Unique Identification of Tangible Items

Gaining in International Acceptance

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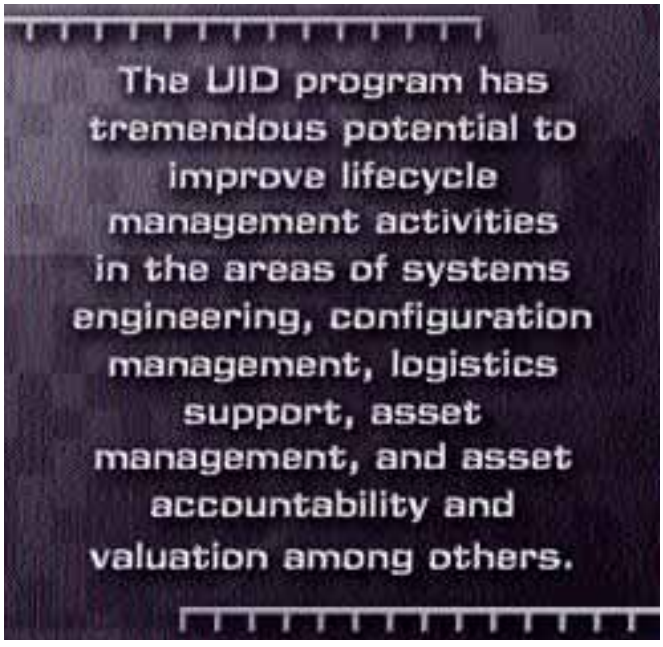
In 1998, the General Accounting Office documented concerns with the Department of Defense's management of its inventory of equipment. GAO found that DoD's inventory exceeded its war reserve or current operating requirements but lacked key spare parts (particularly aviation spares). This, GAO concluded, resulted primarily from a lack of adequate accountability over material shipments or effective monitoring of defective spare parts. Recognizing the need for improvement, DoD's logistics community had actively advocated the use of various bar-coding schemes for several years to improve visibility and configuration tracking of parts.

DoD needed a way to identify tangible assets individually that would be globally unique and unambiguous, have the ability to ensure data integrity and data quality throughout life, and support multi-faceted business applications and users. This approach became known as unique identification. UID requires the placement of a two-dimensional data matrix on every item DoD acquires as an end item as well as those embedded items, components, or sub-assemblies that are serially managed by DoD; critical items; and items that are spared/repaired by DoD. Unique item identification provides the basis for improved parts marking and data capture and has tremendous potential to improve life cycle management activities in the areas of, among others, systems engineering, configuration management, logistics support, asset management, and asset accountability and valuation.

Through a series of policy memoranda, Michael Wynne, acting under secretary of defense (acquisition, technology and logistics) (USD (AT&L)), established and then refined the specific UID requirements. These memoranda, along with implementation details and the historical record of UID integrated product team and program office activities, are available on the program Web site at <www.acq.osd.mil/dpap/uid>.

Early Adoption

The aerospace sector has been a strong advocate for automated data capture using direct part marking technologies, including the Data Matrix ECC 200 Symbology



(or 2-D data matrix). Within this sector, the engine manufacturers have become not just early adopters, but leaders. Led by the engine manufacturers for both defense and commercial applications, the Air Transport Association agreed to recognize an ISO [*International Standards Organization*] 15434-compliant 2-D data matrix using text element identifiers and the "DD" format code as an equivalent mark to their own. This broad acceptance triggered an aerospace engine sector consolidation to the UID construct as the single marking approach for both commercial and defense engines, starting with the prime contractor and flowing to all 3,400 of the sector's suppliers.

In addition, Australia, Canada, and the United Kingdom have taken steps to embrace a UID approach.

Contractual Requirements and Data Submission

The first element of UID implementation is actually placing the correctly formatted life mark on the item. This may be done by direct part marking in the form of dot peen, laser etch, chemical etch, or other techniques. Where

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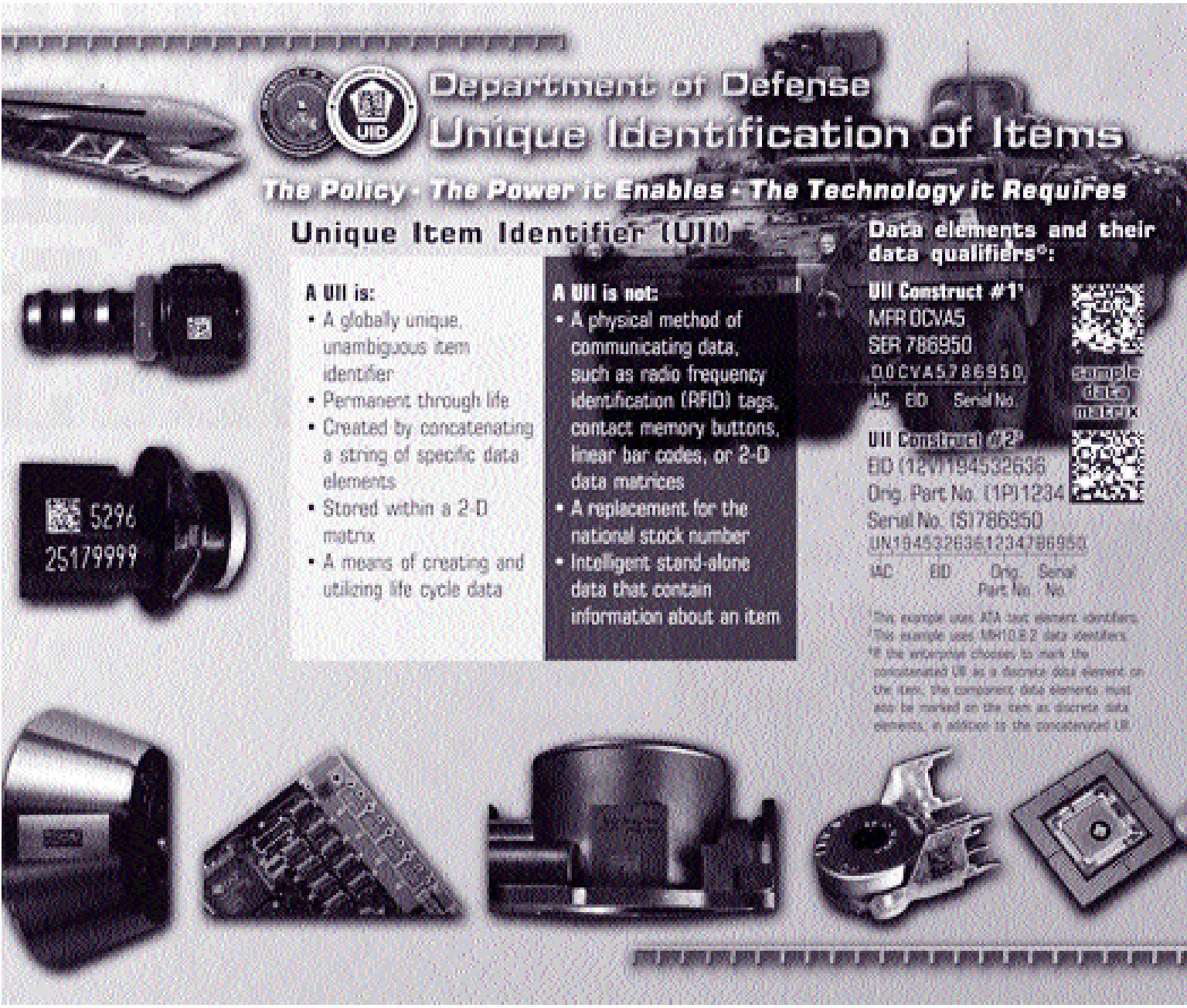
practical, the mark may appear on a data plate or label as long as it can withstand normal wear and tear, including exposure to solvents or other chemicals.

To implement UID, the program office needed a means of getting not just the mark itself, but also the pedigree data that serve as the "birth record" for each item for which a UID is required. The UID requirement was realized in the issuance of the Second Interim Rule, DFARS 252.211-7003, published in the *Federal Register* on Dec. 30, 2003. The interim rule established a number of requirements for contractors to furnish unique item identifiers and additional item identification data, and specifically to provide the government's acquisition cost of items to be delivered under a DoD contract. The interim rule specified that contractors provide unique item identification or a DoD-recognized equivalent for all items delivered with an acquisition cost of $5,000 or more. PMs are responsible for identifying items requiring unique identification, including embedded subassemblies, components, and parts, regardless of dollar value.

A final version of this rule is likely to have been published by the time you read this article and should be reviewed against the interim rule for any changes.

Near-Term Impacts on the Program Manager

The use of the UID changes data capture, storage, use, and utility across the board. To adequately address the



Applications of UID

Among the applications either enabled or enhanced by the use of the UID are:

- Failure reporting/analysis and targeted repair (reactive and predictive)
- Recall or latent defect resolution
- Maximizing capability while minimizing logistics
- Reliability studies to determine best equipment available
- Tracking and redirecting as necessary en route
- Planned maintenance scheduling
- Item repair
- Supplier performance tracking
- Parts (end items and spares) tracking
- Logistics support.

business process changes and to enable a smooth transition, *every PM* is required to develop a UID implementation plan for submission to his or her component acquisition executive for approval; and for ACAT 1 programs, the component acquisition executive will forward it to the USD (AT&L) program manager for unique identification.

PMs and their support staff must understand the true costs and benefits associated with UID and the significant benefits to be gained through accurate and reliable automated data capture. Recent data from a major contractor suggest that a full 4 percent of workforce hours are spent manually transcribing part information. UID will significantly reduce this time and simultaneously increase data accuracy and reliability.

Near-Term Impacts on the Contractor

For some contractors, marking with the 2-D matrix required by UID policy and the latest version of MIL-STD 130 may represent their first foray into high capacity automatic data capture. For others, it may simply mean adding the 2-D matrix to existing direct part-marking techniques. Infrastructure impacts may need to be addressed with contractor management and the government PM. The Defense Contract Management Agency has been given the responsibility for reviewing and approving contractor requests for facility-wide or corporate approaches to UID. This is in concert with the concept of single process initiatives, which provide a means for approval to perform a function the same way across programs within a facility or a corporation. This is a significant benefit to the contractor and government where the potential exists for differing direction from programs/customers that could drive up costs and prolong production schedules. For example, if two customers request differing packaging, the costs of materials and storage will almost certainly be more than if the customers could use a single packaging approach.

Benefits to the Acquisition Community

For the acquisition community within DoD and where contractor logistics support is provided, the technology provides an automated approach to data capture and a means for traceability throughout the life of an item. As the data are captured and linked to in-service data sources, there will be access to a broad range of reliable data for engineering analysis, logistics support decision making, valuation, and even operational decision making.

It is true that operational and maintenance processes need to be modified to conform to an automated data capture capability. It is also true that we already capture much of the product identification data today. The difference is the speed and accuracy with which the data are captured. Today, the operator/maintainer has to read and write down product data that may have been vibro-etched or stenciled onto a part, then he/she must enter the information manually into a database. By the implementation of a standard data structure and mark, the operator/maintainer will use an image capture device to read the 2-D data matrix quickly and accurately, then the data can either be stored or transmitted to the database. The result is faster, more accurate data capture.

The Future of UID

As more and more items meet the UID requirements, business processes will be modified to capture precise data and provide a more accurate picture of individual item history and configuration. We expect that UID will mature as did the universal product code and that a few years after introduction, the payoff in the use and analysis of the data will be even more profound than the data capture quality. (Consider for a moment how accurate item-level history of maintenance, repair, operational use, and current configurations could be leveraged to improve operational readiness and effectiveness while decreasing the required retraining and logistics burden.)

In the short term, a primary focus is on marking the items and electronically submitting the pedigree data through wide area workflow. We are working concurrently with the acquisition, finance, and logistics communities to determine how UID marking and data capture can contribute to functional processes. The long-term future of UID will be determined by the extent to which UID becomes a factor in knowledge-enabled acquisition and logistics. Continued internationalization of the UID approach for tangible items in both the corporate and defense communities will improve and enhance our ability to leverage its use across industry and military applications.

Questions and comments should be addressed to robert.leibrandt@osd.mil. For more information on UID, visit <www.acq.osd.mil/dpap/uid>.