engineering Materiel Management Cataloging	Assign part number Request part number Assign stock number Assign UII
Produce & Accept	Process Control	Apply & inspect item marking
Transport	Transportation	Track items
Stock	Stocking	Stock, locate and retrieve items Control item inventory

[12] DoDI 5158.06, Distribution Process Owner (DPO), establishes the DoD policy to achieve effectiveness, efficiency, and alignment of DoD-wide distribution activities, including force projection, sustainment, and redeployment/retrograde operations. The DPO is the lead functional proponent for Radio Frequency Identification and related Automatic Identification Technology (AIT) implementation in the DoD supply chain, developing a centralized approach for the use of asset visibility technologies.

Order	Requisitioning	Request supply item
Supply	Shipping	Locate and ship items
Use	Receipt	Receive, install and use items
Maintain	Preventive Maintenance	Clean, inspect, and service items
Repair	Maintenance	Restore reparable items
Rebuild	Overhaul	Refurbish items Maintain original UII through process
Decommission	Demilitarization	Remove ownership markings, leave the unique identification data elements
Dispose	Disposal	Sell/recycle scrap Destruction and/or abandonment
Pay	Financial Accounting	Settle invoices
Account	Inventory Financial Statements	Manage & control Property valuation

Table 1. Functional Processes Impacting Item Management

2. The Need to Uniquely Identify Items

2.1. Differentiating Items Throughout the Supply Chain

The Department uniquely identifies the items to which it takes title to provide sufficient asset accountability, valuation and life cycle management. Unique identification provides the Department the opportunity to differentiate an individual item from all others. Unique identification of items provides the Department with the information architecture to facilitate accomplishment of the following:

- Improve the acquisition of equipment and performance based logistics services for the warfighter,
- Capture timely, accurate and reliable data on items (i.e., equipment, reparables, materials, and consumables),
- Improve life cycle asset management, and
- Track items in the Department and industry systems for operational, logistical[13], and financial accountability purposes.

2.2. Accounting for Acquired Items

Accountability of items begins when hardware (equipment and reparables) and supplies (materials and consumables) are acquired through purchase, lease, or other means, including transfer or fabrication, whether the hardware and supplies are already in existence or yet to be created, developed, demonstrated, and evaluated[14]. DoDI 5000.64 requires that accountable property records shall be established in an accountable property system of record for all Government property purchased, or otherwise obtained, having a unit acquisition cost of $5,000 or more; property of any value that is controlled or managed at the item level; leased items (capital leases) of any value; and assets that are sensitive or classified[15]. Property accountability records and systems shall contain the data elements specified in DoDI 5000.64, Enclosure 3, paragraph 6.0, including part number, cost[16], national stock number, UII or DoD recognized IUID equivalent, and other data elements listed[17].

For items covered under DoDI 4140.01, all materiel recurrently used, bought, stocked, or distributed is cataloged with an accountable record[18].

[13] DoDM 4140.01, Volume 9, February 10, 2014 addresses IUID policy for logistics.
[14] See American Society for Testing and Materials Standard E-2135-02, Standard Terminology for Property and Asset Management.
[15] DoDI 5000.64, May 19, 2011, op. cit., Enclosure 3, paragraph 2.a.
[16] Value at full cost and depreciation information, if applicable; or original acquisition cost if the property does not require capitalization
[17] Ibid., Enclosure 3, paragraph 6.0, specifies the minimum data elements required.
[18] See paragraph 4.c.

2.3. CONTRACTOR-ACQUIRED PROPERTY ON COST-REIMBURSEMENT TYPE CONTRACTS

Title to property whose cost is reimbursable to the contractor passes to and vests in the Government upon: (1) delivery to the contractor of an item purchased by the contractor and reimbursed as a direct cost under the contract, (2) issuance of the property for use in contract performance; (3) commencement of processing of the property or use in contract performance; or (4) reimbursement of the cost of the property by the Government, whichever occurs first. The Government acquires title to all property purchased or fabricated by the contractor in support of contract performance and may take title to Special Tooling in accordance with the contract clauses. However, if such items are to be delivered to the Government, they shall be delivered under a contract line item or subline item[19]. Unless required otherwise in the contract, such property shall be marked with an IUID Data Matrix only upon its delivery to the Government, provided that it meets the IUID marking criteria.

2.4. ESTABLISHING ITEM ACQUISITION COST

It is essential that contracts contain specific arrangements to capture the acquisition cost of all delivered items because the acquisition cost shall form the basis for the entries made in the Department's financial statements and shall determine the degree to which those statements comply with the requirements of the Federal Accounting Standards Advisory Board. Ideally, acquisition cost for items would be recorded at the time these items are delivered to and accepted by the Government.

2.4.1. Using Contract Line Items

All property delivered to the Government shall be delivered on a Contract Line Item Number (CLIN) or Sub Line Item Number (SLIN). The acquisition cost of each item entering the Government property inventory is captured on the CLIN or SLIN.

CLINs and SLINs are established when the contract is structured prior to award and shall be included for all items for which the Government shall take delivery, either during the performance or at the completion of the contract. The estimated acquisition cost of property shall be identified upon delivery.

Table 2 shows the acquisition cost of items delivered under contracts that are separately priced under CLINs or SLINs. Informational subline items are used to capture the acquisition cost for items to be delivered when separately priced CLINs or SLINs are not practicable. Informational SLINs used only for identification of acquisition cost have to be clearly marked as such so they are not confused with delivery, acceptance, and payment requirements of the contract. When the acquisition costs for like items differ, separate informational SLINs are used to identify the acquisition cost for each of the items with a different acquisition cost.

[19] For additional information, see DFARS Procedures, Guidance and Instructions 245.401-70 Contractor-acquired property.

Deliverable	UII or IUID Equivalent Required	Unit Acquisition Cost (or price) Required	Valuation Method (Contract type)
CLIN/SLIN items requiring UII or IUID equivalent (includes items delivered separately as spares).	Yes. All items valued over $5K/unit value. Use DoD decision tree[20] to determine requirements under $5K per unit value.	Yes	Fixed Price- use CLIN/SLIN values. Cost Type-use contractor estimated costs. DoD shall address delta $ from final total price.
Sub items requiring UII or IUID equivalent contained within CLIN/SLIN delivered items. (LRU/Spares)	Yes. Application of maintenance plan (e.g. lowest repairable or replaceable unit by DoD); No dollar threshold for applicability[21].	No	N/A
Other commercially marked items not requiring IUID. (CLIN/SLIN)	No. The DoD shall accept existing commercial markings.	Yes – All delivered items shall be valued per unit.	Fixed Price- use CLIN/SLIN values Cost Type-use contractor estimated costs. DoD shall address delta $ from final total price.

Table 2. Contract Requirements – Identifying Unit Acquisition Cost

To comply with IUID policy that UIIs be delivered on a CLIN/SLIN, the Contracting Officer shall modify a contract to establish separate CLINs/SLINs prior to delivery of items that were not identified as contract deliverables at the time of contract award.

2.4.2. Valuation of Items

Both the unique identification and the value of items that shall be delivered under the contract need to be reflected in the Department's property accountability and management information systems. According to DoDI 5000.64, acquisition cost shall be the basis for valuation of property.

For fixed price contracts, the acquisition cost for items to be delivered is the fixed price paid by the Government.

[20] The decision tree for new acquisition items is found in Figure 1.

[21] DFARS 252.211–7003 requires a contract attachment to list embedded DoD serially managed subassemblies, components, and parts that are to be uniquely identified. The IUID data are reported at the time of delivery, either as part of, or associated with the Material Inspection and Receiving Report.

For cost type contracts, the acquisition cost for items to be delivered is the Contractor's estimated cost at the time the item is delivered. The acquisition cost of components within delivered items need not be identified.

A delivered item may be composed of embedded items, such as subassemblies, components, and parts. The prime contractor shall pass down appropriate specifications and contract requirements, including the IUID marking requirements where applicable, to the tiered vendors for subcontracted subassemblies, components, and parts.

Spares may be purchased directly from the vendor(s) or through the prime. IUID-qualifying spare items (subassemblies, components, and parts) have to be marked appropriately with an IUID Data Matrix.

When the prime delivers the complete item that is one UII. The spares are delivered with their own UIIs. The prime is responsible for ensuring the IUID Data Matrix marking and registering of the UII for those DoD serially managed embedded items and their parent items in the delivered complete item.

3. Requirements for IUID

3.1. WHAT IS AN ITEM?

As stated earlier in this guide, an item is a single hardware article or a unit formed by a grouping of subassemblies, components, or constituent parts[22]. In this definition, hardware is a generic term dealing with physical items (as distinguished from a capability or function) such as equipment, tools, implements, instruments, devices, sets, kits, outfits, fittings, trimmings, assemblies, subassemblies, components, and parts[23].

3.2. DECIDING WHAT ITEMS ARE TO BE IDENTIFIED AS UNIQUE

3.2.1. Items Delivered Under Contracts

IUID is driven by an integrated set of logistics, acquisition, and financial requirements to identify and track item information. The criteria in the decision tree apply when the items are delivered under contract. Items being delivered under contract, including new equipment, major modifications, reprocurements of equipment and spares, shall include the contract clause Defense Federal Acquisition Regulation Supplement (DFARS) 252.211-7003 to invoke the IUID requirement[24].

All items delivered to the Government under contract require item unique identification, or a DoD recognized IUID equivalent, if one or more of the following criteria[25] apply (each discussed separately):

(1) All items for which the Government's unit acquisition cost is $5,000 or more;

(2) Items for which the Government's unit acquisition cost is less than $5,000 when the requiring activity[26] determines that item unique identification is required for mission essential or controlled inventory items;

(3) Regardless of value for any—

(a) DoD serially managed item (reparable or nonreparable) or subassembly, component, or part embedded within a subassembly, component, or part;

(b) Parent item (as defined in 252.211-7003(a)) that contains the embedded subassembly, component, or part;

[22] DFARS 252.211-7003(a).
[23] Joint Publication 1-02, DoD Dictionary.
[24] DoDI 8320.04, paragraph 5.4.1, permits alternative implementation provided that the acquired items are marked and registered no later than 30 days after receipt.
[25] These criteria are codified in DFARS 211.274-2, current edition.
[26] The requiring activity will make this determination and list the items in the DFARS 252.211-7003 contract clause. For legacy items, the requiring activity will make this determination in order to identify principal items in inventory or use for item unique identification.

(c) Warranted serialized item;

(d) Item of special tooling or special test equipment, as defined at FAR 2.101, for a major defense acquisition program that is designated for preservation and storage in accordance with the requirements of section 815 of the National Defense Authorization Act for Fiscal Year 2009 (Pub. L. 110-417); and

(e) High risk item identified by the requiring activity as vulnerable to supply chain threat, a target of cyber threats, or counterfeiting.

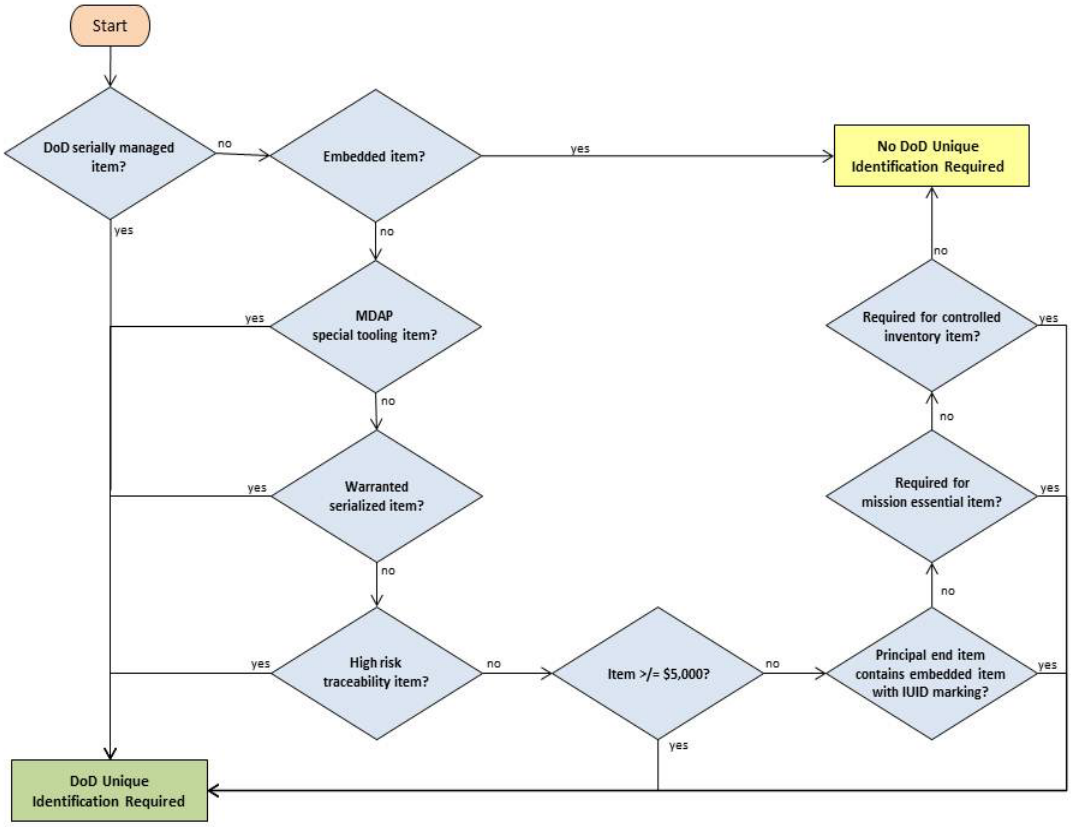

Figure 1. Uniquely Identifying Items Delivered Under Contract

3.2.2. Legacy Items

The criteria in the Figure 2 decision tree apply to existing legacy principal end items[27] and secondary items[28] in inventory, in use, or undergoing maintenance, repair, or

[27] Principal items are end items and replacement assemblies of such importance that management techniques require centralized individual item management throughout the supply system, to include depot level, base level, and items in the hands of using units. These specifically include the items where, in the judgment of the Services, there is a need for central inventory control, including centralized computation of requirements, central procurement, central direction of distribution, and central knowledge and control of all assets owned by the Services. (Joint Publication 1-02)

[28] Secondary items are items that are not defined as principal items and include reparable components, subsystems, and assemblies, consumable repair parts, bulk items and material, subsistence, and expendable end items, including clothing and other personal gear. (DoDM 4140.01, Volume 3)

overhaul. IUID marking for legacy secondary items, which are subject to the materiel management policies of DoDM 4140.01, Volumes 1 through 11, only apply when such items are:

(a) DoD serially managed items that are also – at the same time – categorized as sensitive, critical safety, or pilferable items;

(b) Reparable items;

(c) Non-reparable items that the requiring activity decides require item level traceability at any point in their life cycle.

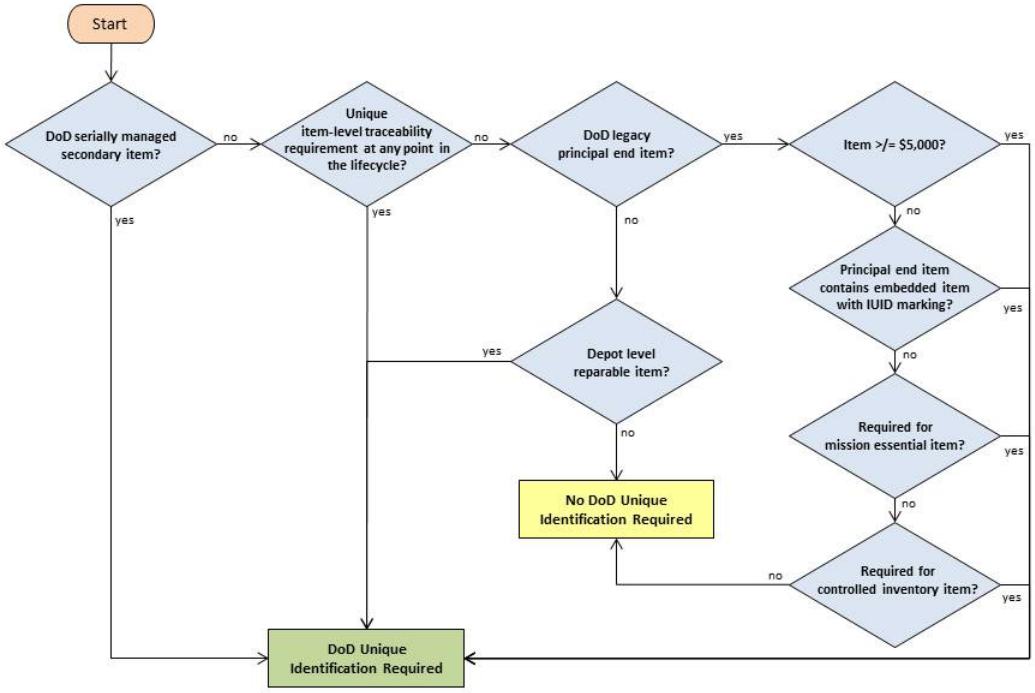

Figure 2. Uniquely Identifying Legacy Items in Inventory or Use

Program and item managers shall prepare implementation plans for implementation of IUID on legacy items in operational use, including items undergoing maintenance, repair or overhaul, and in inventory. Only those legacy items determined in these implementation plans to meet the IUID criteria specified in Figure 2 shall require an IUID Data Matrix.

3.2.3. Context and Scope of Decision Criteria

3.2.3.1. DoD Serially Managed

A distinction is made between “serialized items” and “DoD serially managed” items. While DoD may use an item that has been serialized by the manufacturer, DoD may not manage the item by means of its serial number. When DoD elects to manage an item by its serial number it becomes "DoD serially managed".[29] This means it is a tangible item used by DoD, *which is designated by a DoD or Service Item Manager* to be uniquely tracked, controlled or managed in maintenance, repair and/or supply by means of its serial number[30].

DoD serially managed items require UIIs. Serial numbers may be unique within a product or organization, but UIIs are globally unique. This permits an item to be uniquely distinguishable in different databases.

A broad variety of items fall into the DoD serially managed category through programs for serial number tracking, serialized item management, and unique item tracking. Examples of DoD serially managed items may include reparable items down to and including sub-component reparable unit level; life-limited, time-controlled, or items requiring records (e.g., logbooks, aeronautical equipment service records); and items that require technical directive tracking at the part level[31].

Embedded items include subassemblies, components, or parts that are integral to the item being delivered. All items that are serially managed by DoD require IUID. These items shall be listed in the contract in order to clearly indicate which items are to be marked. This criterion is applied without regard to the value of the embedded item.

Each uniquely identified embedded item is contained within a higher assembly known as its parent item[32]. The parent item shall be chosen at any appropriate level of configuration above the level of the embedded item provided that the parent item is a higher assembly, intermediate component, or subassembly The parent item of a DoD serially managed embedded item is also required to have a UII. This criterion is applied without regard to the value of the parent item.

[29] This would include high risk items that are vulnerable to supply chain threat, a target of cyber threats, or counterfeiting.
[30] A serial number is an assigned combination of numbers and/or letters to an item instance that separately identifies that item instance from all others within a product or organization.
[31] DoDI 4151.19, January 9, 2014, Serialized Item Management (SIM) for Life-Cycle Management of Materiel
[32] Parent item means the item assembly, intermediate component, or subassembly that has an embedded item with a unique item identifier or DoD recognized IUID equivalent.

3.2.3.2. $5,000 Unit Acquisition Threshold

This IUID criterion establishes the $5,000 value as the unit acquisition cost threshold for IUID. All items at this threshold or above are required to have item unique identification in accordance with the threshold requirement for establishing property records. Although DoDI 5000.64 does not require items under $5,000 to have property records unless they are leased assets of any value, or items that are classified or sensitive, a program manager shall examine the other IUID criteria to determine if items below the $5,000 threshold require item unique identification.

3.2.3.3. Mission Essential Items

Item essentiality is a measure of an item's military worth in terms of how its failure would affect the ability of a weapon system, end item, or organization to perform its intended functions. Military mission essentiality is the composite effect of an item on the overall military mission based on the most critical significant application of the item[33]. The primary use of military mission essentiality is in supply chain management for determining resource allocations, determining degree of management intensity, and communicating essentiality among the DoD Components. An assessment of mission essentiality shall include item essentiality and the degree to which it impacts on the overall military mission. The requiring activity shall determine on a case-by-case basis that IUID is required for the traceability of mission critical items.

Some secondary legacy mission essential items are exempt from IUID requirements, see section 3.3.2 for more information.

3.2.3.4. Controlled Inventory Items

The DoD employs item accountability, control, and stewardship procedures to ensure that assets are protected against waste, loss, negligence, unauthorized use, misappropriation, and compromise[34]. Controlled inventory items are those items designated as having characteristics that require they be identified, accounted for, segregated, or handled in a special manner to ensure their safeguard and integrity. They include classified items (require protection in the interest of national security); sensitive items (require a high degree of protection and control due to statutory requirements or regulations, such as precious metals; items of high value, highly technical, or hazardous nature; and small arms); pilferable items (items having a ready resale value or application to personal possession, which are especially subject to theft)[35]; and safety controlled items. The requiring activity shall determine on a case-by-case basis that IUID is required for the traceability of controlled inventory items.

Some secondary legacy controlled inventory items are exempt from IUID requirements; see section 3.3.2 for more information.

[33] DoDM 4140.01
[34] DoDM 4140.01
[35] DoD 4100.39-M, Volume 10, Table 61

3.2.3.5. Warranted Serialized Items

Any warranted serialized item identified pursuant to DFARS 252.246-7006, Warranty Tracking of Serialized Items, shall be marked with an IUID Data Matrix. The UII enables the ability to trace a warranted item from delivery through completion of the requirements of the warranty.

3.2.3.6. Special Tooling for Major Defense Acquisition Programs

Section 815 of the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 (Pub. L. 110-417) requires the Department to plan for the preservation and storage of unique tooling associated with the production of hardware for major defense acquisition programs through the end of the service life of the related weapons system[36]. Unique tooling is one-of-a-kind tooling without which the item could not be produced. For DoD purposes, the term "unique tooling" is appropriately defined by the well-known term "special tooling", as defined in FAR 2.101(b).

The USD(AT&L) policy memorandum, dated August 3, 2009[37], provided guidance for the implementation of the statute. The provisions in this memorandum are: (a) special tooling retention shall continue to be reviewed during the life of the program, (b) special tooling designated for preservation and storage shall be serially managed and uniquely identified as directed in DoDI 8320.04, Item Unique Identification (IUID) Standards for Tangible Personal Property, and (c) special tooling shall be refurbished if it has reached the end of its service life prior to its preservation and storage, as required.

3.2.3.7. High Risk Items

The requiring activity has the responsibility to identify high risk items that are vulnerable to supply chain threat, a target of cyber threats, or counterfeiting. These high risk items shall be marked with an IUID Data Matrix to enable item level life cycle traceability[38] throughout the DoD supply chain.

3.3. SPECIAL TOPICS

3.3.1. IUID of Sets, Kits, and Outfits

Sets, kits, and outfits (SKO) are assemblages of components, support items, or mission specific and common tools in a container (for example, a bag, pouch, box, chest, van, trailer, or shelter) that are used in association. SKOs are primarily designed to accomplish a specific mission or maintenance function. They are identified, cataloged,

[36] This requirement is codified in DFARS 207.106 (S-73).
[37] USD(AT&L) Memorandum, dated August 3, 2009, Subject: Preservation and Storage of Tooling for Major Defense Acquisition Programs.
[38] Item level traceability is the requirement to trace life cycle management to an individual item for specified events related to acquisition, validation of authenticity, property accountability, storage, operation, maintenance, safety, physical security, retirement, and disposal by a single instance of an item, e.g., an item marked with a UII.

authorized, and issued as a single unit. They may be made up of components, support items, and tools included in more than one class of supply; may include end items; may include components, support items, and tools for which logistic responsibilities are assigned to more than one agency; and may include nonexpendable, durable, and expendable components, support items, and tools. The SKO is an item of supply, configuration controlled by a part number or line identification number.

For purposes of both property accountability and materiel management of secondary items, a SKO shall have a UII if it meets the qualifying criteria for tracking and valuation purposes as long as it resides in the inventory. If any of the components of the SKO are DoD serially managed items, they would be uniquely identified separately as embedded items in the parent item. In this case the parent item is the SKO of which the DoD serially managed components are a part. The embedded item would not be separately valued, since the value of the embedded item is capitalized in the value of the SKO.

An SKO could be a set of components for a single assembly part, packaged together as a single part number, for inclusion into one assembly during a maintenance function or configuration change. This type of SKO is most often referred to as a kit. Once the kit is applied to an assembly, the kit is "consumed" and capitalized as part of the value of the assembly in which it is installed; and the UII for the kit would be retired. The assembly in which the kit is installed would become the new parent item for any embedded items from the kit.

3.3.2. Legacy Items Not Requiring IUID Marking and Registration

Secondary legacy items which are not DoD serially managed and for which property accountability records are met by determining the quantity on hand are not required to be marked with an IUID Data Matrix and registered unless the item manager has required they be marked and registered[39]. Included in this exclusion are items such as threaded fasteners designated as critical safety items, but managed only by quantity, National Stock Number (NSN), or part number. Examples of such items by classes of supply are listed in Table 3.

[39] OUSD(AT&L) Policy Memorandum "Policy Refinement for Secondary Items in Use or in Inventory" dated 30 December 2010.

I. Accountability/traceability required by quantity by case, weight, or volume – do not mark and register
• Class I – Subsistence
• Class II – Clothing, expendable individual equipment, consumable administrative and housekeeping supplies
• Class III – Bulk fuels, chemicals, and coal
• Class IV – Fortification and barrier materials
• Class VIII – Consumable medical supplies
II. Accountability/traceability required by quantity by each, unit of issue, or by case – do not mark and register
• Class II – Non-expendable individual equipment and sets, kits, and outfits that are not DoD serially managed
• Class III – Packaged petroleum products
• Class V – Ammunition items that are not DoD serially managed
• Class IX – Consumable repair parts and components that are not DoD serially managed

Table 3. Legacy Items Exempt from Marking and Registering

4. Determining Uniqueness of Items

4.1. WHAT IS THE UII?

The UII is a string of capital letters, digits, dashes and/or forward slashes, not longer than 50 characters in length. The UII is a globally unique and unambiguous identifier that distinguishes an item from all other like and unlike items.

4.1.1. Defining the Data Elements for the UII

There is more than one way to achieve a globally unique, unambiguous string of characters suitable for a UII.

(a) The DoD recognizes six established identifiers sufficient to be used as UIIs as they are: Global Individual Asset Identifier (GIAI); Global Returnable Asset Identifier (GRAI)[40]; Vehicle Identification Number (VIN); Electronic Serial Number (ESN), Mobile Equipment Identifier (MEID), or Cellular Mobile Telephone Identifier (CMTI) (for cell phones); each is discussed in section 4.1.2.

(b) Construct a UII by combining other identifiers (e.g., part number, serial number, CAGE code). The collection of identifiers, which when combined produces a UII, are referred to as the "UII data set". There are two general ways to construct a UII.

1) Construct #1 is made from the following UII data set in this order: issuing agency code (IAC) (see below), enterprise identifier (see below), and serial number. Construct #1 can only be used if the serial numbers are unique throughout the enterprise.

2) Construct #2 is made from the following UII data set in this order: IAC, enterprise identifier, original part number, and serial number. Construct #2 can only be used if the serial numbers are unique within the original part number and the original part numbers are unique throughout the enterprise. (The original part number may be replaced in the above description with either lot number or batch number, and be equally valid within IUID policy.)

4.1.2. DoD Recognized IUID Equivalents

Generally, a commercial identifier is considered for inclusion into the list of officially recognized DoD recognized IUID equivalents[41] if it meets these criteria: (1) Shall contain an enterprise identifier; (2) Shall uniquely identify an individual item within an enterprise identifier, product, or part, lot or batch number; and (3) Shall have an existing Data Identifier (DI) or Application Identifier (AI) listed in ANS MH10.8.2, Data Identifier and

[40] The Global Returnable Asset Identifier (GRAI) shall contain a unique serial number for DoD recognized IUID equivalent application. Other variations of the GRAI are unacceptable for IUID.
[41] DoD recognized IUID equivalents (or IUID equivalents) are subject to DoD approval.

Application Identifier Standard. In addition, the item marks shall comply with the Business Rules listed in Appendix C.

The DoD recognizes six commercial unique identifiers as item unique identification equivalents. They are:

(a) Global Individual Asset Identifier (GIAI) for serially-managed assets.

(b) Global Returnable Asset Identifier (GRAI) for returnable assets which shall contain a unique serial number for DoD IUID equivalent application. Other variations of the GRAI are unacceptable.

(c) ISO Vehicle Identification Number (VIN) for vehicles.

(d) Electronic Serial Number (ESN) (for cellular telephones only).

(e) Mobile Equipment Identifier (MEID) (for cellular telephones only)[42].

(f) Cellular Mobile Telephone Identifier (CMTI) (for cellular telephones only).

4.1.3. The Notion of an Enterprise

An enterprise, in the context of IUID, is the entity responsible for assigning a UII to an item (e.g., a manufacturer, vendor, supplier, depot, or program management office). This responsibility commits the entity to ensuring the uniqueness of the UII at the time of its assignment and continued uniqueness among future UIIs[43] it assigns. For purposes of item unique identification, an enterprise identifier (e.g, a CAGE code, DUNS number, or DoDAAC) shall associate an enterprise with a definition of each entity's location such that it has its own unique, separate, and distinct operation. An enterprise identifier is a code uniquely assigned to an enterprise by a registered issuing agency.

4.1.4. The Notion of an Issuing Agency

An issuing agency (e.g., Allied Committee 135, Dun & Bradstreet, GS1, or Defense Logistics Agency Transaction Services) is an organization responsible for assigning a non-repeatable identifier to an enterprise. An IAC, (e.g., D, UN, or LD) designates which issuing agency is ensuring the uniqueness of the enterprise identifier. As an example, the issuing agency code "D" designates Allied Committee 135 as the organization responsible for ensuring the uniqueness of CAGE codes. IACs are assigned, in turn, by

[42] The ESN is being superseded by the Mobile Equipment Identifier (MEID). The MEID universe consists of approximately 16 million blocks of 16 million numbers, compared to the ESN universe of 256 blocks of 16 million numbers. See Telecommunications Industry Association (TIA) White Paper on the Exhaust of Electronic Serial Numbers (ESNs) and Migration to Mobile Equipment Identifiers (MEIDs), November 2007

[43] The enterprise identifier (EID) in the UII is the entity that is responsible for compliance with the UII rules. An entity cannot commit another entity to that responsibility without authority. The fundamental principle is: Never use another entity's enterprise identifier in the UII without permission or direction from the competent authority for that enterprise identifier.

the registration authority of ISO/IEC 15459-2[44]. For the purposes of IUID, only seven issuing agencies have been designated for use. See Table 4 for the list of issuing agencies and their corresponding IACs used in IUID marking.

Issuing Agency Code	Issuing Agency	Type of Enterprise Identifier
0 - 9	GS1 Global Office	GS1 Company Prefix
D	Allied Committee 135	NCAGE/CAGE
LB	Telcordia Technologies, Inc	ATIS 0300220 MIC
LD	Department of Defense	DoDAAC
LH	European Health Industry Business Communications Council	LIC
RH	Health Industry Business Communications Council	LIC and HIN
UN	Dun & Bradstreet	DUNS

Table 4. Issuing Agency Codes

4.2. CREATING AN IUID DATA MATRIX

An IUID Data Matrix is the UII data set marked on items within an ECC 200 Data Matrix symbol encoded in the syntax specified within ISO/IEC 15434, using the semantics of ISO/IEC 15418[45] or Airlines for America (A4A) (formerly Air Transport Association (ATA)) Common Support Data Dictionary (CSDD)[46], and following the business rules enumerated in Appendix C.

[44] The current Registration Authority of ISO/IEC 15459-2 is NEN–Nederlands Normalisatie-instituut.
[45] See Appendix D, The Mechanics of Item Unique Identification, for a detailed explanation of encoding the IUID Data Matrix. The full titles of the standards are: ISO/IEC International Standard 15434, Information Technology–Automatic identification and data capture techniques–Syntax for high capacity ADC media and ISO/IEC International Standard 15418, Information technology–Automatic identification and data capture techniques–GS1 Application Identifiers and ASC MH10 Data Identifiers and maintenance (note that ISO/IEC 15418 refers the user to ANS MH10.8.2 for technical content).
[46] ISO/IEC 16022 shall also apply.

Generally speaking, syntax specifies rules when arranging and ordering pieces of information. The ISO/IEC 15434 syntax used in IUID requires both the information to be encoded and to specify what kind of information it is. For example, if the CAGE code "0CVA5" were to be encoded into an IUID Data Matrix, both the information 0CVA5 and the fact it is a CAGE code would be encoded. To specify 0CVA5 is a CAGE code a "data qualifier" is used in front of the data. An example of how this could be done is: 17V0CVA5; where 17V is a data qualifier indicating the information following it is a CAGE code. There are lists of specified data qualifiers to use with different types of data within ISO/IEC 15418 and within the CSDD. The list of data qualifiers and the rules for their use are referred to as semantics. More information relevant to this topic is available in Appendix D.

Construct #1 and Construct #2 may be represented in a UII data set encoded as multiple elements, which are composed of the necessary data components with appropriate data qualifiers. Construct #1 and Construct #2 may also be represented in a UII data set encoded as single element, which is composed of the necessary data components, with an appropriate IUID data qualifier (i.e., 18S, 25S, USN , UST , or UID).

As a functional requirement, IUID Data Matrices must be able to render the correct UII when decoded by a reader compliant with the defining standards of the Data Matrix (i.e., ISO/IEC 16022) and the resultant data is subjected to relevant business rules found in Appendix C. The process of decoding a UII is not perfectly reversible. That is to say, a known UII may come from one of several different looking IUID Data Matrices. This is because the Data Matrix standard allows for encoding the exact same data several different ways, and also because there are several different ways to arrange the data to yield the same UII.

For example, all four of the barcodes in Figure 3 yield the same UII. The first three encode exactly the same data. The fourth encodes different data, yet still yields the same UII (viz. 0614141MH80312).

Figure 3. Different IUID Data Matrices, Same UII

Appendix D provides details and examples of encoding UIIs within IUID Data Matrices.

4.3. MARKING AN ITEM WITH AN IUID DATA MATRIX

The current version of MIL-STD-130 provides the criteria and requirements for item marking. The DoD minimum MRI requirement for IUID is the IUID Data Matrix. It is to be applied either through labeling or direct part marking (DPM) of the item, or when an item cannot be physically marked the IUID Data Matrix may be applied to a supplemental bag or tag for the item.

4.3.1. Deciding Where to Place an IUID Data Matrix on an Item

Often the application of the IUID Data Matrix can be incorporated into existing marking requirements and strategies. MIL-STD-130 provides examples of alterations to existing marking templates to include the IUID Data Matrix. When existing markings cannot accommodate the IUID Data Matrix, engineering may be required to update drawings or technical data packages to include the IUID Data Matrix.

4.3.1.1. Marking Items with Severe Space Limitations

For severe space limitations beyond those that can be accommodated through the minimum Data Matrix module size (see paragraph 5.1.2.e, MIL-STD-130) for any item deemed to be at risk (e.g., electronic components susceptible to counterfeiting), the IUID Data Matrix dimension requirements shall be relaxed to allow smaller compliant symbols with a minimum module size of 0.001 inches to be direct part marked on those components. This relaxation of the minimum module size is necessary to allow forensic analysis and confirmation of authenticity of these components, particularly at the component or subcomponent level. The resulting smaller IUID Data Matrix shall not be used by the standard DoD automatic identification and data capture infrastructure nor used in standard business processes. Specialized imaging equipment will be required for reading these smaller symbols.

4.3.1.2. Strategies for Minimizing Non-Recurring Engineering

The implementation of part marking to uniquely identify items with MRI may require changes in the supplier's manufacturing and maintenance processes if these processes have not already been enabled to mark items with MRI. If item designs are final and do not enable MRI marking, changes to enable MRI marking shall be incorporated in the engineering drawings and technical data that define the item. Strategies for minimizing the impacts of non-recurring engineering include:

(a) Replacing/modifying existing data plates with IUID Data Matrix labels. Existing data plate documentation can be used. The current technical data already specifies the material and placement of the data plate. Human readable data other than IUID information can exist on the new data plate. The labels provide high contrast allowing interrogation of the mark by lower cost readers.

(b) Issuing a global engineering change notice. This would provide instructions on a single drawing on how to mark qualifying items.

(c) Issuing IUID part-marking work orders into the existing manufacturing and enterprise resource planning processes, which minimizes the need to change drawings.

(d) Changing company part marking quality standards to include IUID requirements.

(e) When the necessary marking information and criteria do not change the form, fit, or function of the part, the change does not require an immediate drawing update, but

rather can be accomplished by a coversheet with the marking instructions, thus permitting consolidation of drawing requirements.

(f) DPM will require more engineering analysis than labeling. The main issue that necessitates additional engineering analysis for DPM is the fact that the mark is made directly on the component rather than attached like a label. Wherever possible, the engineering decisions for location and type of application should be made on documented results from previous analysis. Currently the Joint Marking Qualification Working Group has taken the lead in this area and their documentation[47] has provided a wealth of information that has precluded much of the testing that would normally be required when one marks directly into the material of a component.

Figure 4 illustrates some considerations in developing a compliant approach to DoD IUID requirements using MRI part marking.

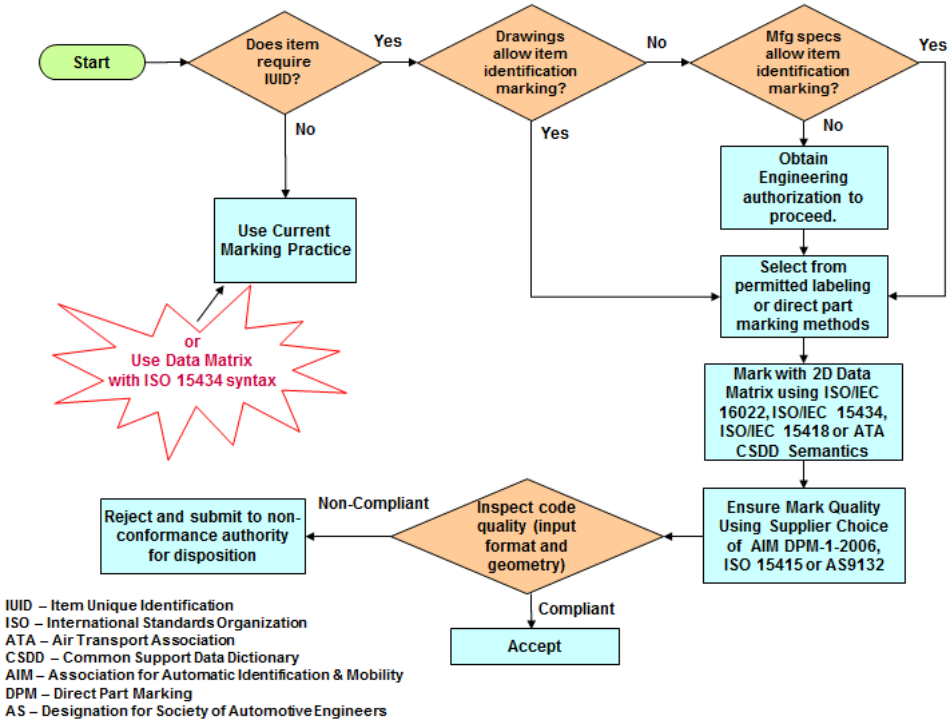

Figure 4. Considerations in MRI Part Marking

4.3.2. Deciding When to Place the IUID Data Matrix on the Item

Strategies that produce the greatest business advantage for the items at the lowest cost and in the shortest possible time shall be considered first. The question of when to mark often leads to a conclusion that the probable scenario would be a mixture of *vendor-applied-at-source*, *opportunity-based*, *seek-and-apply*, and *gated* strategies.[48]

[47] https://acc.dau.mil/CommunityBrowser.aspx?id=30743

[48] See Ronald W. Durant and Owen R. Thompson, "Concept of Operations for AIT in an Automated Maintenance Environment for Army Weapon Systems", Executive Summary and Report (Volume 2), AR130T1, March 2002.

4.3.2.1. Vendor-Applied-at-Source

Vendor-applied-at-source provides a relatively inexpensive and unobtrusive application option for future purchases; however, it will not provide the speed of response necessary to successfully implement a retrospective application program for legacy items.

4.3.2.2. Opportunity-Based

Opportunity-based, or trigger event item application can be done in the field or factory, wherever it is convenient to gain access to items either in operational use or available in a storage facility. Projected situations or processes where a trigger event occurs include, but are not limited to:

(a) Change in location where the item is taken out of service at one accountable location and moved to another location to begin service. The item may be marked during this movement process either at the origin or destination, depending on the availability of marking equipment.

(b) Change in status where the item is taken out of service and placed in maintenance or returned to inventory. Maintenance status may include phase maintenance, scheduled servicing, depot rebuild or overhaul processes, and work-order processes during modification. The item shall be marked while in maintenance or upon receipt at the inventory point[49].

(c) Change in program where the item is shifted from control of one program to another program. The item may be marked by either the losing or gaining program upon the transfer of accountability[50].

(d) Change in organizational alignment where the item is moved from the custody of one organization to the custody of another organization, such as transfer of Government property from the custodian back to the DoD. The item shall be marked by the organization that is losing custody, unless there is a previous agreement with the receiving organization.

4.3.2.3. Seek-and-Apply

The seek-and-apply strategy can be used for particular items held within service, either in operational use or in storage. This strategy is dependent on establishing the location and availability of items before deployment of application equipment and teams. The location of items can be determined through the supply chain management information systems and inventory control systems. This approach is dependent upon accurate legacy data, and will demand greater overhead of coordinated effort to obtain access to the assets. By concentrating application efforts, the advantage is faster implementation of configuration management for specific items.

[49] This also applies to contractual maintenance arrangements; but it does not apply to normal contractor maintenance and calibration efforts.
[50] This does not apply if the item is under control and accountability of the same entity.

4.3.2.4. Gated

The interception of items as they transit specific gates within the supply chain (e.g., distribution depot or port of embarkation) can ensure no item enters service without a UII. Having identified an item at the gate which requires a UII, the situation can be resolved by either diverting the item back to the sender for application, provision of an application capability at the specific supply gate, or diversion of the item to a centralized application facility.

4.3.3. Virtual UIIs

When applying IUID to legacy items already in inventory or operational use, all items that meet the IUID criteria shall be assigned a UII and marked with an IUID Data Matrix. If a serialized item can be uniquely identified by its existing serial number and markings, a virtual UII may be assigned[51].

A virtual UII enables the database entry of a UII and its associated data, while postponing the physical marking of the legacy item[52] with an IUID Data Matrix to the next opportunity to mark based on logistic and economic considerations. In addition to legacy items already in the inventory or operational use, DoD resident equipment[53] and spares in the custody of contractors may also be assigned virtual UIIs until an item is subject to transfer at which time the physical marking of the item shall be accomplished. The use of virtual UIIs is described in the latest version of the *Guidelines for the Virtual Unique Item Identifier (UII)*[54].

4.4. USE OF UIIS IN AISS

In the Service or Agency material management and supporting AISs (developed or maintained in compliance with BEA requirements), once the UII is created, the UII shall not be parsed to determine the original elements, since parsing and recombination of the elements invariably results in the introduction of errors in the UII. However, the UII, the enterprise identifier, the serial number[55] and, in the case of Construct #2, the original part number or lot or batch number is captured separately at the time of initial Government receipt and acceptance. The UII shall be a common data element for item traceability in all computational functions including inventory acceptance, item accountability, storage, issue, receipt, valuation, maintenance, and disposal.

The UII shall be used to enable traceability of the item throughout its life within the DoD inventory system, and facilitate item tracking in DoD business systems to provide reliable and accurate data for a variety of purposes that include but are not limited to: program management, property accountability, anti-counterfeiting, reliability analysis, life cycle management, and serialized item management.

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[51] The enterprise identifier used in marking a legacy item shall be the enterprise identifier of the entity ensuring the uniqueness of the UII. See Business Rules #28 and #29 in Appendix C.
[52] Virtual UIIs are not used for new items. New items shall conform to DFARS 252.211-7003.
[53] Resident equipment is government owned property that is usually stationary within a contractor's facility.
[54] This guide is available for download at http://dodprocurementtoolbox.com/page/unique-id/tools.
[55] It may not be possible to capture a serial number for a UII data set encoded as single element.

4.4.1. Derivation of the UII

The UII for an item shall be derived from the data elements encoded into an IUID Data Matrix. The automatic identification technology (AIT) device[56] machine-reads all of the encoded data found in the IUID Data Matrix. The data element(s) found within the encoded string are interpreted separately using business rules to derive the UII. It is not necessary to include the UII on the item as a separate data element expressed in common, human readable, text. It is only required that the data elements required to derive the UII be included on each item. When deriving the UII, the data qualifiers are omitted from the UII.

Although not used to determine the UII, other data elements, such as the current part number, may also be placed on the item. It may be beneficial for an enterprise to select one of the two constructs for exclusive use, rather than attempting to use both constructs within the same enterprise identifier.

In applying the IUID rules and requirements, care shall be given to the distinction among the UII, the UII data set, the IUID Data Matrix, and item data encoded string (IDES) containing the UII data set. An important distinction is the relationship between the UII and the IDES. The UII is a string of capital letters and numbers and perhaps a dash and/or forward slash. The IDES, however, is everything encoded into the Data Matrix. The IDES will include UII data as well as additional data, not found in the UII. It is also the case that the UII may include data not found in the IDES[57]. Even so, the UII can always be derived from the IDES in accordance with the rules found in Tables 6, 7 and 8 in Appendix D of this Guide.

4.4.2. UII Derivation Process

Figure 5 depicts how the UII for an item is derived and the business rule for generating the UII from the data elements placed on the item[58]. The AIT reader device shall machine-read the data elements and output the UII for onward transmission to the appropriate automated information system (AIS). The decisions of which construct to use to uniquely identify items, and use of the data qualifiers and associated business rules, are

[56] AIT devices include readers, scanners, interrogators, and hybrid devices which may incorporate more than one automatic data capture technology. AIT devices with imaging capability are required to decode Data Matrices.

[57] Some arrangements of encoding data within the IUID Data Matrix include the IAC and others do not. When the IAC is not explicitly encoded into the IUID Data Matrix, it shall be derived from the data qualifier for the enterprise identifier. The IAC is not marked separately on the item. The IAC for the GS1 Company Prefix is not derived because it is contained in each GS1 Company Prefix. The IAC for the data qualifiers 3V, 18V, 25S, EUC , and UID is not derived because it is contained in the data elements associated with each of these data qualifiers. The IAC shall not be repeated when forming the UII using these data qualifiers.

[58] The identification of the agency issuing the enterprise identifier, or the IAC, is frequently derived by the AIT device from the data qualifier for the enterprise identifier. The IAC is not placed on the item as a separate data element. The IAC for the GS1 Company Prefix need not be derived because it is contained as the first number in each GS1 Company Prefix. The IAC for the data qualifiers 3V, 18V, 25S, EUC and UID need not be derived because it is contained in each data element. The IAC shall not be repeated when forming the UII.

made by the enterprise assigning serialization to the item and guaranteeing its uniqueness.

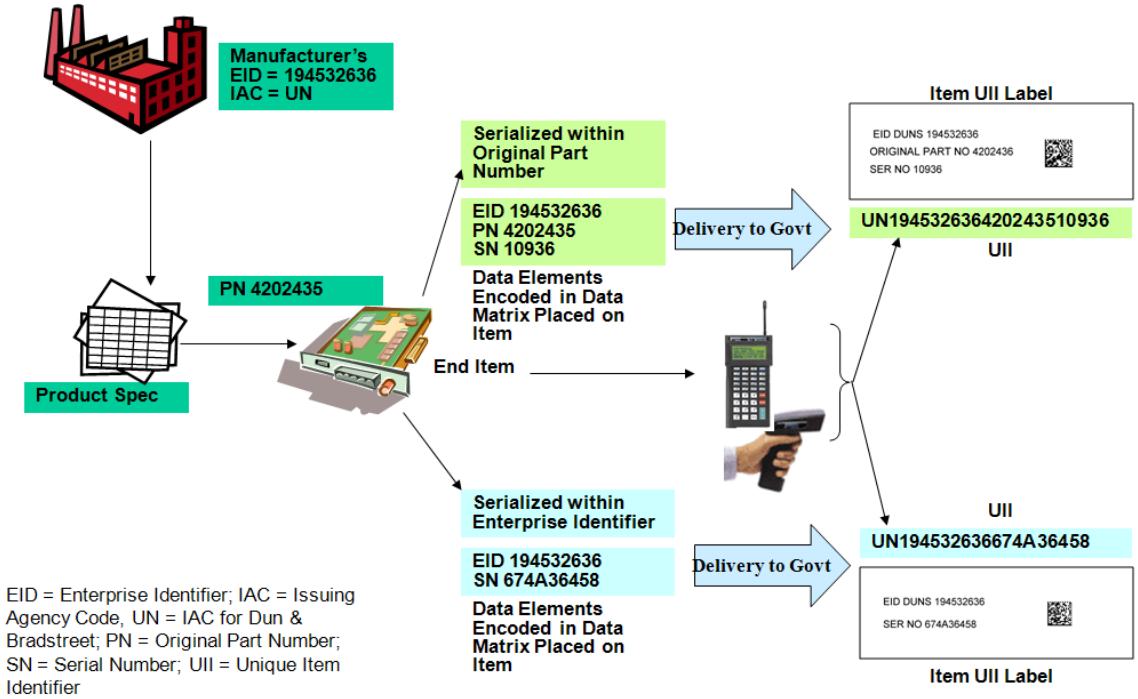

Figure 5. UII Determination Process

4.5. Roles and Responsibilities for Property Records

4.5.1. Property Accountability

DoDI 5000.64[59] provides a comprehensive framework for DoD property accountability policies, procedures, and practices; and assists DoD property managers, accounting and financial officers, and other officials in understanding their roles and responsibilities relating to property accountability. It establishes accountability policy for property and equipment; and contains concepts useful for asset management throughout the Department, particularly for property in the possession of individual military units and end-users. Paragraph 2.0 of Enclosure 3 addresses accountable property records. It excludes property and materiel for which accountability and inventory control requirements are prescribed in DoDM 4140.01 and DoD 4000.25-2-M[60].

DoDI 5000.64 requires that the accountability of property shall be enabled by IUID for identification, tracking, and management. It also requires that the Heads of the DoD

[59]It integrates the broad requirements of the Federal Property and Administrative Services Act of 1949, as amended (Act of 30 June 1949, 63 Stat. 372), and the Chief Financial Officers (CFO) Act of 1990 into an overarching property accountability policy. This instruction complements the accounting and financial reporting requirements contained in DoD 7000.14-R.

[60] Military Standard Transaction Reporting and Accounting Procedures (MILSTRAP).

Components post changes to the property records for all transactions as required (e.g., loan, loss, damage, disposal, inventory adjustments, item modification, transfer, sale).

4.5.2. Materiel Management of Secondary Items

DoDM 4140.01contains accountability and inventory control requirements for secondary items in the DoD wholesale supply system. It provides for maintaining official records of inventory to identify the quantities of items on hand, unit prices, locations, physical condition, receipt and issue records, authorized stock numbers, item descriptions and other such information necessary to properly account for materiel and exercise other inventory management responsibilities.

4.6. THROUGH-LIFE TRACEABILITY OF UII ITEMS IN THE DOD IUID REGISTRY

The UII shall be associated to authentication data registered in the DoD IUID Registry[61]. The DoD IUID Registry may be accessed by the manufacturer, supplier, distributor, and shipper, as well as the DoD Components' supply chain processes, for receipt and acceptance, inventory management, maintenance, and operations. Authorized users shall add items, update, and add events to existing items registered in the DoD IUID Registry. The DoD Components and industry shall ensure procedures for updating the DoD IUID Registry[62] to record custodial life cycle events and transfer events are accomplished in accordance with the following guidelines.

4.6.1. Obtaining User Access to the DoD IUID Registry

As of November 2014, the DoD IUID Registry is a constituent application within the Wide Area Workflow[63] (WAWF) suite of DoD enterprise business systems. DoD Components and industry representatives can register for access at the WAWF site (www.wawf.eb.mil).

4.6.2. Initial Item Registration

New acquisition items with UIIs are automatically registered in the IUID Registry upon acceptance by DoD of the item through the Invoice, Receipt, Acceptance and Property Transfer (iRAPT, the application formerly known as Wide Area Workflow (WAWF)) Receiving Report[64]. The Receiving Report containing the IUID data is transmitted by industry to iRAPT electronically via an X.12 formatted file or a Flat File, or manually via the iRAPT web site. Up to 100 embedded items may be registered on the Receiving Report as long as they are a single layer deep. Embedded items that exceed these conditions are registered using the "Item Update" capability described in 4.6.3.

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[61] https://wawf.eb.mil

[62] See Paragraph 5.7, DoD Instruction 8320.04.

[63] WAWF has changed with the migration of the IUID Registry. The name "Wide Area Work Flow" now represents the single sign-on site for the suite of constituent applications of which the IUID Registry in one. What used to be known as the Wide AreaWork Flow is now a different constituent application alongside the IUID Registry; it is now known as iRAPT (Invoice, Receipt, Acceptance and Property Transfer).

[64] Items are to be registered within 30 days of receipt of materiel.

Legacy items should be registered upon assignment of the UII to the item. Legacy items are registered electronically through either an XML or Flat File[65] or manually on the IUID Registry web site. Data submission requirements vary based on the type of item being registered (e.g., legacy or embedded).

4.6.3. Item Update

DoD Components and industry representatives shall use the DoD IUID Registry Update function to record a reportable event that happened to a registered item. The IUID Registry shall be updated to reflect the following changes to the item:

- Current part number change (usually as part of a maintenance activity)
- Mark change (addition or removal of identifiers)
- Custody change[66]
- Embedded IUID items update (to complete the initial submission or update during maintenance activities)
- Item owner change (DoD entity)
- Condition (generally during contracted repair)
- Special tooling status change
- Type designation change
- Life cycle event update (for events that change the DoD inventory position)[67]

When a registered item experiences any of the changes listed above, the DoD IUID Registry shall be updated by the DoD Component or industry representative that caused the change to take place. The update can occur electronically via XML or Flat File submission, or the update can be entered manually via the IUID Registry web site. A registered item's status, or life cycle event, shall be changed in the DoD IUID Registry within 90 days of an event occurrence.

[65] http://dodprocurementtoolbox.com/page/overview/data-submission

[66] A "custody change" reportable event is at the DoD Component level. If an item changes from the custody of one DoD component to another – that is reportable. If an item changes from the custody of one unit within a DoD component to another within the same DoD Component – that is not reportable. If the item changes custody from a DoD entity to a non-DoD entity (e.g., Foreign Military Sales (FMS), Government Furnished Property (GFP)) that is reportable.

[67] Possible life cycle events are: abandoned, consumed, destroyed by accident, destroyed by combat, donated, exchanged – repair, exchanged – sold, exchanged – warranty, expended – experimental/target, expended – normal use, leased, loaned, lost, reintroduced, retired, scrapped, sold – foreign government, sold – historic, sold – nongovernment, sold – other federal, sold – state/local, and stolen.

Appendix A - Definitions

Key Definitions

Word or Phrase	Definition	Source
Accountable property	Property that meets accountability requirements. This property is recorded in the accountable property system of record.	DoDI 5000.64
Accountable property record	The record contained within the accountable property system of record.	DoDI 5000.64
Accountable property system of record	The Government system used to control and manage accountable property records; a subset of existing organizational processes related to the life cycle management of property; the system that is integrated with the core financial system.	DoDI 5000.64
Automatic identification device	A device, such as a reader or interrogator, used to retrieve data encoded on machine-readable media.	DFARS 252.211-7003
Compliant unique item identifier	For DoD purposes, a compliant UII is either a Construct #1, Construct #2, Global Individual Asset Identifier (GIAI); Global Returnable Asset Identifier[68] (GRAI); Vehicle Identification Number (VIN); and Electronic Serial Number (ESN), Mobile Equipment Identifier (MEID), or Cellular Mobile Telephone Identifier (CMTI) (for cell phones only), all of which have their data elements encoded in a Data Matrix symbol using the ISO/IEC 15434 syntax with ISO/IEC 15418 or A4A CSDD semantics.	DoD Guide to Uniquely Identifying Items

[68] The GRAI shall contain a unique serial number for DoD recognized IUID equivalent application. Other variations of the GRAI are unacceptable for IUID.

Word or Phrase	Definition	Source
Controlled inventory items	Those items designated as having characteristics that require they be identified, accounted for, secured, segregated, handled or transported in a special manner to ensure their integrity and they are safeguarded. The list of controlled inventory item codes includes nuclear weapons-related material, non-nuclear missiles and rockets, arms, ammunition, and explosives. Controlled inventory item categories in descending order of the degree of control normally exercised are classified items, sensitive items, and pilferable items. (See DoD 4100.39-M, Volume 10, Table 61).	DoDI 5000.64 DoDM 4140.01, Volume 11 DoD 4100.39-M
Custodian	The enterprise that has stewardship accountability of an item, i.e., responsibility for the control of, transfer and movement of, and access to, equipment and material. Custody also includes the maintenance of accountability for equipment and material.	Based on the definition of "custody" from the Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms
Data carrier	The medium selected to record, transport or communicate data. For item unique identification purposes, the data carrier is the Data Matrix.	The American Heritage Dictionary

Word or Phrase	Definition	Source
Data Matrix	A two-dimensional matrix symbology containing dark and light square data modules. It has a finder pattern of two solid lines and two alternating dark and light lines on the perimeter of the symbol. A two-dimensional imaging device such as a charge-coupled device camera is necessary to scan the symbology. The Data Matrix is designed with error correction capability. The Data Matrix is used for item marking applications using a wide variety of printing and marking technologies. The Data Matrix symbol looks like this:  The ECC 200 Data Matrix which uses Reed-Solomon error correction is the specified symbol for IUID.	ISO/IEC 16022 Information technology - International symbology specification - Data Matrix
Data qualifier	A specified character (or string of characters) that immediately precedes a data field that defines the general category or intended use of the data that follows.	DFARS 252.211-7003
DoD item unique identification[69]	A system of marking and registering items delivered to the DoD with UIIs that have machine-readable data elements to distinguish an item from all other like and unlike items. Items are marked with an IUID Data Matrix, the contents of which are encoded in the syntax of ISO/IEC 15434 and the semantics of ISO/IEC 15418 or the A4A CSDD[70]. The IUID Data Matrix contents may be either a UII (Construct #1 or Construct #2) or a DoD recognized IUID equivalent.	DFARS 252.211-7003

[69] Formerly known as DoD unique item identification.
[70] Text Element Identifiers are taken from the A4A CSDD.

Word or Phrase	Definition	Source
DoD serially managed items	Includes reparable items down to and including sub-component reparable unit level; life-limited, time-controlled, or items requiring records (e.g., logbooks, aeronautical equipment service records, etc.); and items that require technical directive tracking at the part level. Note: A distinction is made between "serialized items" and "DoD serially managed" items. While DoD may use an item that has been serialized by the manufacturer, DoD may not manage the item by means of its serial number. When DoD elects to manage an item by its serial number it becomes "DoD serially managed". This means it is a tangible item used by DoD, which is designated by a DoD, or Service Item Manager to be uniquely tracked, controlled or managed in maintenance, repair and/or supply by means of its serial number[71].	DoDI 4151.19
DoD recognized item unique identification equivalent (or IUID equivalent)	An item unique identification method that is in commercial use and has been recognized by DoD. The IUID equivalents are the Global Individual Asset Identifier (GIAI); Global Returnable Asset Identifier[72] (GRAI); Vehicle Identification Number (VIN); and Electronic Serial Number (ESN), Mobile Equipment Identifier (MEID), and Cellular Mobile Telephone Identifier (CMTI) (for cell phones only). While the constructs are equivalent, they shall be placed on the items in an ECC 200 Data Matrix symbol encoded with ISO/IEC 15434 syntax and semantics of ISO/IEC 15418 in order to be compliant with DoD IUID policy.	DFARS 252.211-7003

[71] A serial number is an assigned combination of numbers and/or letters to an item instance that separately identifies that item instance from all others.

[72] The Global Returnable Asset Identifier (GRAI) shall contain a unique serial number for DoD recognized IUID equivalent application. Other variations of the GRAI are unacceptable for IUID.

Word or Phrase	Definition	Source
Enterprise[73]	The entity (e.g., a manufacturer, depot, or vendor) responsible for assigning unique item identifiers to items.	DFARS 252.211-7003
Enterprise identifier	A code that is uniquely assigned to an enterprise by a registered issuing agency.	DFARS 252.211-7003
Equipment	A tangible article of personal property that is complete in-and-of itself, durable, nonexpendable, and needed for the performance of a contract. Equipment generally has an expected service life of one year or more, and does not ordinarily lose its identity or become a component part of another article when put into use. Note: Includes military equipment, support equipment, general-purpose equipment, special test equipment, and special tooling. Includes Class VII, Major End Items, a final combination of end products that is ready for its intended use, that is, launchers, tanks, mobile machine shop, and vehicles, etc. It does not include real property, reparables, consumables or materials.	DoDI 5000.64
Issuing agency	An organization responsible for assigning a non-repeatable identifier to an enterprise (e.g., Dun & Bradstreet GS1, Allied Committee 135 or DoD).	DFARS 252.211-7003
Issuing agency code	A code that designates an agency with authority to issue unique enterprise identifiers.	DFARS 252.211-7003
Item	A single hardware article or unit formed by a grouping of subassemblies, components, or constituent parts.	DFARS 252.211-7003
Item essentiality	A measure of an item's military worth in terms of how its failure (if a replacement is not immediately available) would affect the ability of a weapon system, end item, or organization to perform its intended functions.	DoDM 4140.01, Volume 2

[73] The enterprise identifier in the UII is the entity that is responsible for compliance with the UII rules. An entity cannot commit another entity to that responsibility without authority. The fundamental principle is: Never use another entity's enterprise identifier in the UII without permission or direction from the competent authority for that enterprise identifier.

Word or Phrase	Definition	Source
Item identification	Sufficient data to establish the essential characteristics of an item that give the item its unique character and differentiate it from other supply items.	DoDM 4140.01, Volume 2
Item unique identification equivalent	See DoD recognized item unique identification equivalent.	
Legacy items	DoD-owned items and end items that have already been produced and deployed for use, or that have been produced and placed in inventory or storage pending issue for use.	MIL-STD-130, current edition
Lot/Batch number	An identifying number assigned by the enterprise to a designated group of items (lot or batch), all of which were manufactured under the same controlled conditions of production.	DFARS 252.211-7003 (derived from)
Machine-readable media	An automatic identification technology media, such as barcodes, contact memory buttons, radio frequency identification, or optical memory cards.	DFARS 252.211-7003
Marking	The application of legible numbers, letters, labels, tags, symbols, or colors to ensure the proper handling and identification during shipment and storage.	DoDM 4140.01, Volume 10
Military Mission Essentiality	A code indicating the composite effect of an item on the overall military mission based on the most critical significant application of the item. Used in determining resource allocations, determining degree of management intensity, and communicating essentiality among the DoD Components.	DoDM 4140.01, Volume 3
Operating materials and supplies	Personal property to be consumed in normal operations. Excluded are (a) goods that have been acquired for use in constructing real property, (b) stockpile materials, and (c) inventory.	DoD 7000.14-R, Volume 4, Chapter 4, current edition
Original part number	A combination of numbers or letters assigned by the enterprise at asset creation to a class of items with the same form, fit, function, and interface.	DFARS 252.211-7003

Word or Phrase	Definition	Source
Parent item	The item assembly, intermediate component or subassembly that has an embedded item with a UII or DoD recognized item unique identification equivalent.	DFARS 252.211-7003
Personal property	Property of any kind or any interest therein, except real property.	Joint Publication 1-02
Pilferable items	Items that have a ready resale value or application to personal possession and that are, therefore, especially subject to theft. (See DoD 4100.39-M, Volume 10, Table 61)	DoDI 5000.64 DoD 4100.39-M
Principal items	Principal items are end items and replacement assemblies of such importance that management techniques require centralized individual item management throughout the supply system, to include depot level, base level, and items in the hands of using units. These specifically include the items where, in the judgment of the Services, there is a need for central inventory control, including centralized computation of requirements, central procurement, central direction of distribution, and central knowledge and control of all assets owned by the Services.	Joint Publication 1-02
Property accountability	The assignment of duties and responsibilities to an individual or organization that mandates jurisdiction, security, and answerability over public property.	DoDM 4140.01, Volume 5
Registration authority	Refers to the Nederlands Normalisatie-instituut (NEN), Registration Authority for ISO/IEC 15459, which is responsible for assigning codes to issuing agencies with conforming systems for issuance of unique enterprise identifiers.	DFARS 252.211-7003 ISO/IEC 15459
Secondary items	Secondary items are items that are not defined as principal items and include reparable components, subsystems, and assemblies, consumable repair parts, bulk items and material, subsistence, and expendable end items, including clothing and other personal gear.	DoDM 4140.01, Volume 1

Word or Phrase	Definition	Source
Sensitive items	Items that require a high degree of protection and control due to statutory requirements or regulations, such as narcotics and drug abuse items; precious metals; items that are of a high value, highly technical, or a hazardous nature; and small arms, ammunition, explosives, and demolition material. (See DoD 4100.39-M, Volume 10, Table 61)	DoDM 4140.01, Volume 5
Serialization within the enterprise identifier	Each item produced is assigned a serial number that is unique among all the tangible items produced by the enterprise and is never used again. The enterprise is responsible for ensuring unique serialization within the enterprise identifier.	DFARS 252.211-7003
Serialization within the part or lot or batch number	Each item of a particular part or lot or batch number is assigned a unique serial number within that part, lot or batch number assignment. The enterprise is responsible for ensuring unique serialization within the part or lot or batch number within the enterprise identifier.	DFARS 252.211-7003
Sets, kits, and outfits	Assemblages of components, support items, or mission specific and common tools in a container (for example, a bag, pouch, box, chest, van, trailer, or shelter) primarily designed to accomplish a specific mission or maintenance function.	DoD Guide to Uniquely Identifying Items and DA PAM 700-60
Total item property record	The record or record set maintained by the materiel manager that identifies the quantity, condition, and value of the items for each organizational entity having physical custody of those items. The total item property record includes materiel that is due in, in transit, in organic wholesale and retail repair facilities, in a contractor's custody, on loan, on hand in wholesale distribution centers, on-hand at retail activities, and for reported assets in the custody of users.	DoDM 4140.01, Volume 5
Unique item identifier	A globally unique and unambiguous identifier that distinguishes an item from all other like and unlike items. The UII is a value derived from a UII data set of one or more data elements.	DFARS 252.211-7003 (derived from)

Word or Phrase	Definition	Source
Unique item identifier data set	A set of one or more data elements marked on an item in an IUID Data Matrix from which the UII shall be derived. For items that are serialized within the enterprise identifier, the UII data set includes the data elements of enterprise identifier and a unique serial number (Construct #1). For items that are serialized within the part, lot, or batch number within the enterprise identifier, the UII data set includes the data elements of enterprise identifier, the original part number or lot or batch number, and the serial number (Construct #2). In addition to the two constructs composed of multiple data elements, the UII data set may be represented by a UII data set encoded as a single element, such as would be defined by the use of data qualifiers 18S, 25S, USN , UST , or UID , or by a DoD recognized IUID equivalent, such as would be defined by the use of data qualifiers I, 22S, 8002, 8003, or 8004.	DFARS 252.211-7003 (derived from)
Unique item identifier type	A designator to indicate which method of uniquely identifying a part has been used. The current list of accepted UII types is maintained at http://dodprocurementtoolbox.com/page/unique-id/overview.	DFARS 252.211-7003
Unit acquisition cost	1. For fixed-price type line, subline, or exhibit line items, the unit price identified in the contract at the time of delivery; and 2. For cost-type or undefinitized line, subline, or exhibit line items, the contractor's estimated fully burdened unit cost to the Government at the time of delivery; and 3. For items produced under a time-and-materials contract, the contractor's estimated fully burdened unit cost to the Government at the time of delivery.	DFARS 252.211-7003

Word or Phrase	Definition	Source
Virtual unique item identifier	A UII of a legacy item that has been entered, along with its associated data, in the DoD Item Unique Identification (IUID) Registry, while postponing the physical marking of the item with an IUID Data Matrix to a more advantageous time based on logistic and economic considerations.	DoD Guide to Virtual Unique Item Identifiers, Version 1.3, August 6, 2013

Appendix B - Where Does the Guidance Exist Today?

Document Reference	Document Name
P. L. 110-417, Title VIII, Subtitle B, Section 815	The Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, Preservation and Storage of Tooling for Major Defense Acquisition Programs
DFARS 252.211-7003	Defense Federal Acquisition Regulation Supplement
DFARS 252.211-7007	Defense Federal Acquisition Regulation Supplement
MIL-STD-129	Military Marking for Shipment & Storage
MIL-STD-130	Identification Marking of US Military Property
DoD 4100.39-M	Federal Logistics Information System (FLIS) Procedures Manual
DoDI 4140.01	DoD Supply Chain Material Management Policy
DoDM 4140.01 V1 – V11	DoD Supply Chain Materiel Management Procedures
DoDI 5000.2	Operation of the Defense Acquisition System
DoDI 5000.64	Accountability and Management of DoD Equipment and Other Accountable Property
DoD 7000.14-R	Financial Management Regulations
DoDD 8320.03	Unique Identification (UID) Standards for a Net-Centric Department of Defense
DoDI 8320.04	Item Unique Identification (IUID) Standards for Tangible Personal Property
CJCSI 3170.1C	Requirements Generation System
DCMA One Book	DCMA reference material for contractors
DoD MIL-HDBK-61A (SE)	Configuration Management Guidance
EIA Standard 836	Configuration Management Data Exchange and Interoperability
ANSI/EIA 649	National Consensus Standard for Configuration Management
GS1 US BarCodes and eCom™	Guidelines for Department of Defense Unique Identification (UID) Markings Using the GS1 System
ISO/IEC 15415	Information technology—Automatic identification and data capture techniques—Barcode print quality test specification—Two-dimensional symbols
ISO/IEC 15418	Information technology—Automatic identification and data capture techniques—GS1 Application Identifiers and ASC MH10 Data Identifiers and maintenance
ISO/IEC 15434	Information technology—Automatic identification and data capture techniques–Syntax for high capacity ADC media
ISO/IEC 15459-2	Information technology—Part 2: Registration Procedures
ISO/IEC 16022	Information technology—Automatic identification and data capture techniques—Data Matrix barcode symbology specification

Document Reference	Document Name
ISO/IEC TR 24720	Information technology—Automatic identification and data capture techniques—Guidelines for direct part marking (DPM)
AIM DPM-1-2006	Direct Part Mark (DPM) Quality Guideline
SAE AS9132	Data Matrix (2D) Coding Quality Requirements for Parts Marking
A4A CSDD	Airlines for America Common Support Data Dictionary
ANS MH10.8.2	Data Identifier and Application Identifier Standard
These documents may have been revised since publication of this guide. Check for the latest version of the reference.	

Appendix C - Business Rules (Version 4.1)

WHAT ARE BUSINESS RULES?

A business rule is a statement that defines or constrains some aspect of the business. It is intended to assert business structure or to control or influence the behavior of the business. Typical business rules include definitions of terms, facts relating terms to each other, constraints, and derivations.

IUID BUSINESS RULES

The following section includes the business rules for IUID. The business rules for IUID are divided into the following implementation categories:

- Contracts and Administration
- Unique Item Identifier (UII) Construction and Physical Marking for:
    - Items considered part of a new solicitation after January 1, 2004 (i.e., New Items)
    - Items existing under contract, in operational use, or in inventory (i.e., Legacy Items)
    - Items considered tangible personal property owned by the Government in custody of a contractor after January 1, 2005 (i.e., Property Management Items)

As the IUID implementation has progressed, additions, clarifications and modifications to these business rules have been made.

CONTRACTS AND ADMINISTRATION

1. Within the same Contract Line Item Number (CLIN), there is no need for a contractor to segregate the same items delivered against different Accounting Classification Reference Numbers (ACRN).
2. For FAR Part 12 contracts and subcontracts[74]:
    - The Government shall mark the item, or
    - The Government shall request the contractor mark the item.
3. Foreign Military Sales (FMS) contracts are not exempt from IUID.
4. Classified and unclassified contracts require IUID.

[74] Pursuant to the execution of a determination and findings.

UII CONSTRUCTION AND PHYSICAL MARKING

Items Considered Part of a New Solicitation

Creating and Generating the UII

1. The UII shall be derived from its discrete, component data elements or UII data set encoded as single element[75]. The UII is not required to be marked on the item as a separate data element.
2. If an enterprise chooses to mark the UII data set encoded as single element on the item, any component data elements specified by the contract[76] shall also be marked on the item as discrete data elements in addition to the UII encoded into an IUID Data Matrix.
3. Data qualifiers (semantics) shall define each machine-readable data element marked on the item[77].
4. If an enterprise serializes items within the EID, the UII shall be derived by combining the following data elements, in order[78]:
    - The IAC, which shall be derived from the data qualifier for the enterprise identifier if it is not contained within the data element[79]
    - The enterprise identifier, which shall be included as a UII data element in the IUID Data Matrix on the item[80]
    - The serial number unique within the enterprise, which shall be included as a UII data element in the IUID Data Matrix on the item *(Note: This is referred to as UII Construct #1.)*
5. If an enterprise serializes items within original part numbers or lot or batch numbers, the UII shall be derived by combining the following data elements, in order[81]:

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[75] DI 25S, TEI UID and the DoD recognized IUID equivalents contain the complete UII in a single data element. DI 18S, TEI USN and TEI UST are sufficient to derive the UII from a single data element by adding the IAC prefix for CAGE (D).

[76] Configuration management or other purposes may require marking of individual data elements. The contract shall specify the data elements that are required beyond the UII and other MIL-STD-130 requirements.

[77] See Appendix D of this Guide for a list of IUID data qualifiers.

[78] The IDES may contain the component data elements in any order. The ordering of the elements into a valid UII is done after the decoding of the symbol.

[79] Enterprise identifiers that are assigned by GS1 contain the IAC prefix. The IAC for the data qualifiers 3V, 18V, 25S, EUC, and UID need not be derived because it is contained in each data element. The IAC shall not be repeated when forming the UII.

[80] The enterprise identifier in the UII is the entity that is responsible for compliance with the UII rules. An entity cannot commit another entity to that responsibility without authority. The fundamental principle is: Never use another entity's enterprise identifier in the UII without permission or direction from the competent authority for that enterprise identifier.

- The IAC, which shall be derived from the data qualifier for the enterprise identifier if it is not contained within the data element
- The enterprise identifier, which shall be included as a UII data element in the IUID Data Matrix on the item
- The original part number or lot or batch number[82], which shall be included as a UII data element in the IUID Data Matrix on the item
- The serial number unique within original part number or lot or batch number, which shall be included as a UII data element in the IUID Data Matrix on the item *(Note: This is referred to as UII Construct #2.)*

6. The IAC shall be derived from the data qualifier for the enterprise identifier if it is not contained within the data element. The IAC is not required to be separately marked on the item[83].
7. A specific set of data qualifiers shall allow the AIT device to determine which UII construct should be used to build the UII or if the UII is already marked on the item[84].
8. If UII Construct #2 is used, the enterprise shall maintain the data element containing the original part number or lot or batch number on the item for the life of the item. For example, when using the Text Element Identifier (TEI) UID for a UII Construct #2 (i.e., the original part number or lot or batch number is contained within the data element), the TEI UID data element shall be maintained on the item for the life of the item.
9. The enterprise is responsible for ensuring that the serial number is unique within the enterprise identifier (for UII Construct #1) or unique within the original part number or lot or batch number (for UII Construct #2).
10. The enterprise is responsible for ensuring that the original part number is not duplicated within the enterprise and that the combination of the original part number and the serial number is unique within the enterprise. If the lot or batch number is used to create the UII then the combination of the lot or batch number and the serial number shall be unique within the enterprise.
11. The UII shall not change over the life of the item. Therefore, the component data elements of the UII shall not change over the life of the item.
12. The enterprise identifier used in the UII identifies the enterprise that assigned the UII to the item. The UII machine-readable code shall not contain more than one enterprise identifier if ambiguity in constructing the UII would result.

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[81] The IDES may contain the component data elements in any order. The ordering of the elements into a valid UII is done after the decoding of the symbol.

[82] Original part numbers and lot or batch numbers are mutually exclusive in the UII. In order to avoid ambiguity, only one of those three types of original numbers shall appear in the UII. For serialization within the part number, use only the original part number in the UII. For serialization within the lot or batch number, use only the lot or batch number in the UII.

[83] See Table 3 of this Guide for a list of IACs.

[84] See Appendix D of this Guide for more details on these data qualifiers.

13. Data elements not required to construct the UII shall remain discrete but may be contained within the same mark or media as the UII-required elements, provided that (1) all data elements contained in the mark or media are properly identified with a data qualifier, (2) the added data elements do not introduce ambiguity in the UII, and (3) the added data elements do not violate other business rules stated herein. UII data sets encoded as single elements that are sufficient to derive UIIs (i.e., 18S, 25S, UID , UST , USN , and DoD recognized IUID equivalents) shall always be interpreted as the UII regardless of any apparent ambiguity introduced by additional data elements in the symbol. The UII data elements should appear first in the sequence.

14. The UII component data elements or UII data set encoded as single element[85] and additional data elements shall be contained in an IUID Data Matrix, as required by the latest revision of MIL-STD-130[86]. Data may also be contained in human-readable information and/or other AIT media (e.g., contact memory buttons, linear barcodes, radio frequency identification) in addition to the IUID Data Matrix. The physical marks that contain the UII-required elements shall conform to the permanency and legibility requirements of MIL-STD-130 for the normal life expectancy of the item.

15. Where space is available, human-readable information for UII data elements should be marked on the item. However, if a single element UII (i.e., data qualifiers 18S, 25S, UID , UST , USN , and DoD recognized IUID equivalents) marked on an item includes an item traceability number that is different from an actual serial number that may already be marked on the item, then the traceability number of the single element UII shall not be separately marked on the item in order to avoid having two different serial numbers physically marked on an item. Furthermore, a traceability number used only to create the UII that is not consistent with the item manufacturer's existing serialization may never be encoded in an IUID Data Matrix using data qualifiers "SER “, “SEQ " or "S".

16. The Data Matrix shall utilize DoD-accepted syntax[87].

17. There are identification numbers used in the commercial sector that are DoD recognized IUID equivalents. IUID equivalents shall comply with the IUID Business Rule #14 for minimum data carrier requirements[88].

Parent-Child Relationships

18. DFARS 211.274-2(a)(3) requires the item unique identification, regardless of value, for any — (a) DoD serially managed item (reparable or nonreparable) or subassembly, component, or part embedded within a subassembly, component,

[85] DI 25S, TEI UID , and the DoD recognized IUID equivalents contain the complete UII in a single data element. DI 18S, TEI USN , and TEI UST are sufficient to derive the UII from a single data element by adding the IAC prefix for CAGE (D).
[86] See *MIL-STD-130* for additional information on DoD-approved data carriers.
[87] ISO/IEC International Standard 15434, Information technology–Automatic identification and data capture techniques–Syntax for high-capacity ADC media.
[88] See Chapter 4 of this Guide for a list of approved DoD recognized IUID equivalents.

or part; and, (b) the parent item (as defined in DFARS 252.211-7003(a)) that contains the embedded subassembly, component or part.

- For purposes of complying with this requirement, the parent item for the embedded item UII shall be the next higher replaceable subassembly, intermediate component, or assembly within the end item that contains the embedded UII.
- In order to provide traceability of the embedded UII to its next higher replaceable assembly level within the end item, the end item shall not be identified as the parent item in instances where a replaceable assembly, intermediate component, or subassembly exists that contains an embedded item UII.

Metadata Requirements

19. The UII is a non-parsable field, not to exceed 50 characters in length (excludes overhead characters). Overhead characters in the encoded data string, such as syntax and data qualifiers, are not part of the UII and are eliminated when the UII is constructed. The source protocols for specific data qualifiers may be more restrictive than the allowable field lengths of these rules. Refer to ANS MH10.8.2 for AIs and DIs, and to A4A CSDD for TEIs, for specific limitations on field lengths and usage[89].
    - The IAC string of characters shall not exceed 3 characters.
    - The enterprise identifier string of characters shall not exceed 13 characters, excluding the data qualifier.
    - The original part number or lot or batch number string of characters (including special characters) shall not exceed 32 characters, excluding the data qualifier.
    - The serial number string of characters (including special characters) shall not exceed 30 characters, excluding the data qualifier[90].
    - The sum of the maximum number of characters for possible UII data elements is 78, which exceeds the 50 character limit. In order to meet the overall length limitation of 50 characters for the UII, it may be necessary to use field lengths for original part numbers, lot or batch numbers and serial numbers that are shorter than the maximum allowable field lengths for the individual data elements.
20. The UII shall have worldwide uniqueness (non-repeatable).
21. When constructing the UII:
    - Any spaces contained in the component data elements shall be deleted.

[89] For example, serial number strings are not to exceed 30 characters however TEI SER is limited to 15 characters in accordance with the A4A CSDD.

[90] Leading zeroes in serial numbers are significant characters in the serial number string and in the UII. Avoiding the use of leading zeroes when creating serial numbers may preclude errors in data entry or data processing applications that do not recognize significant leading zeroes.

- All special characters shall be deleted from the enterprise identifier.
- All special characters, except for dashes (-) and forward slashes (/) shall be deleted from the original part number, lot or batch number, and serial number. The deletion of the special characters shall be done when the IUID Data Matrix is decoded to form a UII. The special characters shall be retained within the data elements when encoded in an IUID Data Matrix unless the data element within the IUID Data Matrix is a UII data set encoded as single element.
- The UII shall only contain uppercase English alphabet characters A through Z, numeric characters 0 through 9, and the special characters "-" and "/"[91]. If the UII data set elements contain lowercase alpha characters, they shall be converted to uppercase before a UII is derived and encoded in the IUID Data Matrix and/or submitted to the IUID Registry. When lowercase alpha characters are encoded in the IUID Data Matrix, they shall be converted by the reader to uppercase alpha characters when the IUID Data Matrix is decoded to form a UII.

Capturing the UII

22. For activities in support of the product life cycle after initial delivery, any entity that collects data about the item shall be capable of associating the data with the UII in accordance with program requirements.

23. If the IUID Data Matrix is unreadable and other AIT media are present, these can be used in a backup mode to derive the UII or query the IUID Registry. If only the human readable data qualifiers and data elements are adjacent to the symbol, the data elements shall be manually input to derive the UII using existing business rules. Prior to derivation of UIIs from backup information the existence of a UII shall be checked by querying the IUID Registry for confirmation of the UII using any identifiable information already marked on the item.

24. Discovery of a duplicate UII shall occur when an attempt is made to register the UII in the IUID Registry. If a true duplicate exists, the Government shall work with the appropriate enterprise(s) to resolve the duplication.

25. Once the UII is derived, it shall not be parsed to determine the original elements.

26. A database containing information on IUID items shall be capable of using the UII or, for a legacy database, the combination of the UII data elements or other

[91] The basic character set for Data Identifiers (MH10.8.2) does not include special characters, unless individually specified for a Data Identifier, or unless the application prescribes an expanded character set. For application in IUID the use of dashes (-) and slashes (/) is permitted in DIs as significant characters for part numbers, lot or batch numbers, and serial numbers, and in DIs that are composed from these numbers (i.e., S, 18S, 25S, 1P, 30P, 1T, and 30T). Dashes and slashes shall not be used as separators between component parts in a single data element that is formed from component parts. Free text formats, if used for additional data, are the responsibility of the user. AIT devices generally support American Standard Code for Information Interchange (ASCII) and extended ASCII for encoding and decoding Data Matrices, while database applications may vary greatly.

physically marked data associated to the UII in the IUID Registry to retrieve the data record associated with the item represented by the UII.

Using the UII

27. One and only one UII shall be assigned to an item. The UII shall not be transferred from one item to another item once assigned and shall not be reused.

Legacy Items in Operational Use or in Inventory

These rules apply in addition to Business Rules #1-#27.

28. Election to use or not use the existing part number and/or existing serial number as part of the UII for a legacy item is the responsibility of the enterprise assigning the UII[92], as is the responsibility for the uniqueness of the resulting UII within its EID.

29. Other than EID, legacy items may use the existing marked data elements in the format of either Construct #1 or #2, or using a DoD recognized IUID equivalent provided that:

    - Regardless of enterprise identification in existing marks, the enterprise identifier of the entity that is responsible for assigning the UII and ensuring its uniqueness shall be used.
    - The serial number used in the UII complies with Business Rule #9. If the existing serial number is missing or does not ensure uniqueness of the UII, the enterprise shall assign a serial number for the UII that complies with Business Rule #9.
    - The original part number or lot or batch number, if it is used in the UII, complies with Business Rule #10. If the original part number or lot or batch number is missing, cannot be determined or does not comply with Business Rule #10, obtain a part, lot, or batch number for the UII from the in-service engineer or other appropriate authority (see Business Rule #30).
    - The original equipment manufacturer (OEM) enterprise identifier and manufacturer assigned serial number, if marked on the item and not a part of the UII, shall be registered in the IUID Registry.

30. If the original part number or lot or batch number cannot be precisely determined, use the following method for establishing an original part number or lot or batch number for the purposes of building the Construct #2 UII:

    - First, use the part, lot or batch number at the time of acquisition, if it can be determined.
    - Second, use the part, lot or batch number marked on the part at the time the UII is created.

[92] The EID used in marking a legacy item shall be the EID of the entity assigning and registering the UII of the item.

Although this may result in the current part number or lot or batch number being used as the original part number or lot or batch number, the data qualifier for the UII data element shall be the original part number or lot or batch number (i.e., 1P, PNO , 1T, LTN , or BII). If the lot or batch number is used to create the UII then the combination of the lot number and serial number or batch number and serial number shall be unique within the enterprise. See Business Rule #10.

31. If the item is unidentifiable[93], a UII should not be assigned.

32. For an on-going contract that is modified to include the IUID requirements:

    - If the contract is for delivery of new items to the Government, follow IUID business rules for items considered part of a new solicitation.
    - If the contract is for support involving existing inventory items, the program manager shall specify the extent to which IUID business rules for items in operational use or in inventory apply.

Items Considered Tangible Personal Property Owned by the Government in the Custody of a Contractor that Have Not Been Previously Marked

These rules apply in addition to Business Rules #1-#32.

33. A UII shall be created for tangible personal property items owned by the Government in the custody of a contractor.

34. Tangible personal property items owned by the Government in the custody of a contractor may use the asset identification number used to track the item as the item's serial number within the enterprise identifier of the entity ensuring the uniqueness of the UII.

35. A UII is not required to be physically marked on tangible personal property items owned by the Government in the custody of a contractor unless the item is moved or delivered to a different location with a different enterprise identifier[94].

36. Tangible personal property initially furnished to the contractor by the Government shall use the UII provided by the Government. If none is provided, establish a UII using the criteria in Business Rules #33-35.

37. Tangible personal property items owned by the Government in the custody of a contractor also require markings or labels indicating Government ownership.

[93] The available information (or information that can be reconstructed) shall be sufficient to identify an item and its essential data, including the part identity and configuration status, and any other factors relevant to the serviceability of the item.

[94] For instructions on assignment of virtual UIIs, see the latest version of the *DoD Guidelines for the Virtual Unique Item Identifier*, available at http://dodprocurementtoolbox.com/page/unique-id/tools.

Appendix D - The Mechanics of IUID

STRUCTURING THE DATA ELEMENTS FOR IUID

This appendix explains how data elements are correctly structured using semantics and syntax. The concepts of semantics and syntax, which are used to identify and structure data so it can be read by any AIT device, are explained. Examples of current structures in industrial use are presented for American National Standard (ANS) MH10.8.2 Data Identifiers (DIs) (Tables 9, 10 and 11) and GS1[95] Application Identifiers (AIs) (Tables 12 and 13). The historic use of A4A CSDD TEIs is discussed and examples using TEIs are presented (Tables 14, 15 and 16).

Semantics

For the UII data elements to be "machine-readable" by an AIT device, they shall be identified by some means such that the reader device can recognize, through its resident software, what data element it is reading. This is accomplished by employing the concept of "semantics", which is literally "the meaning of language". For the purposes of constructing machine-readable data elements, semantics take the form of data qualifiers. These data qualifiers[96] have to define each data element placed on the item. Specific data qualifiers are used to indicate to the AIT devices whether to derive the UII by using Construct #1, Construct #2, UII data set encoded as single element, or an IUID equivalent. Table 5 shows the different data qualifiers for each of the data elements that are used for determining uniqueness.

[95] Formerly EAN.UCC.

[96] There are three types of data qualifiers being used: DIs (Format Indicator 06), AIs (Format Indicator 05), and, within the aerospace industry, TEIs (Format Indicator 12, formerly DD). ISO/IEC International Standard 15418, Information technology–Automatic identification and data capture techniques–GS1 Application Identifiers and ASC MH10 Data Identifiers and maintenance, governs DIs and AIs. The A4A CSDD defines TEIs. ISO/IEC International Standard 15434, Information technology–Automatic identification and data capture techniques–Syntax for high capacity ADC media, contains format indicators for using DIs, AIs and TEIs in syntax encoding.

Data Element	DI (ISO/IEC 15418) Format Indicator 06	AI (ISO/IEC 15418) Format Indicator 05	TEI (A4A CSDD) Format Indicator 12
Enterprise Identifier			
CAGE/NCAGE	**17V**	**-**	**MFR [98], SPL [99] or CAG**
DUNS	**12V**	**-**	**DUN**
GS1 Company Prefix	**3V**	**-**	**EUC**
DoDAAC	**7L**	**-**	**-**
Other Agencies	**18V[97]**	**-**	**-**
Serial Number within Enterprise Identifier	**-**	**-**	**SER [100] or UCN [101]**
Serial Number within Original Part Number (or Serial Number within Lot/Batch Number)	**S**	**-**	**SEQ**
Original Part Number	**1P**	**-**	**PNO**
Lot/Batch Number	**1T**	**-**	**LTN or BII [102]**
IUID using a Single Data Qualifier			
Complete UII	**25S[104]**	**-**	**UID**
CAGE + Serial Number within CAGE (does not contain the IAC)	**18S[105]**	**-**	**USN or UST**
IUID Equivalents			
VIN	**I[106]**	**-**	**-**
ESN/MEID/CMTI[103]	**22S[107]**	**8002[108]**	**-**
GRAI		**8003[109]**	**-**
GIAI		**8004[110]**	**-**
Current Part Number (additional data element—not used in UII)[111]	**30P**	**240**	**PNR**
Lot/Batch Number (additional data element—not used in UII)[112]	**30T**	**-**	**-**
Export Controlled Item (additional data element—not used in UII)	**49P[113]**	**-**	**ECI [114]**

Table 5. Data Qualifiers for IUID Usage

[97] DI 18V – the concatenation of the issuing agency code (IAC) + enterprise identifier (EID). This DI would be used for EIDs, which were assigned by an issuing agency, having a registered IAC, that is not listed in this table.

[98] MFR – Manufacturer CAGE Code. Identifies the manufacturer, government agency or other organization controlling the design and the part number assignment of the subject part.

[99] SPL – Supplier CAGE Code. Identifies the organization creating the UII, where the organization is not the manufacturer, government agency, or other organization controlling the design of the serialized component.

Syntax

The machine-readable symbology for UII is the Data Matrix ECC 200 (ISO/IEC 16022), which uses Reed-Solomon error correction. The symbol is a two-dimensional representation of encoded ASCII characters. To permit translation of the encoded string of ASCII characters, the characters are ordered according to the precise rules of ISO/IEC 15434, Information Technology–Automatic identification and data capture techniques–

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[100] SER – Part Serial Number (Serial Number within Enterprise). The SER is the manufacturer's serialized identity for an individual part, component or component end item.

[101] UCN – Unique Component Identification Number. The UCN is the permanent tracking identity assigned to an in-service part by an organization other than the manufacturer, government agency or other organization controlling the design of the subject part and used in lieu of the manufacturer's serial number.

[102] LTN and BII . LTN – Enterprise Lot Number is a lot number that *is* unique within the Enterprise Identifier. BII – Batch Item Identifier, is a subdivision of an LTN .

[103] ESN is a cellular mobile telephone Electronic Serial Number. MEID is the Mobile Equipment Identifier. CMTI is the GS1 Cellular Mobile Telephone Identifier.

[104] 25S is the identification of a party to a transaction (as identified by DI 18V), followed by a supplier assigned serial number (For UII purposes, this has to be unique serialization within the EID that assigns the UII data elements). Thus, for UII purposes, 25S shall represent the following string of elements – IAC + EID + Unique serial number within the EID, which directly corresponds to a UII using serialization within the enterprise.

[105] In the case where the EID is the CAGE Code, DI 18S shall be used. 18S is the concatenation of the CAGE Code (EID) + Unique serial number within the CAGE Code. This data element does not contain the IAC, which shall be added in decoding to form a UII using serialization within the enterprise.

[106] DI I is the U. S. Vehicle Identification Number (VIN).

[107] DI 22S is the Unique Individual Identity For Cellular Mobile Telephones – previously designated as an Electronic Serial Number (ESN) and changing to Mobile Equipment Identifier (MEID).

[108] AI 8002 is the GS1 Cellular Mobile Telephone Identifier (CMTI). The CMTI is up to 20 characters and is an electronic serial identifier of a cellular mobile telephone.

[109] AI 8003 is the Global Returnable Asset Identifier (GRAI).

[110] AI 8004 is the Global Individual Asset Identifier (GIAI). The GIAI is up to 30 characters and is a combination of the GS1 Company Prefix and an Individual Asset Reference, which is assigned by the holder of the GS1 Company Prefix. A serialized Global Trade Identification Number (GTIN™) shall also be converted to a GIAI using GS1 procedures.

[111] DI 30P current part number *is not* part of the UII. It is an additional data element that may be encoded in the ISO 15434 syntax in the same Data Matrix along with the UII data elements (see MIL-STD-130). Use 1P when original part number *is* part of the UII.

[112] DI 30T lot/batch number *is not* part of the UII. It is an additional data element that may be encoded in the ISO 15434 syntax in the same Data Matrix along with the UII data elements (see MIL-STD-130). Use 1T when lot/batch number *is* part of the UII.

[113] DI 49P designates that an item is subject to export control and or restrictions as identified in the Wassenaar Arrangement, see http://www.wassenaar.org/controllists/index.html. The data element is formed by the two-character alpha Country code from ISO 3166-1, which has imposed the export control or restriction, where the Wassenaar code is either the single numeric (1 to 9) category code or the Military List code (an "ML" followed by a numeric 1 to 22) that identifies the particular nature of the material that is controlled or restricted. When applicable the code can be suffixed by either an "SL" or a "VSL" to indicate that the item is also on the list of sensitive or very sensitive items. It is an additional data element that may be encoded in the ISO 15434 syntax in the same Data Matrix along with the UII data elements (see MIL-STD-130).

[114] Tentative approval has been given to the use of TEI ECI to designate that an item is subject to export control and or restrictions as identified in the Wassenaar Arrangement, See Footnote 152. http://www.wassenaar.org/controllists/index.html.

Syntax for high capacity ADC media–the "syntax"[115]. Each data string is assembled beginning with a message header consisting of the compliance indicator and a record separator. The compliance indicator is the ASCII code for the three characters [,), and > which are assembled in that order [)>. The record separator that follows the compliance indicator is also an ASCII-coded character but it does not have a printable representation. The convention for depicting the record separator uses $^{R}_{S}$ to represent the single ASCII-coded character. Because the record separator also appears at the end of the formatted data in the data string, it is known as the format trailer character. There are two other ASCII-coded characters that are used in UII encoding that do not have printable representations. They are the data element separator—$^{G}_{S}$—and the message trailer character—$^{E}_{OT}$. The hexadecimal and decimal codes for ASCII encoding for $^{R}_{S}$, $^{G}_{S}$ and $^{E}_{OT}$ 30, 29, and 4 respectively when expressed as decimal numbers and 1e, 1d, and 04 respectively when expressed as hexadecimal numbers.

The message header is followed by a two-character format indicator to identify the semantics of the formatted data elements. The format indicator, the data qualifiers, and the data values in the remainder of the data string are separated using the data element separator— $^{G}_{S}$ —between each element of the formatted data. The formatted data is terminated using the format trailer character— $^{R}_{S}$ —after the last data element, and the data string is terminated using the message trailer character— $^{E}_{OT}$—to indicate the end.

Once the data elements are identified to the AIT device, the AIT device needs instructions on how to put the data element fields together to define the unique item identifier.

Tables 6, 7, and 8 show how the UII is constructed within Format Indicators 05, 06, and 12 with the various data qualifiers. Conformance to the syntax and semantics requirements is crucial to item unique identification, since the process of encoding, decoding, identifying, and forming the data elements shall be unambiguous[116].

[115] Syntax—the way words are put together to form constructions, such as phrases and sentences. This standard defines the manner in which the data is transferred to the high capacity ADC media from a supplier's information system and the manner in which the data is transferred to the recipient's information system.

[116] The enterprise identifier used in the UII identifies the enterprise that assigned the UII to the item. The UII machine-readable code shall not contain more than one enterprise identifier if ambiguity in constructing the UII would result. Data elements in addition to those required to construct the UII are permitted unless ambiguity in constructing the UII would result. See Business Rules #12 and #13 in Appendix C.

	Required Application Identifiers	**Resultant UII**
Construct 1—Serialization within the enterprise		
Use an IUID equivalent if appropriate ***Otherwise use Format Indicator 06 (see Figure 7) or Format Indicator 12 (see Figure 8)***	—	—
Construct 2—Serialization within the original part number or lot or batch number		
Serialization within the original part number[117] ***Or use an IUID equivalent if appropriate*** ***Otherwise use Format Indicator 06 (see Figure 7) or Format Indicator 12 (see Figure 8)***	—	—
IUID Equivalents		
CMTI **GRAI** **GIAI**	**8002** **8003** **8004**	**<8002>**[118] **<8003>** **<8004>**

Table 6. UII Construction for AIs (Format Indicator 05)

[117] When using the GS1 System to replicate Construct #2, enterprises shall use serialization within the GTIN™.

[118] The enclosure of the AI in angle brackets, e.g. **<8002>**, is the notation used to indicate the value (character string) associated with the data qualifier.

	Required Data Identifiers	**Resultant UII**
Construct 1—Serialization within the enterprise		
Complete UII	**25S**	**<25S>**[119]
CAGE + Serial Number within CAGE (does not contain the IAC)	**18S**	**D + <18S>**
Construct 2—Serialization within the original part number or lot or batch number		
Serialization within the original part number	**17V, 1P & S** **12V, 1P & S** **3V, 1P & S** **7L, 1P & S** **18V, 1P & S**	**D + <17V> + <1P> + <S>** **UN + <12V> + <1P> + <S>** **<3V> + <1P> + <S>** **LD + <7L> + <1P> + <S>** **<18V> + <1P> + <S>**
Serialization within the lot or batch number	**17V, 1T & S** **12V, 1T & S** **3V, 1T & S** **7L, 1T & S** **18V, 1T & S**	**D + <17V> + <1T> + <S>** **UN + <12V> + <1T> + <S>** **<3V> + <1T> + <S>** **LD + <7L> + <1T> + <S>** **<18V> + <1T> + <S>**
UII data set encoded as single element	**25S**	**<25S>**
IUID Equivalents		
VIN **ESN/MEID**	**I** **22S**	**<I>** **<22S>**

Table 7. UII Construction for DIs (Format Indicator 06)

[119] The enclosure of the DI in angle brackets, e.g. **<25S>**, is the notation used to indicate the value (character string) associated with the data qualifier.

	Required Text Element Identifiers	**Resultant UII**
Construct 1—Serialization within the enterprise		
Serialization within the enterprise (component data elements)	**MFR & SER** **SPL & UCN** **CAG & SER** **CAG & UCN** **DUN & SER** **DUN & UCN** **EUC & SER** **EUC & UCN**	**D + <MFR >**[120] **+ <SER >** **D + <SPL > + <UCN >** **D + <CAG > + <SER >** **D + <CAG > + <UCN >** **UN + <DUN > + <SER >** **UN + <DUN > + <UCN >** **<EUC > + <SER >** **<EUC > + <UCN >**
Complete UII	**UID**	**<UID >**
CAGE + Serial Number within CAGE (does not contain the IAC)	**USN** **UST**	**D + <USN >** **D + <UST >**
Construct 2—Serialization within the original part number or lot or batch number		
Serialization within the original part number	**MFR , PNO & SEQ** **SPL , PNO & SEQ** **CAG , PNO & SEQ** **DUN , PNO & SEQ** **EUC , PNO & SEQ**	**D + <MFR > + <PNO > + <SEQ >** **D + <SPL > + <PNO > + <SEQ >** **D + <CAG > + <PNO > + <SEQ >** **UN + <DUN > + <PNO > + <SEQ >** **<EUC > + <PNO > + <SEQ >**
Serialization within the lot or batch number	**MFR, LTN & SEQ** **SPL, LTN & SEQ** **CAG, LTN & SEQ** **DUN, LTN & SEQ** **EUC, LTN & SEQ** ***If LTN is sub-divided into smaller units (batches), insert BII after LTN, as appropriate.***	**D + <MFR > + <LTN > + <SEQ >** **D + <SPL > + <LTN > + <SEQ >** **D + <CAG > + <LTN > + <SEQ >** **UN + <DUN > + <LTN > + <SEQ >** **<EUC > + <LTN > + <SEQ >** ***If LTN is sub-divided into smaller units (batches), insert BII after LTN, as appropriate.***
Complete UII	**UID**	**<UID >**

Table 8. UII Construction for TEIs (Format Indicator 12)

[120] The enclosure of the TEI in angle brackets, e.g. **<MFR >**, is the notation used to indicate the value (character string) associated with the data qualifier.

EXAMPLES OF SEMANTICS AND SYNTAX CONSTRUCTIONS FOR IUID

Using ANS MH10 DIs

Construct #1 – Serialization within the Enterprise Identifier. Table 9 shows two examples of how the data elements would have to be encoded with DIs on the AIT media placed on or with the item for UII Construct #1. Table 10 shows an example of how the data elements would have to be encoded with DIs on the AIT media placed on or with the item for UII Construct #1 and additional item data.

Data Element	DI Format Indicator 06	Data Element Value	Encoded Data Element on AIT Media
Complete UII	**25S**	**UN077991289 674A36458**	**25SUN077991289674 A36458**
CAGE + Serial Number within CAGE (does not contain the IAC)	**18S**	**0CVA5674A3 6458**	**18S0CVA5674A36458**

Table 9. Examples of the Use of DIs in Construct #1 Serialization within the Enterprise (Format Indicator 06 of ISO/IEC 15434)

The UII data elements would be encoded as follows using Format Indicator 06 of the ISO/IEC 15434 syntax for DIs:

[)>$^{R}_{S}$06$^{G}_{S}$25SUN077991289674A36458$^{R}_{S}{}^{E}_{T}$

or

[)>$^{R}_{S}$06$^{G}_{S}$18S0CVA5674A36458$^{R}_{S}{}^{E}_{T}$

Where:

[)> = The three-character compliance indicator

$^{R}_{S}$ = A Format Trailer Character which indicates the end of a data format envelope

06 = A Format Header which indicates DIs are being used

$^{G}_{S}$ = A Data Element Separator used between data fields

25S = DI for the complete UII (IAC + Enterprise Identifier + Serial Number)

UN077991289674A36458 = Complete UII—As defined by the DI 25S (the IAC (UN) and DUNS Enterprise Identifier (077991289) and the Serial Number (674A36458))

18S = DI for CAGE + Serial Number within CAGE (does not contain the IAC)

0CVA5674A36458 = CAGE + Serial Number within CAGE (does not contain the IAC)—As defined by the DI 18S (CAGE Enterprise Identifier (0CVA5) and the Serial Number (674A36458))

$^{E}\mathbf{o}_{T}$ = A Message Trailer which identifies the end of the message within the data stream

When the AIT device reads the data qualifier for the enterprise identifier, it shall have what agency (that is, the IAC) issued the enterprise identifier available in its software. The AIT device shall then attach the IAC to the beginning of the UII concatenation.

When the AIT device reads the data qualifier for 25S, it shall recognize that the data following the 25S is a complete UII for Construct #1, including the IAC. When the AIT device reads the data qualifier for 18S, it shall recognize that the data following the 18S is a CAGE + Serial Number within CAGE (does not contain the IAC) for Construct #1 and shall insert the IAC for CAGE (D) to form the UII.

For these examples using ANS MH10.8.2 DIs in Format Indicator 06 of ISO/IEC 15434, the UII output from the AIT device, once the overhead and syntax are stripped away, would be **UN077991289674A36458** and **D0CVA5674A36458** respectively.

Data Element	DI Format Indicator 06	Data Element Value	Encoded Data Element on AIT Media
Complete UII	**25S**	**UN077991289674A36458**	**25SUN077991289674A36458**
CAGE	**17V**	**0CVA5**	**17V0CVA5**
Free Text[121]		**K: F33657-80-C-0310**	**07K: F33657-80-C-0310**

Table 10. Example of the Use of DIs in Construct #1 Serialization within the Enterprise with Additional Item Data (Format Indicator 06 of ISO/IEC 15434)

The UII data elements may be encoded in any order. In this example the UII data elements would be encoded as follows using Format Indicator 06 for DIs utilizing the ISO/IEC 15434 syntax:

[)>$^{R}_{S}$06$^{G}_{S}$25SUN077991289674A36458$^{G}_{S}$17V0CVA5$^{R}_{S}$07K: F33657-80-C-0310$^{E}\mathbf{o}_{T}$

Where:

[)> = The three-character compliance indicator

$^{R}_{S}$ = A Format Trailer Character which indicates the end of a data format envelope

06 = A Format Header which indicates DIs are being used

[121] Free text is encoded as a separate record within the IDES and requires DI Format Indicator 07.

$^{G}_{S}$ = A Data Element Separator used between data fields

25S = DI for the complete UII[122]

UN077991289674A36458 = complete UII

17V = DI for CAGE Code

0CVA5 = CAGE Code

07 = A Format Header which indicates free text is being used[123]

K: F33657-80-C-0310 = free text

$^{E}\mathbf{0}_{T}$ = A Message Trailer which identifies the end of the message within the data stream

When the AIT device reads the data qualifier for 25S, it shall recognize that the data following the 25S is a complete UII for Construct #1, including the IAC.

For this example using ANS MH10.8.2 DIs in Format Indicator 06 of ISO/IEC 15434, the UII output from the AIT device, once the overhead and syntax are stripped away, would be **UN077991289674A36458**.

Construct #2 – Serialization within the Original Part Number or Lot or Batch Number. Tables 11 and 12 show examples of how the data elements would have to be encoded with DIs on the AIT media placed on or with the item for UII Construct #2. Table 13 shows an example of how the data elements would have to be encoded with DIs on the AIT media placed on or with the item for UII Construct #2 and additional item data.

Data Element	DI Format Indicator 06	Data Element Value	Encoded Data Element on AIT Media
Enterprise Identifier • **DUNS**	**12V**	**077991289**	**12V077991289**
Original Part Number	**1P**	**4202435**	**1P4202435**
Serial Number within Original Part Number	**S**	**10936**	**S10936**

Table 11. Example of the Use of DIs in Construct #2 Serialization within the Original Part Number (Format Indicator 06 of ISO/IEC 15434)

[122] If DI 12V had been used to encode the DUNS number separately an unacceptable ambiguity in how to construct the UII would have been introduced (i.e. which EID to use in the UII, the DUNS or the CAGE). By using DI 25S the ambiguity has been removed.

[123] The first record within an IUID Data Matrix of a multiple record ISO15434 message must contain the UII data elements.

The UII data elements may be encoded in any order. In this example the UII data elements would be encoded as follows using Format Indicator 06 for DIs of the ISO/IEC 15434 syntax:

[)>$^{R}_{S}$06$^{G}_{S}$12V077991289$^{G}_{S}$1P4202435$^{G}_{S}$S10936$^{R}_{S}$^{E}o$_{T}$

Where:

[)> = The three-character compliance indicator

$^{R}_{S}$ = A Format Trailer Character which indicates the end of a data format envelope

06 = A Format Header which indicates DIs are being used

$^{G}_{S}$ = A Data Element Separator used between data fields

12V = DI for DUNS Code

077991289 = DUNS Code

1P = DI for Part Number assigned by supplier (Original)

4202435 = Original Part Number

S = DI for Serial Number

10936 = Serial Number within original part number

^{E}**o$_{T}$** = A Message Trailer which identifies the end of the message within the data stream

When the AIT device reads the data qualifier for the enterprise identifier, it shall have what agency (that is, the IAC) issued the enterprise identifier available in its software. The AIT device shall then attach the IAC to the beginning of the UII concatenation. In this example the IAC for Dun & Bradstreet is "UN".

The UII data elements would be in the order IAC/Enterprise Identifier/Original Part Number/Serial Number. For this example using ANS MH10 DIs in Format Indicator 06 of ISO/IEC 15434, the UII output from the AIT device, once the overhead and syntax are stripped away and the IAC has been added, would be **UN077991289420243510936**.

Data Element	DI Format Indicator 06	Data Element Value	Encoded Data Element on AIT Media
Enterprise Identifier • **DUNS**	**12V**	**077991289**	**12V077991289**
Lot Number	**1T**	**AA20070230**	**1TAA20070230**
Serial Number within Lot Number	**S**	**6109**	**S6109**

Table 12. Example of the Use of DIs in Construct #2 Serialization within the Lot Number (Format Indicator 06 of ISO/IEC 15434)

If serialization within the lot or batch number is used then the lot or batch number is used in place of the original part number to construct the UII. The UII data elements would be in the order IAC/Enterprise Identifier/Lot or Batch Number/Serial Number. The UII data elements would be encoded as follows using Format Indicator 06 for DIs of the ISO/IEC 15434 syntax:

[)>$^{R}_{S}$06$^{G}_{S}$12V077991289$^{G}_{S}$1TAA20070230$^{G}_{S}$ S6109 $^{R}_{S}$ ^{E}o$_{T}$

Where:

[)> = The three-character compliance indicator

$^{R}_{S}$ = A Format Trailer Character which indicates the end of a data format envelope

06 = A Format Header which indicates DIs are being used

$^{G}_{S}$ = A Data Element Separator used between data fields

12V = DI for DUNS Code

077991289 = DUNS Code

1T = DI for Lot Number assigned by supplier

AA20070230 = Lot Number

S = DI for Serial Number

6109 = Serial Number within lot number

^{E}o$_{T}$ = A Message Trailer which identifies the end of the message within the data stream

When the AIT device reads the data qualifier for the enterprise identifier, it shall have what agency (that is, the IAC) issued the enterprise identifier available in its software. The AIT device shall then attach the IAC to the beginning of the UII concatenation. In this example the IAC for Dun & Bradstreet is “UN”.

For this example using ANS MH10 DIs in Format Indicator 06 of ISO/IEC 15434, the UII output from the AIT device, once the overhead and syntax are stripped away and the IAC has been added, would be **UN077991289AA200702306109**.

Data Element	DI Format Indicator 06	Data Element Value	Encoded Data Element on AIT Media
Enterprise Identifier • **CAGE**	**17V**	**0CVA5**	**17V0CVA5**
Original Part Number	**1P**	**4202435**	**1P4202435**
Serial Number within Original Part Number	**S**	**674A36458**	**S674A36458**
Current Part Number	**30P**	**4202435-1**	**30P4202435-1**

Table 13. Example of the Use of DIs in Construct #2 Serialization within the Original Part Number with Additional Item Data (Format Indicator 06 of ISO/IEC 15434)

The UII data elements may be encoded in any order. In this example the UII data elements would be encoded as follows using Format Indicator 06 for DIs utilizing the ISO/IEC 15434 syntax:

[)>$^{R}_{S}$06$^{G}_{S}$17V0CVA5$^{G}_{S}$1P4202435$^{G}_{S}$S674A36458 $^{G}_{S}$30P4202435-1$^{R}_{S}$^{E}o$_{T}$

Where:

[)> = The three-character compliance indicator

$^{R}_{S}$ = A Format Trailer Character which indicates the end of a data format envelope

06 = A Format Header which indicates DIs are being used

$^{G}_{S}$ = A Data Element Separator used between data fields

17V = DI for Manufacturer CAGE code

0CVA5 = CAGE Code

1P = DI for Original Part Number

4202435 = Original Part Number

S = DI for Serial Number within the Original Part Number

674A36458 = Serial Number within the Original Part Number

30P = DI for Current Part Number

4202435-1 = Current Part Number[124]

^{E}**o**$_{T}$ = A Message Trailer which identifies the end of the message within the data stream

When the AIT device reads the data qualifier for the enterprise identifier, it shall have what agency (that is, the IAC) issued the enterprise identifier available in its software.

[124] For application in IUID the use of dashes (-) and slashes (/) is permitted in DIs as significant characters for part numbers, lot or batch numbers, and serial numbers, and in DIs that are composed from these numbers (i.e., S, 18S, 25S, 1P, 30P, 1T, and 30T).

The AIT device shall then attach the IAC to the beginning of the UII concatenation. In this example the IAC for CAGE is "D".

For this example using ANS MH10 DIs in Format Indicator 06 of ISO/IEC 15434, the UII output from the AIT device, once the overhead and syntax are stripped away and the IAC has been added, would be **D0CVA54202435674A36458**.

Using GS1 AIs

Serialization within the Enterprise Identifier. When using GS1[125] AIs for purposes of IUID, enterprises shall use the General GS1 Specifications[126] to construct the DoD recognized IUID equivalent or the UII data elements. Serialization within the enterprise identifier requires the use of a DoD recognized IUID equivalent.

Serialization within the Global Trade Item Number (GTIN). When using the GS1 System for serialization within a GTIN and enterprise, the serial number shall be incorporated into the Individual Asset Reference component of the GIAI that is described in Table 15 below. The GTIN™ is the 14-character identifier which uniquely identifies the company (enterprise) and its product (part number). When properly associated with a serial number, a globally unique UII can be created. The Individual Asset Reference component element containing the GTIN and serial number is constructed as described in the GS1 published Guidelines for Department of Defense Unique Identification (UID) Markings Using the GS1 System.

Table 14 shows an example of the use of AIs in the context of the General GS1 Specifications for a GIAI using the Individual Asset Reference Number.

Data Element	AI Format Indicator 05	Data Element Value	Encoded Data Element on AIT Media
IUID equivalent GIAI[127]	**8004**	**06141411A0B9C3D6**	**800406141411A0B9C3D6**

Table 14. Example of the Use of AIs for GIAI using the Individual Asset Reference Number (Format Indicator 05 of ISO/IEC 15434)

For IUID, the GIAI is considered by the DoD to be an IUID equivalent[128]. The data elements considered components of the IUID equivalent (i.e., GS1 Company Prefix,

[125] Formerly EAN.UCC.
[126] See http://www.gs1.org/ for information about the GS1 System (formerly EAN.UCC System) and GS1 documents.
[127] Within the General GS1 Specifications, the GIAI is considered a DoD recognized IUID equivalent. The AI 8004 indicates that the data field contains a GIAI. The GIAI is made up of the GS1 Company Prefix and an individual asset reference number. The holder of the GS1 Company Prefix determines the structure and numbering of the individual asset reference number.
[128] A DoD recognized IUID equivalent means an item unique identification method that is in commercial use and has been recognized by DoD.

Individual Asset Reference Number) are not required to be marked on the item, unless specifically required by the contract[129].

Using the General GS1 Specifications, the minimum DoD IUID equivalent data elements would be encoded as follows under Format Indicator 05 of the ISO/IEC 15434 syntax for AIs:

[)>$^{R}_{S}$05$^{G}_{S}$ 800406141411A0B9C3D6 $^{R}_{S}$ ^{E}o$_{T}$

Where:

[)> = The three-character compliance indicator

$^{R}_{S}$ = A Format Trailer Character which indicates the end of a data format envelope

05 = A Format Header which indicates AIs are being used

$^{G}_{S}$ = A Data Element Separator used between data fields

8004 = AI for the GIAI

06141411A0B9C3D6 = GIAI, which is composed of the GS1 Company Prefix including the IAC as the leading character **(0614141)** and the Individual Asset Reference Number **(1A0B9C3D6)**

^{E}**o$_{T}$** = A Message Trailer which identifies the end of the message within the data stream

For this example using AIs in Format Indicator 05 of ISO/IEC 15434, the DoD IUID equivalent output from the AIT device, using the GIAI as the IUID equivalent, stripping away the overhead and syntax, would be **06141411A0B9C3D6**[130].

IUID Equivalent – GIAI using the Serialized GTIN™. Table 15 shows an example of the use of AIs in the context of the General GS1 Specifications for a GIAI using the Serialized GTIN™. The AI 8004 is also used for this construct but the composition of the data element value shall be derived from the GTIN™ and a serial number. The General GS1 Specifications provide information on the GTIN™ and the method for creating the GIAI is described in the *Guidelines for Department of Defense Unique Identification Markings Using the GS1 System.*[131]. In this construct, the GTIN™ is the 14-character identifier which uniquely identifies the company (enterprise) and its product (part number). When properly associated with a serial number, a globally unique UII can be created.

[129] This is an exception to IUID Business Rule #2. See Appendix C. If the contract requires marking IAW MIL-STD-130, the enterprise ID shall be included in the Data Matrix as a separate data element as well as the part number.
[130] Since the IAC is the first digit of the Company Prefix, it is not necessary to add it in forming the UII.
[131] See http://www.gs1.org/ for information about the GS1 System (formerly EAN.UCC System) and GS1 documents.

Data Element	AI Format Indicator 05	Data Element Value	Encoded Data Element on AIT Media
IUID equivalent GIAI	**8004**	**061414100332411A0B 9C3D6**	**8004061414100332411A0B 9C3D6**

Table 15. Example of the Use of AIs for GIAI using the Serialized GTIN™ (Format Indicator 05 of ISO/IEC 15434)

Using the General GS1 Specifications, the minimum UII data elements would be encoded as follows under Format Indicator 05 of the ISO/IEC 15434 syntax for AIs:

[)>$^{R}_{S}$05$^{G}_{S}$ 8004061414100332411A0B9C3D6 $^{R}_{S}$ ^{E}o$_{T}$

Where:

[)> = The Message Header consisting of a three-character compliance indicator and the Format Trailer Character $^{R}_{S}$ to indicate the end of a data format envelope

$^{R}_{S}$ = A Format Trailer Character which indicates the end of a data format envelope

05 = A Format Header which indicates AIs are being used

$^{G}_{S}$ = A Data Element Separator used between data fields

8004 = AI for GIAI

061414100332411A0B9C3D6 = GIAI, which is derived by a two-step method of modifying the GTIN™ **(10614141003324)** to create a new data element **(06141410033241)**[132] and concatenating a serial number **(1A0B9C3D6)** with the new data element.

^{E}o$_{T}$ = A Message Trailer which identifies the end of the message within the data stream

For this example using AIs in Format Indicator 05 of ISO/IEC 15434, the UII output from the AIT device, stripping away the overhead and syntax would be **061414100332411A0B9C3D6**[133].

Historic Use of TEIs

TEIs[134] are the preferred approach of the aerospace industry. The aerospace industry uses CAGE Code (TEI = MFR)[135] to identify the manufacturer with serial number (TEI = SER) to provide unique identity of the item. The aerospace industry philosophy is no duplication of serial numbers within an enterprise, regardless of the product, so that a simple combination of enterprise identifier and serial number provides item unique identification of that item forever. As revisions are implemented that change the

[132] The new data element is created by moving the first character of the GTIN™ to the last position of the GTIN™.
[133] Since the IAC is the first digit of the Company Prefix, it is not necessary to add it in forming the UII.
[134] All TEIs are four characters in length, consisting of three uppercase letters followed by a space.
[135] CAGE Code is also indicated by TEI = CAG . An enterprise identified by CAG need not be the manufacturer.

form, fit or function of the part, the aerospace industry changes the part number (TEI = PNR) to reflect those changes. This is called "rolling the part number."

As aerospace moved TEIs into broader multi-industry use, they determined a need to establish additional TEIs for DUNS Number (TEI = DUN), UCC Company Prefix (TEI = EUC), Serial Number within Part Number (TEI = SEQ), Original Part Number (TEI = PNO), and UII (TEI= UID) to encode TEIs other than Manufacturer (TEI = MFR), Serial Number (TEI = SER) and Current Part Number (TEI = PNR)[136]. It was also determined that they needed a separator that would not be used within data, as opposed to the "/" used in ATA SPEC2000, Chapter 9. Finally, it was determined that an unambiguous header/trailer was needed to identify that the data fields represented were in TEI form.

The needed non-data separator and unambiguous header/trailer were available in ISO/IEC 15434, Information Technology–Automatic identification and data capture techniques–Syntax for high capacity ADC media, and this gave rise to the Collaborative Solution.

The Collaborative AIT Solution

The DoD has approved the use of ISO/IEC 15418 and ISO/IEC 15434 in its acquisitions. The collaborative solution was established to enable the use of TEIs selected from the A4A CSDD using the syntax of ISO/IEC 15434 until such time as the ISO could consider a new format indicator in ISO/IEC 15434 to support TEIs. In the interim DoD recognized "DD" as the format indicator for TEIs thereby permitting use of ISO/IEC 15434 as the IUID syntax standard[137]. DoD also recognized selected TEIs for IUID usage from the A4A CSDD and new TEIs that were proposed to support IUID. In addition, in support of the collaborative solution, the A4A Spec 2000 International Coordinating Group approved the use of ISO/IEC 15434 syntax with TEIs as an alternative item marking method.

Since that time, the ISO has added a new format indicator, "12", in ISO/IEC 15434 to support TEIs. The new format indicator "12" has replaced the interim format indicator "DD" previously prescribed in this guidance[138]. Items that have been marked with the format indicator "DD" do not have to be re-marked but further use of "DD" is not

[136] On October 26, 2004, the ATA Spec2000 Coordinating Group approved the following TEIs for usage: PNO (Original Part Number), SEQ (Serial Number) within Original Part Number) and UID (Unique Item Identifier). The PNO and SEQ TEIs will allow for the use of UII Construct 2 (i.e., serialization within original part number).

[137] ISO/IEC 15434, Information Technology–Automatic identification and data capture techniques–Syntax for high capacity ADC media, specifies a two-digit format indicator. All two-digit numbers (00-99) are assigned or reserved for future use. This means that a format indicator for TEIs of the collaborative solution could not be assigned a two-digit number without ISO approval. To enable the collaborative solution utilizing the ISO/IEC 15434 syntax, the Department specified a special DoD-specific format indicator, designated as "DD", to indicate TEIs were being used in the collaborative solution.

[138] Format Indicator DD has been used in the past within IUID Data Matrices. Some items with this Format Indicator persist in the DoD inventory. Users of this guide intending to develop decoding algorithms to construct UIIs should treat any IUID Data Matrix with Format Indicator DD exactly the same as if it had Format Indicator 12.

permitted. Also, the TEIs that were proposed for IUID usage have been approved and incorporated into the A4A CSDD.

Using TEIs

Construct #1 – Serialization within the Enterprise Identifier by Manufacturer. Table 16 shows an example of the use of TEIs for UII Construct #1 when the manufacturer serializes the item.

Data Element	TEIs	Data Element Value	Encoded Data Element on AIT Media
Enterprise Identifier • **CAGE**	**MFR**	**0CVA5**	**MFR 0CVA5**
Serial Number within Enterprise Identifier	**SER**	**674A36458**	**SER 674A36458**

Table 16. Example of the Use of TEIs for UII Construct #1, Manufacturer Serialization (Format Indicator 12 of ISO/IEC 15434)

The UII data elements may be encoded in any order. In this example the UII data elements would be encoded as follows using Format Indicator 12 for TEIs utilizing the ISO/IEC 15434 syntax:

[)>$^{R}_{S}$12$^{G}_{S}$MFR 0CVA5$^{G}_{S}$SER 674A36458$^{R}_{S}{}^{E}$o$_{T}$

Where:

[)> = The three-character compliance indicator

$^{R}_{S}$ = A Format Trailer Character which indicates the end of a data format envelope

12 = A Format Header which indicates TEIs are being used

$^{G}_{S}$ = A Data Element Separator used between data fields

MFR = TEI for Manufacturer CAGE code

0CVA5 = CAGE Code

SER = TEI for Serial Number within the Enterprise Identifier

674A36458 = Serial Number within Enterprise Identifier

^{E}**o$_{T}$** = A Message Trailer which identifies the end of the message within the data stream

When the AIT device reads the data qualifier for the enterprise identifier, it shall have what agency (that is, the IAC) issued the enterprise identifier available in its software.

The AIT device shall then attach the IAC to the beginning of the UII concatenation. In this example the IAC for CAGE is "D".

The UII data elements would be in the order IAC/Enterprise Identifier/Serial Number. For this example using Format Indicator 12 for TEIs in the ISO/IEC 15434 syntax, the UII output from the AIT device, once the overhead and syntax are stripped away and the IAC has been added, would be **D0CVA5674A36458**.

Construct #1 – Serialization within the Enterprise by an Organization other than the Manufacturer. Table 17 shows an example of the use of TEIs for UII Construct #1 when serialization is done by an organization other than the manufacturer of the item.

Data Element	TEIs	Data Element Value	Encoded Data Element on AIT Media
Enterprise Identifier • **CAGE**	**SPL**	**0F3N5**	**SPL 0F3N5**
Serial Number within Enterprise Identifier, other than Manufacturer	**UCN**	**10936**	**UCN 10936**

Table 17. Example of the Use of TEIs for UII Construct #1, Enterprise other than Manufacturer (Format Indicator 12 of ISO/IEC 15434)

The UII data elements may be encoded in any order. In this example the UII data elements would be encoded as follows using Format Indicator 12 for TEIs utilizing the ISO/IEC 15434 syntax:

[)>$^{R}_{S}$12$^{G}_{S}$SPL 0F3N5$^{G}_{S}$UCN 10936$^{R}_{S}{}^{E}$o$_{T}$

Where:

[)> = The three-character compliance indicator

$^{R}_{S}$ = A Format Trailer Character which indicates the end of a data format envelope

12 = A Format Header which indicates TEIs are being used

$^{G}_{S}$ = A Data Element Separator used between data fields

SPL = TEI for CAGE code, Enterprise other than Manufacturer

0F3N5 = CAGE Code

UCN = TEI for Unique Component Number assigned by Enterprise other than the Manufacturer

10936 = Unique Component Number

^{E}**o$_{T}$** = A Message Trailer which identifies the end of the message within the data stream

When the AIT device reads the data qualifier for the enterprise identifier, it shall have what agency (that is, the IAC) issued the enterprise identifier available in its software. The AIT device shall then attach the IAC to the beginning of the UII concatenation. In this example the IAC for CAGE is "D".

The UII data elements would be in the order IAC/Enterprise Identifier/Serial Number. For this example using Format Indicator 12 for TEIs in the ISO/IEC 15434 syntax, the UII output from the AIT device, once the overhead and syntax are stripped away and the IAC has been added, would be **D0F3N510936**.

Construct #2 – Serialization within the Original Part Number or Lot or Batch Number. Table 18 shows an example of the use of TEIs for UII Construct #2 when the manufacturer serializes the item within the original part number, PNO [139].

Data Element	TEIs	Data Element Value	Encoded Data Element on AIT Media
Enterprise Identifier • **CAGE**	**CAG**[140]	**0CVA5**	**CAG 0CVA5**
Original Part Number	**PNO**	**4202435**	**PNO 4202435**
Serial Number within Original Part Number	**SEQ**	**674A36458**	**SEQ 674A36458**

Table 18. Example of the Use of TEIs for UII Construct #2, Serialization within the Original Part Number (Format Indicator 12 of ISO/IEC 15434)

The UII data elements may be encoded in any order. In this example the UII data elements would be encoded as follows using Format Indicator 12 for TEIs utilizing the ISO/IEC 15434 syntax:

[)>$^{R}_{S}$12$^{G}_{S}$CAG 0CVA5$^{G}_{S}$PNO 4202435$^{G}_{S}$SEQ 674A36458$^{R}_{S}$$^{E}_{T}$

Where:

[)> = The three-character compliance indicator

$^{R}_{S}$ = A Format Trailer Character which indicates the end of a data format envelope

12 = A Format Header which indicates TEIs are being used

$^{G}_{S}$ = A Data Element Separator used between data fields

CAG = TEI for Manufacturer CAGE code

[139] An enterprise that serializes within lot or batch number would use LTN or BII , as appropriate, in place of PNO .

[140] The TEI of MFR may also be used to designate the manufacturer.

0CVA5 = CAGE Code

PNO = TEI for Original Part Number

4202435 = Original Part Number

SEQ = TEI for Serial Number within the Original Part Number

674A36458 = Serial Number within the Original Part Number

$^{E}\mathbf{o}_{T}$ = A Message Trailer which identifies the end of the message within the data stream

When the AIT device reads the data qualifier for the enterprise identifier, it shall have what agency (that is, the IAC) issued the enterprise identifier available in its software. The AIT device shall then attach the IAC to the beginning of the UII concatenation. In this example the IAC for CAGE is "D".

The UII data elements would be in the order IAC/Enterprise Identifier/Original Part Number/Serial Number. For this example using Format Indicator 12 for TEIs in the ISO/IEC 15434 syntax, the UII output from the AIT device, once the overhead and syntax are stripped away and the IAC has been added, would be **D0CVA54202435674A36458.**

Appendix E - Glossary of Terms

A4A	Airlines for America
ACRN	accounting classification reference number
ADC	automatic data capture
AIM	Association for Identification and Mobility
AIS	automated information system
AIT	automatic identification technology
ANS	American National Standard
ANSI	American National Standards Institute
ANSI/EIA	American National Standards Institute/Electronic Industries Alliance
ASC	Accredited Standards Committee
ASCII	American Standard Code for Information Interchange
ATIS 0300220 Number	North American Telecommunication Industry Manufacturers, Suppliers, and Related Service Companies number
BEA	business enterprise architecture
BII	text element identifier for Batch Number
CAG	text element identifier for CAGE
CAGE	Commercial and Government Entity
CDRL	contract data requirements list
CFO	Chief Financial Officers
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CLIN	contract line item number
CMTI	Cellular Mobile Telephone Identifier
CSDD	Common Support Data Dictionary published by the A4A
D	issuing agency code for CAGE Codes
DCMA	Defense Contract Management Agency
DFARS	Defense Federal Acquisition Regulation Supplement
DLMS	Defense Logistics Management System
DoD	Department of Defense
DoDAAC	Department of Defense Activity Address Code
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
DPM	direct part mark
DUN	text element identifier for DUNS Number
DUNS® Number	Dun & Bradstreet Data Universal Numbering System number
DUSD	Deputy Under Secretary of Defense
EAN	European Article Numbering

EAN.UCC	European Article Numbering Uniform Code Council
ECC	error correction code
EHIBCC	European Health Industry Business Communications Council
EIA	Electronic Industries Alliance
EID	enterprise identifier
EOT	end of transmission
ESN	Electronic Serial Number
EUC	text element identifier for GS1 Company Prefix
FACT	Federation of Automatic Coding Technologies
FAR	Federal Acquisition Regulation
FMR	DoD Financial Management Regulation
FMS	foreign military sales
GAO	Government Accountability Office
GIAI	Global Individual Asset Identifier
GRAI	Global Returnable Asset Identifier
GS	group separator
GS1	Global Commerce Standards Organization formerly known as EAN.UCC
GTIN™	Global Trade Item Number™
HIBCC	Health Industry Business Communications Council
HIN	Health Industry Number
IAC	issuing agency code
ID	identification
IDES	item data encoded string
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ISO/IEC 15418	Information technology–Automatic identification and data capture techniques–GS1 Application Identifiers and ASC MH10 Data Identifiers and maintenance
ISO/IEC 15434	Information technology–Automatic identification and data capture techniques–Syntax for high capacity ADC media
ISO/IEC 15459-2	Information technology—Unique Identifiers—Part 2: Registration Procedures
IUID	item unique identification
JCS	Joint Chiefs of Staff
JRIB	Joint Requirements Implementation Board
JTC 1	ISO/IEC Joint Technical Committee One
LB	issuing agency code for ATIS 0300220Numbers
LD	issuing agency code for DoDAAC Numbers
LH	issuing agency code for EHIBCC Numbers

LIC	Labeler Identification Code
LOT	text element identifier for Lot Number within the Original Part Number
LRU	line- replaceable unit
LTN	text element identifier for Lot Number within the Enterprise
MAPAC	Military Assistance Program Address Code
MEID	Mobile Equipment Identifier
MFR	text element identifier for CAGE Code of the Manufacturer
MIC	Manufacturer Identification Code
MIL HDBK	military handbook
MIL-STD	military standard
MILSTRAP	Military Standard Transaction Reporting and Accounting Procedures
MH10	The US Technical Advisory Group to ANSI
MRI	machine-readable information
NATO	North Atlantic Treaty Organization
NCAGE	NATO Commercial And Government Entity
NEN	Nederlands Normalisatie-instituut
OEM	original equipment manufacturer
OSD	Office of the Secretary of Defense
PAM	pamphlet
PNO	text element identifier for Original Part Number
PP&E	property, plant and equipment
RS	record separator
SC 31	ISO Sub Committee 31 (Automatic Data Capture)
SER	text element identifier for Serial Number assigned by the Manufacturer
SEQ	text element identifier for Serial Number assigned within the Original Part Number
SIM	serialized item management
SKO	sets, kits and outfits
SLIN	sub line item number
SPL	text element identifier for CAGE Code of Enterprise other than the Manufacturer
SUM	software user manual
TAG	technical advisory group
TC	ISO technical committee
TEI	text element identifier
TG	US TAG technical group
TIA	Telecommunications Industry Association

UCC	Uniform Code Council
UCN	text element identifier for Unique Component Number assigned by Enterprise other than the Manufacturer
UID	unique identification; text element identifier for unique item identifier
UII	unique item identifier
UN	issuing agency code for DUNS numbers
USD (AT&L)	Undersecretary of Defense for Acquisition, Technology and Logistics
USN	text element identifier of Universal Serial Number formed by concatenating MFR+SER
UST	text element identifier of Universal Serial Tracking number formed by concatenating SPL+UCN
US TAG	U.S. Technical Advisory Group
VIN	Vehicle Identification Number
WG	ISO working group