

# Item Unique Identification (IUID)

Deploying greater Marine Corps asset identification and tracking capabilities through digital transformation

by Mr. Brent Lancaster & Mr. Mike Hickman

The criticality of logistics sustainability to Marine Corps operations cannot be overstated. Commanders must rely upon efficient practices, processes, and tools to optimally support the warfighter by enabling the effective acquisition, issuance, tracking, repairing, and deployment of assets and equipment. The Logistics Integrated Information Systems-Marine Corps (LI2S-MC) Program Office, an acquisition element of the Marine Corps Systems Command and PEO MLB with Deputy Commandant Installations and Logistics (DC I&L) advocacy, is deploying greater Marine Corps asset identification and tracking capabilities through the Item Unique Identification (IUID) program. The IUID program consists of a refactored data repository, refreshed hardware, data integration, and improved awareness and advocacy.

## Background

The DOD establishes IUID policy and requirements in *DOD Instruction 8320.04, Item Unique Identification Standards for Tangible Personal Property*. IUID is defined as a system of establishing Unique Item Identifiers (UIIs) by assigning a unique alphanumeric string to a discreet item that never changes throughout the item's lifecycle and is never reused. These strings are encoded into a two-dimensional Data Matrix barcode (Figure 1), referred to as the IUID Mark, and permanently applied to the item. In addition, the UII is submitted to the DOD IUID Registry, along with other associated item identifying data, in order to ensure the UII is unique. The use of IUID dis-

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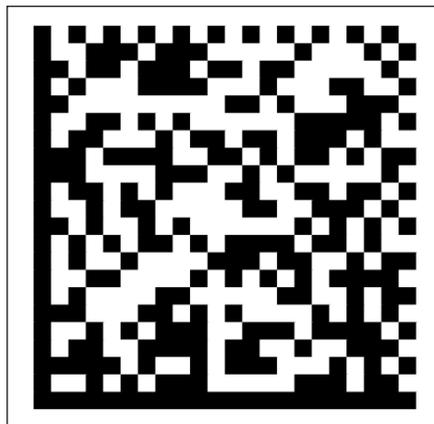


Figure 1. IUID Mar. (Figure provided by author.)

tinguishes assets from “like and unlike” items and the standards it implements to allow the DOD to acquire, track, repair, and deploy assets efficiently—thus enabling the Marine Corps to meet Financial Improvement and Audit Readiness mandates and requirements.

## Mission

LI2S-MC is meeting the *38th Commandant's Planning Guidance* by transitioning from the legacy Marine Corps IUID data repository, Temporary Data Storage, to the refactored, .mil-hosted, Unique Item Identification Data Storage

(UIIDS) and embracing a paradigm shift of coordinated security accreditation and software development methodologies. The IUID system provides the Marine Corps with a platform to improve property accounting, valuation, reporting, and audibility. Through the combination of assigning a unique identifier for the item's life, the use of automated tools to capture data, and the ability to share data across information systems, the IUID capability improves military readiness, financial auditability, and product lifecycle sustainment.

## Digital Transformation

LI2S-MC adopted Scaled Agile Framework principles and utilized the Pivotal Cloud Foundry, an open-source Platform-as-a-Service (PaaS), to charter an innovative course of effective product development and accreditation. UIIDS is the first Marine Corps application developed and accredited utilizing Pivotal and serves as a pilot for the Marine Corps Business Operations Support System (MCBOSS) to accredit the Pivotal PaaS framework and tools.

LI2S-MC embraced several cutting-edge software development philosophies and methodologies, including Extreme

Programming (XP) Paired Programming, Test Driven Development, Continuous Integration/Delivery, User-Centered Design, and Lean Start-Up Methodologies applied to software development. Also fundamental to the success of UIIDS was the early establishment of relationships and trust with Cyber Leadership, System Engineering Acquisition Logistics, and Headquarters Marine Corps in UIIDS development and instituting competency ownership and accountability from the very beginning of the effort. The combination of these elements resulted in the development and accreditation of UIIDS within ten months and provided valuable lessons for organizations to leverage in future endeavors.

ate philosophy. Together, the Information System Security Manager and Agile Product Manager enforce adherence to the IUID DevSecOps plan. User Stories are developed in accordance with acceptance criteria (e.g., the definition of done), and developers write the needed code in a test-driven fashion, which means that the developers write no code until a failing test has been established to validate the intended outcome. Unit tests and security scans are conducted at all code

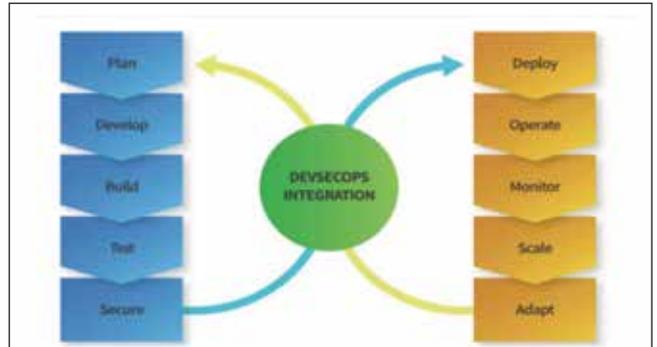


Figure 2. DevSecOps integration. (Figure provided by author.)

**Integrated Marking Equipment**

Along with UIIDS, LI2S-MC has refreshed the IUID marking equipment (Figure 3) and expanded the marking capabilities to include laser engraving data plates to support additional Marine Corps assets. In addition, there are thirteen fielded Integrated Marking Carts (IMCs) (Table 1 on following page) distributed globally to support the marking and capture of marked item data for inclusion in UIIDS.

This increased capability supports the creation of item identification plates, including the Gold Standard Data Plate (Figure 4 on following page), as published by the Enterprise Ground Equipment Management Internal Controls and Audit Readiness Team, to correct and report identification plate discrepancies for accountable property,

**... the developers write no code until a failing test has been established to validate the intended outcome.**

UIIDS is the first of many Marine Corps software applications developed following an Agile framework Development, Security, and Operations (DevSecOps) plan. The DevSecOps practices inject security throughout the standard Software Development Life Cycle steps: Design, Build, Test, and Deploy. As a result of the Agile nature of this DevSecOps plan, the various stages may be repeated iteratively during development at the discretion of the product team, security team, or leadership.

UIIDS inherits most of its security controls from three primary entities: the MCBOS, the PaaS, and the Amazon Web Services GovCloud hosting environment, resulting in a reduced number of cyber controls for the UIIDS development team to implement. In addition, UIIDS leverages the security tools configured and managed by the MCBOS platform to satisfy each passing criterion in the Continuous Integration/Continuous Delivery Pipeline to deploy in a production environment.

The IUID team operates under a continuous authorization to oper-

check-in points. All associated test and security scan results are included when a developer delivers the User Story for the XP Product Team product manager’s review. This approach allows the product manager to review the delivered product against the acceptance criteria before accepting or rejecting the User Story.

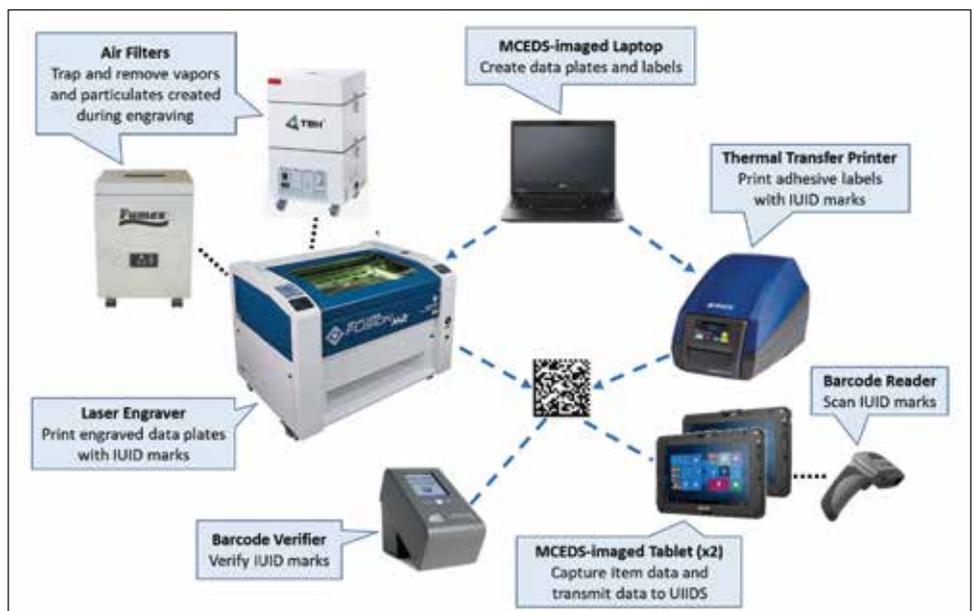


Figure 3. IMC components. (Figure provided by author.)

MEF	Qty	Unit (Location of IMC)
I MEF (Camp Pendleton)	1	General Support Maintenance (GSM)
I MEF (29 Palms)	1	GMS
II MEF (Camp Lejeune)	2	Reparable Issue Point (RIP)
III MEF (Hawaii)	1	Supply Management Unit (SMU)
III MEF (Okinawa)	1	RIP
III MEF (Okinawa)	1	Ordnance Maintenance Company (OMC)
MCLB (Albany)	1	Central Receipt & Issue (CRI)
MCLB (Barstow)	1	1st Force Storage Battalion (FSB)
MCLB (Blount Island Command (BIC))	1	Distribution Management Office (DBO)
MARFORRES (Albany)	1	Reserve Intermediate Supply Activity (RISA)
Weapons Training Battalion (Quantico)	1	Precision Weapons Section (PWS)
MARCORSYSCOM	1	Naval Surface Warfare Center (NSWC) Corona

Table 1. IMC locations. (Table provided by author.)

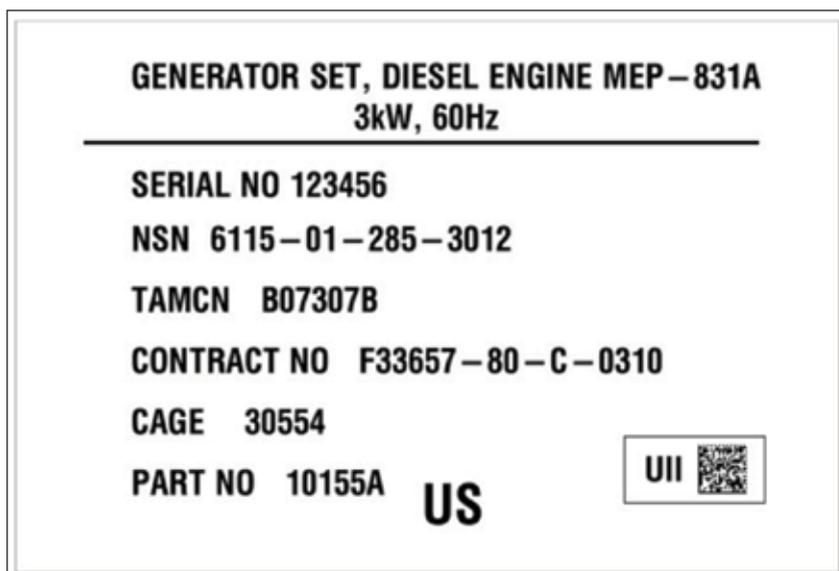


Figure 4. Marine Corps gold standard data plate. Example for military equipment (TAMCN items). (Figure provided by author.)

which undermine Marine Corps audit efforts. The Gold Standard Data Plate guidance identifies mandatory data for the data plates supporting Financial Improvement and Audit Readiness and Field Supply and Maintenance Analysis Office audits. In addition, the refreshed IMCs enable plate replacement and correction, assist with the verification and validation of item identification data between information systems and the

item, assist in resolving data plate discrepancies and replacements, and improve audit readiness and compliance.

#### Impacts

The benefits of IUID implementation include efficiently and accurately capturing data for downstream use. Realizing these benefits requires the following: Automatic Identification Technology (AIT), such as the IUID

mark and barcode scanners; Automated Information Systems (AISs), such as Global Combat Support System–Marine Corps (GCSS-MC); the integration of AIT and AISs; and coordination with policies and procedures.

IUID supports the automation of item identification in all aspects of equipment lifecycle management, including maintaining, tracking, accounting, and reporting. Automation provides for timely and accurate data to identify equipment, enabling Marines to focus on their specialized tasks, vice performing manual data entry, and supports data error correction. The integration of IUID into processes and policies also provides a convenient and valuable opportunity to evaluate and re-engineer operations and coordinate policies to leverage and accommodate the automation enabled by IUID in order to realize additional efficiencies and benefits.

Exchanging and aggregating trusted data is critical to gaining improvements in supporting the Warfighter. The use of AIT to enable the capture of data facilitates process efficiencies and improves data integrity, which is particularly valuable when exchanging and aggregating data across disconnected information systems. Marine Corps processes must be capable of fusing and synchronizing relevant data across related AISs. The UII provides the data necessary to connect the item information across separate information systems throughout the DOD, enabling more sophisticated analytics and a more complete, multi-faceted lifecycle view. In alignment with this effort, LI2S-MC has initiated the exchange of IUID data with GCSS-MC to associate the IUID information with the GCSS-MC logistics information individual items.

#### Conclusion

Coordination and cooperation across multiple competencies and business domains within the Marine Corps is necessary to achieve the benefits of IUID. Therefore, LI2S-MC is eager for stakeholder advocacy support in order to mature the IUID Concept of Operations enterprise for the Marine Corps. Additionally, the IUID team has established a working group of ad-

vocates within Headquarters Marine Corps, DC I&L, Deputy Commandant Combat Development and Integration, and Marine Corps Systems Command Acquisition Logistics Product Support to further define the end-to-end user community and plan for funding requirements across the Future Years Defense Program.

A phased approach is needed to address IUID integration into Marine Corps policies, processes, and supporting AIS(s). The initial phase established basic IUID functionality, generating IUID marks and sustaining IUID pedi-

gree and mark data. The next phase will utilize commercial off-the-shelf bridge systems, middleware, edgeware, and other technologies that will enable IUID capability in existing processes and achieve benefits where legacy AISs are not IUID compliant. In parallel, a third phase will integrate and leverage IUID within supporting AIS(s) value chain processes. These phased efforts entail detailed consultation and collaboration with enterprise process and AIS owners on technical implementation methodologies and lessons learned in policy, training, and resource planning.

These phases will be executed concurrently and overlap to provide capabilities where possible. Once items are marked, AIT is implemented, AISs are IUID-enabled, and policies and procedures are tailored, the Marine Corps will harvest the many benefits of IUID.

