

# Department of Defense



## Guidelines for the Virtual Unique Item Identifier (UII)

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Office of the Principal Deputy Under Secretary of Defense  
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# Preface

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The *DoD Guidelines for the Virtual Unique Item Identifier (UII)*, Version 1.2, dated November 28, 2006, is changed by Version 1.3, dated August 2, 2013, as follows:

- Synchronized Chapter 2, Registering the Virtual UII, with the DoD IUID Registry data submission requirements.
- Updated the definitions in the Appendix to be consistent with the definitions provided in the *DoD Guide to Uniquely Identifying Items*.

# Introduction

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## PURPOSE

This guide describes the Department of Defense (DoD) virtual unique item identifier (UII) concept, the processes for assigning and registering virtual UIIs, and the prospective marking of items with Item Unique Identification (IUID) Data Matrices<sup>1</sup>.

## CONCEPT OF VIRTUAL UII

A virtual UII enables the entry of a UII and its associated pedigree data in the DoD 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.

Virtual UIIs may only be used for DoD-owned legacy personal property items, which are: (1) items and embedded items already produced and deployed for use, or placed in inventory or storage pending issue for use<sup>2</sup>, or (2) Government furnished property (GFP). These types of items may not previously have been marked with an IUID Data Matrix if they were produced or deployed prior to IUID policy.

In order to assign a virtual UII, data elements must already be marked on the item that permits the item to be uniquely associated with its assigned virtual UII. This is an essential requirement. If a future opportunity allows for marking an IUID Data Matrix on an item, the previously associated virtual UII must be used in the IUID Data Matrix. Trigger events are discussed in Chapter 3 of this guide. These data elements may be UII data elements supporting any valid UII construct. The data elements will typically be physically marked on an item in a medium other than an IUID Data Matrix, such as a Data Matrix<sup>3</sup>, linear barcode, or a human readable data plate or label. The reporting of one or more physical marks on an item assigned a UII may be sufficient to associate the item

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<sup>1</sup> For the purpose of this document, the term “IUID Data Matrix” is used to describe a Data Matrix 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.

<sup>2</sup> A virtual UII can be assigned to an item acquired from a small business concern or a commercial item acquired under FAR Part 12 or Part 8 per the exception at DFARS 211.274-2(b)(2) to the extent that these type items already have innate serialized identity data marked on them.

<sup>3</sup> A Data Matrix would be non-compliant if the UII or the UII data elements are not identified by the acceptable semantics and encoded per the syntax requirements of ISO/IEC 15434, or use more characters than are allowed in a UII (i.e., 50) or use characters that are not allowed within a UII.

with its pedigree data in the IUID Registry. If there is no IUID Data Matrix marked on the item, then the assigned UII is recorded in the IUID Registry as “DEFINED” along with as many physical marks needed to uniquely identify the item. When the IUID Data Matrix is marked on the item, the IUID Registry should be updated to reflect the change.

Legacy items and GFP previously marked with DoD IUID equivalents without using an IUID Data Matrix may be registered as virtual UIIs until such time that the IUID equivalent is marked on the items in an IUID Data Matrix.

Virtual UIIs should only be used after the program manager has accomplished the required planning for eventually placing the IUID Data Matrix marks on items that have been assigned virtual UIIs. Virtual UIIs should not be applied to items that are not tracked.

# Chapter 1

## Assignment of Virtual UIIs

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### GENERAL

Assignment of UIIs to existing items requires: (1) identifying those items of legacy equipment and spares to be uniquely identified, and then determining whether to apply an IUID Data Matrix or assign a virtual UII, (2) determining the UII to be used, and (3) following all applicable business rules.

### IDENTIFYING LEGACY ITEMS FOR ASSIGNMENT OF VIRTUAL UIIs

Virtual UIIs may be used for those DoD-owned personal property items that can be accurately and uniquely identified until a trigger event<sup>4</sup> for physical marking occurs. The legacy item must have one or more physical marks which can be used to absolutely identify the item uniquely now and in the future so it can be associated to its virtual UII in the future (i.e., no possibility of redundant serialization). This means serialized legacy equipment or reparable spares that are actively tracked and meet the IUID qualifying criteria may be assigned virtual UIIs<sup>5</sup> when any one of the following conditions exists:

- The Government's unit acquisition cost or historical unit cost of the item is \$5,000 or more; or
- The item is either equipment or a reparable item for which the Government's unit acquisition cost or historical unit cost is less than \$5,000, and is DoD serially managed, or serialized mission essential, or serialized controlled inventory items; or
- The item is a DoD serially managed subassembly, component, or part embedded within another item; or
- The item is a parent item, which contains a DoD serially managed subassembly, component, or part as an embedded item; or
- The item is provided to a contractor as GFP.

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<sup>4</sup> A trigger event might be scheduled depot maintenance of an item, or removal and repair of an embedded item in an item. See Chapter 3 of this guide for details on trigger events.

<sup>5</sup> Materials that change form in manufacturing and consumable items will not normally be assigned virtual UIIs, unless there is a compelling reason to do so, such as tracking hazardous materials or precious metals.

## DETERMINING THE UII

The construction of a UII is the same regardless if it is being assigned as a virtual or physically marked on the item in an IUID Data Matrix. The basic elements of information required to construct a UII are: (1) the identity of the organization that assigns the UII, known as the enterprise identifier, and a serial number unique within the enterprise (UII Construct #1); (2) the identity of the organization that assigns the UII, the part, lot or batch number of the item, and a serial number unique within the part, lot or batch number (UII Construct #2); or (3) the actual value of a DoD IUID equivalent. An enterprise that assigns a UII may be an entity such as a contractor, depot, program management office, or a third party.<sup>6</sup>

## BUSINESS RULES FOR ASSIGNING THE VIRTUAL UII

The virtual UII shall be assigned and managed through use of the following business rules:

- An item shall have an existing innate serialized identity (e.g., enterprise designation; part, lot or batch number; serial number; or property control number) and qualify for IUID. Contractors in possession of Government property may use the property control number or asset identification number they use to track the item as the innate serialized identity.
- The innate serialized identity data must be affixed to the item (e.g., contact memory button, linear bar code on a data plate, or human readable information on a data plate).
- Items requiring unique identification and too small to have their innate serialized identity data physically placed on them may have this data placed on a tag attached to the item. The tag must remain attached to the item to ensure unique identification is maintained. Once the tag is removed, unique identification is lost.
- Methods and considerations for how the UII is generated to be used as a virtual UII are no different from how any other UII is generated for legacy items. The enterprise assigning the virtual UII shall: (a) validate the accuracy of the innate serialized identity data for items to guarantee uniqueness of the virtual UIIs to be assigned, and (b) ensure that using the innate serialized identity data on items not create a duplicate UII<sup>7</sup>.

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<sup>6</sup> The [DoD Guide for Uniquely Identifying Items](#) contains guidance on how to formulate the UII constructs and describes the conditions for DoD IUID equivalence.

<sup>7</sup>The enterprise assigning the UII may wish to consider appending a prefix to the item's current serialization construct in order to minimize this issue.

- The enterprise with stewardship responsibility of Government property shall use its enterprise identifier for the assignment of virtual UIIs to the Government property it is responsible for, even though the Government property may be physically located at different facilities of the enterprise or at the enterprise's subcontractor facilities.
- The assigned virtual UII becomes the permanent UII for the life of the item and the UII to be used in the eventual marking of the IUID Data Matrix.

## Chapter 2

# Registering the Virtual UII

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### GENERAL

Virtual UIIs and their pedigree data shall be entered into the IUID Registry. Using the virtual UII does not change the basic data requirements for legacy items, but will require additional data be provided about the serialization data marked on the item when a UII is not physically marked on the item in an IUID Data Matrix. The additional information on the existing physical mark(s) on the item is needed to associate the item's data with the virtual UII.

### REGISTERING ITEMS WITH VIRTUAL UIIS

#### Pedigree data required for the virtual UII

The pedigree data for a GFP and a non-GFP legacy item with a virtual UII that must be recorded in the IUID Registry are listed in the IUID Data Submission schema<sup>8</sup>. In addition to the basic data elements of the virtual UII, it is essential the existing innate serialization mark contents be registered for each virtual UII. This allows the virtual UII to be retrieved from the IUID Registry and associated to the physical item it uniquely identifies.

#### Registering an item's existing physical mark contents

There are two types of interactions with the DoD IUID Registry which need to be understood. The first type of interaction is when a UII is initially entered into the DoD IUID Registry. This is often referred to as an "AddItem" transaction. When the UII is associated to an item this type of transaction needs to be completed. Except for two details, an AddItem transaction for virtual UIIs is the same as other AddItem transactions. The two differences are:

1. When designating the "medium code" for the virtual UII mark, the medium code must be "DEFINED". "2D COMPLIANT", "NONCOMPLIANT DATA MATRIX", and "BARCODE" cannot be used to populate this field for virtual UIIs.
2. Although entry of other marks, such as part numbers and serial numbers, are normally optional when entering UII information into the DoD IUID Registry, this is not the case for virtual UIIs. The specific set of required marks is not explicitly listed because it can

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<sup>8</sup> <http://dodprocurementtoolbox.com/site/uidregistrydatasubmission/>

change from item to item. The requirement is to include all of the marks necessary to uniquely identify the item so the Registry can be queried at a later date to lookup the virtual UII so the correct IUID Data Matrix may be physically marked on the item.

The other type of transaction with the Registry is to change information that already exists within the Registry. This type of transaction is often referred to as an UpdateItem transaction. There are several types of UpdateItem transactions, but the one of interest with virtual UIIs is the one involving the updating of “Mark” information. When an item with a virtual UII is marked with an IUID Data Matrix, the UII changes from virtual to actual and the Registry needs to be notified of this change. An UpdateItem transaction about the Mark needs to be sent to the Registry. When constructing this transaction the “medium code” needs to be “2D COMPLIANT” and the “added or removed code” needs to be “C” to indicate a change from “DEFINED” to a physical mark. All of the other required information to include in the UpdateItem transaction is identical to other types of Mark updates.

## **Business rule for registering the virtual UII**

Once the virtual UII is assigned, it shall be registered through use of the following business rule:

The enterprise (contractor, depot, program management office, or a third party) that assigns the virtual UII shall initially register it and its pedigree data in the DoD IUID Registry. When the item is marked with an IUID Data Matrix, the enterprise marking the item should update the information in the IUID Registry about the item’s mark(s) to reflect the change.

## Chapter 3

# Prospectively Marking the Item

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### GENERAL

The following sections apply to physically marking the item with an IUID Data Matrix. At a designated trigger event, the innate serialized identity data is used to determine the virtual UII to be marked on the item.

### PHYSICALLY MARKING ITEMS THAT HAVE ALREADY BEEN PRODUCED AND DEPLOYED, OR PLACED IN INVENTORY OR STORAGE

These items shall be physically marked when a trigger event occurs or a pre-planned opportunity is executed, as follows:

- Trigger events will be designated based on accessibility of the item to be marked and establishment of the marking capability. A number of opportunities may exist in the field, factory, and repair depot or storage facility. Situations where a trigger event may occur include, but are not limited to:
  - (a) Change in location where the item is taken out of service at one accountable entity and moved to another accountable entity to begin service. The item shall be marked during this movement process by the organization losing custody, unless there is a previous agreement with the receiving organization.
  - (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, or work-order processes during modification. The item shall be marked while in maintenance or upon receipt at the inventory point.<sup>9</sup>
  - (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.<sup>10</sup>

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<sup>9</sup> This also applies to contractual maintenance arrangements; but it does not apply to normal contractor preventive maintenance and calibration efforts.

<sup>10</sup> This does not apply if the item is under control and accountability of the same entity.

(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 losing custody, unless there is a previous agreement with the receiving organization.

- As a pre-planned opportunity, a seek-and-apply strategy can be used for particular items in use or 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 supervision of coordinated effort to effect access to the assets. By concentrating application efforts, the advantage is faster fielding of configuration management for specific items.
- As a pre-planned opportunity, the interception of items as they transit specific gates within the supply chain can ensure no item enters service without the data elements needed to construct item unique identification. Having identified an item at the gate that requires item unique identification, the situation can be resolved by either provision of an application capability at the specific supply gate, or diversion of the item to a centralized application facility.

## PHYSICALLY MARKING GOVERNMENT PROPERTY IN THE POSSESSION OF CONTRACTORS

These items shall be physically marked when the contractual accountability of the items changes from one contractor to another. The accountable contractor may, however, physically mark the item at its discretion any time before the movement event if it is advantageous to do so.

## BUSINESS RULES FOR MARKING AN ITEM WITH AN IUID DATA MATRIX

The item shall be marked with an IUID Data Matrix through use of the following business rules:

- Legacy items shall be marked with an IUID Data Matrix, encoded with its registered UII, in accordance with marking protocols at a trigger event.
- The enterprise marking the item shall obtain the item's virtual UII from the IUID Registry or other official documentation.

- If the innate serialization data on an item is unreadable, then it will not be possible to query the DoD IUID Registry to determine if an assigned virtual UII exists. If the innate serialization data for the item cannot be determined by other means (such as, shipping documentation or property book records), then the item cannot be marked with an IUID Data Matrix.<sup>11</sup>
- An IUID Data Matrix must be marked on Government furnished property when the item is physically moved to an entity with a different enterprise identifier, unless a contractor is moving the item between entities with enterprise identifiers that are both under control of the contractor.
- In the event the Government furnished property item is dispositioned and physically moved to another prime contractor or returned to the Government, the contractor shall mark the item with its IUID Data Matrix prior to movement to the new enterprise and update the Mark status in the DoD IUID Registry.
- If the item is declared excess and placed into the disposal process, the virtual UII will be used to track the item until actual disposition has been confirmed.
  - (a) No IUID Data Matrix need be placed on an item that no longer has residual value and is to be destroyed or scrapped.
  - (b) Items that are reutilized or redeployed to another entity will be marked with the IUID Data Matrix prior to movement.
- For small items that are tagged, the IUID Data Matrix may be marked on the tag.
- The enterprise identifier of the enterprise that physically places the IUID Data Matrix on the item will be recorded in the IUID Registry.
- The enterprise that marks an item with its IUID Data Matrix shall update the IUID Registry to indicate the item is physically marked.

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<sup>11</sup> If it is positively known that a virtual UII was never assigned to an item whose innate serialization data is missing or unreadable, then that item may, with engineering approval, be identified and re-serialized for purposes of marking with an IUID Data Matrix.

# Appendix - Definitions

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**a. Concatenated Unique Item Identifier.** (1) For items that are serialized within the enterprise identifier, the linking together of the unique item identifier data elements in order of the issuing agency code, enterprise identifier, and unique serial number within the enterprise identifier; or (2) For items that are serialized within the original part, lot or batch number, the linking together of the unique item identifier data elements in order of the issuing agency code, enterprise identifier, original part, lot or batch number, and serial number within the part number.

**b. 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.

**c. 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 a fixed level of error correction capability. The Data Matrix is used for item marking applications using a wide variety of printing and marking technologies (see ISO/IEC 16022 Information technology - International Symbology Specification - Data Matrix). The Data Matrix symbol looks like this:



The Data Matrix ECC 200 which uses Reed-Solomon error correction is the specified symbol for IUID.

**d. Defined UII.** A UII has been assigned, but it has not been marked on the item in either a compliant or non-compliant method.

**e. DoD Item Unique Identification.** A system of marking items delivered to the Department of Defense with unique item identifiers that have machine-readable data elements to distinguish an item from all other like and unlike items. Items are marked with a Data Matrix, the contents of which are encoded in the syntax of ISO/IEC 15434 and the semantics of ISO/IEC 15418 or the Airlines for America Common Support Data Dictionary (CSDD). The Data Matrix contents may be either a unique item identifier or a DoD-recognized IUID equivalent. For items serialized within the enterprise identifier, the unique item identifier shall include the data elements of issuing agency code, enterprise identifier and a unique serial number. For items serialized within the part, lot or batch number within the enterprise identifier, the unique item identifier shall include the

data elements of issuing agency code, enterprise identifier, the original part, lot or batch number, and the serial number.

**f. DoD Recognized Item Unique Identification 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 (GRAI), Vehicle Identification Number (VIN), and Electronic Serial Number (ESN)/Mobile Equipment Identifier (MEID) (for cell phones only). While the constructs are equivalent, they shall be placed on the items in a Data Matrix ECC 200 symbol encoded with ISO/IEC 15434 syntax and semantics of ISO/IEC 15418 in order to be compliant with DoD IUID policy.

**g. 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. 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.

**h. Enterprise Identifier.** A code that is uniquely assigned to an enterprise by a registered issuing agency.

**i. Innate Serialized Identity.** The essential inherent data elements that are physically and permanently placed on an item at original manufacture, subsequent overhaul, or during operations to distinguish it from all other like items, which can be read from either a human or machine-readable format. For contractors with custody of Government property, this may be the asset identification number they use to track the item.

**j. Issuing Agency.** An organization responsible for assigning a non-repeatable identifier to an enterprise (i.e., Dun & Bradstreet's Data Universal Numbering System (DUNS) Number, Uniform Code Council GS1 Company Prefix, Defense Logistics Information System (DLIS) Commercial and Government Entity (CAGE) Code or Department of Defense Activity Address Code (DoDAAC)).

**k. Issuing Agency Code.** A code that designates an agency with authority to issue unique enterprise identifiers.

**l. Item.** A single hardware article or a single unit formed by a grouping of subassemblies, components, or constituent parts.

**m. Legacy Items.** DoD-owned or managed 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.

**n. Lot or 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.

**o. Marking.** The application of legible numbers, letters, labels, tags, symbols, or colors to ensure the proper handling and identification during shipment and storage.

**p. 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.

**q. Parent Item.** The item assembly, intermediate component or subassembly that has an embedded item with a unique item identifier or DoD recognized item unique identification equivalent.

**r. Personal Property.** Property of any kind or any interest therein, except real property, i.e., land and facilities.

**s. Repairable Item.** An item of supply subject to economical repair for which repair (at either depot or field level) is considered in satisfying computed requirements at any inventory level. Examples include aircraft engines, rotors, guidance systems, and electronic circuit boards.

**t. Serial Number.** A combination of numbers, letters, or symbols assigned by the enterprise to an item that provides for the differentiation of that item from any other like and unlike item and is never used again within the enterprise.

**u. 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.

**v. Serialization within the Part, Lot or Batch Number.** Each item of a particular part, 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, lot or batch number within the enterprise identifier.

**w. Unique Item Identifier (UII).** A globally unique and unambiguous identifier that distinguishes an item from all other like and unlike items. The UII is a value that is derived from a UII data set of one or more data elements.

**x. Unique Item Identifier (UII) Data Set.** A set of one or more data elements marked on an item in machine-readable Data Matrix symbology 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.

**y. Virtual Unique Item Identifier (UII).** 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 a DoD IUID-compliant two-dimensional (2D) Data Matrix symbol to a more advantageous time based on logistic and economic considerations.