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BRIEFING

Equipment Sustainment Data in Standard Army Management Information Systems

Needs, Gaps, and Opportunities

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Prepared for the United States Army

ARROYO CENTER

The research described in this report was sponsored by the United States Army under Contract No. W74V8H-06-C-0001.

Library of Congress Cataloging-in-Publication Data

Equipment sustainment data in standard Army management information systems : needs, gaps, and opportunities / Lisa Pelled Colabella ... [et al.].
p. cm.
Includes bibliographical references.
ISBN 978-0-8330-6680-0 (pbk. : alk. paper)
1. United States. Army—Inventory control. 2. United States. Army—Combat sustainability. 3. United States. Army—Data processing. 4. Logistics. I. Colabella, Lisa Pelled.

UC263.E75 2012
355.6'21320285—dc23

2012015133

Published 2012 by the RAND Corporation
1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
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Summary

In 2003 the Department of Defense (DoD) revised its acquisition policy to include the Total Life Cycle Systems Management (TLCSM) directive, which calls for "cradle-to-grave" management of weapon and materiel systems. In line with this revised policy, the Army made a substantial organizational change, creating Life Cycle Management Commands (LCMCs) in 2004 to give Army Materiel Command (AMC) logisticians more input into acquisition processes and move toward TLCSM. The Army has also made significant information systems changes, such as fielding the Logistics Information Warehouse (LIW), to facilitate life cycle management of equipment.

Still, recent reports have described cases of critical life cycle management (LCM) decisions and supporting analyses being hindered by problems with life cycle sustainment (LCS) data, i.e., information about the operations, support, and/or disposal of Army equipment. Additional steps may therefore be needed to ensure that Army information systems provide managers and analysts with access to high-quality, comprehensive LCS data. Recognizing this, the Deputy Chief of Staff, G-4, Headquarters Department of the Army (DA G-4), Resource Integration Directorate sponsored a study to assess the LCS data currently available in Standard Army Management Information Systems (STAMIS).

Specifically, we examined the extent to which STAMIS capture information needed for critical life cycle management decisions and analyses. Focusing on Army ground systems, our research approach included three components: a review of articles on military and commercial LCM decisions (to identify types of LCS data needed); interviews with personnel who regularly use, access, or manage Army LCS data; and the direct access, review, and analysis of standard Army database extracts by our research team.

Data Needs for Life Cycle Management Decisions

In evaluating Army LCS Data, we began by considering key LCM decision areas and associated analyses. The decision areas considered included acquisition strategy, upgrade planning, renewal planning, scheduled service updates, maintenance workforce planning, budgeting, new system design, and system performance. Based on documents on commercial and military LCM best practices, we then identified a set of prescribed LCS data elements for LCM analyses. The set includes vehicle demographics (information that uniquely identifies an item or describes its physical attributes, owner, or location); operations data (information about readiness and usage of an item); and maintenance and disposal data (information about maintenance actions and about the removal of assets from the fleet). We then investigated the degree to which STAMIS provides the elements for the various analytic needs.

Assessment of Life Cycle Sustainment Data

Our evaluation of STAMIS LCS data was based on criteria in three categories: ease of access and use, quality, and historical span of the data. Overall, the findings suggest that Army data policies, processes, and systems require substantial changes to support LCM analyses effectively.

General Obstacles to Access and Use of LCS Data

Statements from interviewees, along with the research team's own experiences with gathering LCS data, revealed a set of obstacles to data access; for example, it is not always clear whether certain data exist or where to find them. While many databases are centrally located in LIW, others are not and require a separate application to obtain a system account. Second, access request forms for some systems, like the Operating and Support Management Information System (OSMIS), ask the applicant to specify those portions of the information system he/she will need to access. The "catch-22" is that, to get an account, one must first specify the portions of the information system one will use, but one cannot determine which portions will be useful unless one already

has an account with full access. Third, when applying for accounts, analysts who have security clearances, common access cards (CACs), and approval to work on Army-sponsored projects may nevertheless face long waits for approval. In some systems an account is later frozen or revoked if a user does not log on to the system for 30 days.

Assessment of Demographic Data on Army Equipment

Our review of demographic data on Army equipment indicates that such data elements—especially serial numbers, manufacture dates, and weight/volume (cube) measurements—tend to be reasonably accessible but low quality. Serial number errors are widespread, and because of such errors, different databases often have different versions of the same serial number. Serial number discrepancies make it difficult to link vehicle data from different sources (usage and maintenance data) by serial number. Also, manufacture dates in the TAMMS Equipment Database (TEDB) have inaccuracies. Many do not correspond to the serial number sequence or are not plausible, for example, M2A2 ODS (Operation Desert Storm) vehicles that have manufacture dates preceding Operation Desert Storm.

Assessment of Data on the Operation of Army Equipment

Like equipment demographic data in STAMIS, operations data have considerable limitations. In particular, data on rounds fired are only available for a few end items and require several approval processes to access. Additionally, missing and implausible odometer readings are prevalent in Logistics Integrated Database (LIDB) usage data. Units often have many months of missing odometer readings. When odometer readings are present, errors are common, suggesting that vehicles have negative monthly usage or unreasonably high monthly usage.

Assessment of Data on the Maintenance and Disposal of Army Equipment

Our review of equipment maintenance and disposal data in STAMIS suggests that such data have moderate levels of accessibility and historical span

but are low-to-medium in quality. There is little financial information about disposal of Army equipment. Also, there are few records of scheduled field maintenance and no records of non-deadlining, unscheduled, organizational-level field maintenance. In addition, Army STAMIS generally lack data on equipment renewal (reset, recapitalization, or refurbishment) by serial number.

Impact of Data Limitations

Key LCM Decisions Are Hindered by Data-Quality Issues

	Data Element	Acquisition strategy: Assess remaining life of current systems	Upgrade planning: Assess failure rates & profiles (end item and component)	Renewal planning: Assess failure rates, costs, & readiness over time	Scheduled service updates: Assess failure rates & profiles
Demographics	Serial Number	X	X	X	X
	Model	X	X	X	X
	Age (Manufacture Date)	X	X	X	X
	Weight/cube/cost	X (cost)	X (cost)		
	Unit				X
	Location	X	X	X	X
Oper-ations	Readiness levels & dates	X	X	X	X
	Usage (miles, hours, rounds fired, fuel consumed) & dates	X	X	X	X
Maintenance/ Disposal	Configuration mgmt.	X	X	X	X
	Maintenance type (sch/ unsch) & echelon (field, sustainment, renewal) & dates	X	X	X	X
	Parts used & cost	X	X	X	X
	Labor hours & cost	X	X	X	X
	Maintenance capacity			X	
	Disposal	X			

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After evaluating LCS data elements available in Army STAMIS, we found that most LCM analyses are not well supported by available data. The table above shows data elements in rows, decisions and associated analyses in columns, and an X indicating each data element (row) needed for a given analysis (column). The cells are shaded based on a data element quality rating: green for high, yellow for medium, and red for low. Most cells were shaded red

or yellow, an indication that existing data are not sufficient for effective analyses and quantitatively well-supported decisions in the areas of acquisition strategy (with respect to replacement), upgrade planning, renewal planning, and scheduled service updates. A similar table in the main text (see page 55) shows that existing data also do not support decisions and analyses related to maintenance workforce planning, budgeting, new system design, and system performance as well as they should. Consistent with these tables, Army personnel interviewed for this study described negative effects of LCS data gaps on critical analyses and decisions.

Factors Contributing to Data Issues

It is likely that three sets of factors contribute to the aforementioned data issues and their effects: (1) policy factors (limitations of existing Army maintenance policies), (2) design factors (information system design features), and (3) execution factors (how Army doctrine and policy are carried out by personnel). An example of a policy factor is that Army Regulation (AR) 750-1 specifies relying heavily on Program Managers (PMs) to ensure that renewal data are gathered and analyzed but does not specify that STAMIS should archive such data by serial number. A system design factor is that serial numbers, manufacture dates, odometer readings, and maintenance data are input manually; consequently, they are subject to keystroke and logic errors as well as input reliability problems. A policy execution factor is the tendency for deployed units to treat usage and readiness reporting as optional, and another is the lack of enforcement of reporting policies. Also not well executed are policies concerning Army access to contractor maintenance data.

Potential Impact of STAMIS Changes in Progress

Over the past decade, several programs were initiated to change STAMIS structure and content: the Global Combat Support System-Army (GCSS-A), the Logistics Modernization Program (LMP), and, more recently, Item Unique Identification (IUID). Subject matter experts indicate that all three may address

some of the data issues discussed in this document, potentially providing improved asset visibility, faster run times for reports, better database access, and less manual data entry.

However, interviewees also raised concerns that suggest these initiatives should not be seen as a cure-all for LCS data issues. Some cautioned that Army business rules do not yet incorporate the broad, enterprise perspective needed for GCSS-A and LMP. While GCSS-A promises to capture needed field-level maintenance data that are currently missing or of low quality, doing so will also require changes in maintenance reporting practices, and GCSS-A data quality cannot yet be evaluated in an operational environment. It was reported that LMP does not capture key data elements that legacy systems have overlooked—renewal data by serial number, for one. In the case of IUID, a concern is the potential for varying degrees of implementation, given that it is an unfunded requirement.

Recommendations

Although the impact of GCSS-A, LMP, and IUID is still uncertain, it is clear that there are currently a number of opportunities for improving the ease-of-access/use, quality, and historical span of Army LCS data. Further expanding LIW to centralize additional data and streamlining account approval processes (via a list of authorized account users for unclassified systems) would increase ease of access. Additional query options—such as eliminating restrictions that require data to be extracted in a piecemeal fashion—would increase ease of use by analysts.

Data quality could be enhanced by greater error- and mistake-proofing in information systems. To reduce manual data entry, a one-time input of a vehicle's serial number and manufacture date could populate multiple systems. Also, embedded automated data-reporting instruments could be required in new Army vehicles and added to vehicles with onboard diagnostic systems that already capture needed data.

To improve LCS data capture overall, a particularly valuable step would be a methodical review and revision of Army data policies, with analyst input in the review process; this step may better align data policies with strategic decision-making and analytical needs. Army policies should specify all data elements that STAMIS need to capture.

Additionally, an in-depth examination of GCSS-A and LMP should be conducted against the data needs identified in this research; this could reveal modifications needed for new systems to provide critical LCS data elements. Taking a comprehensive approach to LCS data improvement will help ensure that managers and analysts have the information needed to manage Army equipment life cycles effectively.