

United States Government Accountability Office  
Washington, DC 20548

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March 08, 2006

The Honorable Donald H. Rumsfeld  
Secretary of Defense

Subject: *Defense Logistics: More Efficient Use of Active RFID Tags Could  
Potentially Avoid Millions in Unnecessary Purchases*

Dear Mr. Secretary:

For many years, the Department of Defense (DOD) has been attempting to improve visibility over its inventory and equipment. The lack of visibility over inventory and equipment shipments increases vulnerability to undetected loss or theft and substantially heightens the risk that millions of dollars will be spent unnecessarily. Additionally, needed supplies may not reach the warfighter when needed, which may impair readiness. In order to improve visibility, DOD began using a technology to enable it to track shipments. This technology is known as radio frequency identification (RFID). RFID technology consists of active or passive electronic tags that are attached to equipment and supplies that are shipped from one location to another. This technology is part of a family of automatic information technologies used to enable hands-off identification of cargo and inventory. This report focuses on active RFID tags, which cost around \$100 each and are reusable.

DOD has been using active RFID technology since the early 1990s to help with in-transit visibility of shipments, and, as of January 2005, it officially began to implement the use of passive RFID. During the course of our work on the use and implementation of passive RFID technology in DOD,<sup>1</sup> we observed that active RFID tags were not being routinely returned for reuse. This report discusses DOD's efficiency in managing the reuse of active RFID tags, specifically the effectiveness of DOD's RFID policy and the extent of tag reuse and monitoring. DOD's final RFID policy was issued by the Under Secretary of Defense (Acquisition, Technology, and Logistics), the defense logistics executive for RFID implementation, on July 30, 2004.

For this report, we reviewed DOD's July 30, 2004, RFID implementation policy and its concept of operations guidance for DOD components, and interviewed knowledgeable officials from the Defense Logistics Agency (DLA); the Army Program Executive Office, Enterprise Information Systems, Product Manager Joint –

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<sup>1</sup> GAO, *Defense Logistics: Better Strategic Planning Can Help Ensure DOD's Successful Implementation of Passive Radio Frequency Identification*, GAO-05-345 (Washington, D.C.: Sept. 12, 2005).

Automatic Identification Technology Office; the Navy; the Air Force; and the U.S. Transportation Command. Although we did not verify the data provided, we determined that the data used were sufficiently reliable for the purposes of this report. We conducted this assignment in conjunction with our work on passive RFID from July 2004 through January 2006 in accordance with generally accepted government auditing standards. Our scope and methodology are discussed in further detail at the end of this report.

## **Results in Brief**

DOD's use of active RFID tags can be more efficiently managed, potentially avoiding millions of dollars in unnecessary tag purchases. DOD's current RFID policy does not require active tags to be returned or reused even though these tags are designed for repeated reuse. DOD's July 30, 2004, RFID policy governing active RFID tag return and reuse only "encourages" components to return active RFID tags for reuse. The policy does not specifically direct that active tags be returned for reuse or require military services and other users to reuse tags. Estimates of tag reuse by DOD component officials and DOD tag reuse data as of May 2005 indicate that the majority of active RFID tags had not been returned or reused more than twice. For example, Army and DLA officials estimate that 10 percent of active tags were being returned for reuse before Operations Iraqi Freedom and Enduring Freedom and only 3 percent after. Moreover, during the period May 2002 through May 2005, DOD active tag use data for 614,681 tags show that 84 percent of the tags (514,455 tags) had been used only one or two times. Only 16 percent of the tags (100,226 tags) were reported as being reused more than twice. Furthermore, DOD does not routinely monitor or account for reuse of all active RFID tags because it has not developed procedures to do this. Officials from the Army and DLA—the largest purchasers of active RFID tags—informed us that they are unaware of the status or location of the majority of previously used tags. Nonetheless, DOD continues to spend millions of dollars purchasing active RFID tags without having procedures to determine whether the purchase of new tags is needed or whether the demand could be met through reuse of existing tags. If the 84 percent reuse rate is applied to DOD's total tag purchases since December 1997,<sup>2</sup> around 1,101,816 tags, valued at over \$110 million, have been used only one or two times and are in an unknown status, even though these tags could potentially be reused. Without greater efficiency in the reuse of active RFID tags, DOD could spend millions of dollars for unnecessary purchases.

We are recommending that DOD revise its RFID policy and operational guidance to require that active tags be returned for reuse and to develop procedures to track and monitor use of RFID tags. In commenting on a draft of this report, DOD concurred with our first recommendation and partially concurred with our second recommendation. DOD stated that it will issue additional guidance on tag reuse by

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<sup>2</sup> The Army Program Executive Office, Enterprise Information Systems, Product Manager Joint – Automatic Identification Technology Office began recording purchases of active RFID tags in December 1997.

July 2006. DOD's comments and our evaluation are discussed in detail at the end of this report.

## **Background**

DOD began implementing active RFID technology in the mid-1990s with Army initiatives to better identify and manage its total assets, including those in transit to the warfighter. Active RFID technology is used on containers and major pieces of equipment for tracking shipments and their contents while in transit over long distances. Active RFID tags, which generally use a battery, have transmitters that transmit information through radio signals that are read electronically. Active RFID tags hold relatively large amounts of data so they are capable of storing detailed manifest and transportation data. Active RFID tags cost around \$100 each and are reusable. By using active RFID tags and associated infrastructure, DOD has sought to improve its capability to see timely and accurate information on military units' strategic deployments, troop sustainment cargo, military units' intra-theater movements, and non-military unit cargo movements within the United States. Active RFID technology was used to track parts and supplies shipped to and within theater during Operation Iraqi Freedom, although not entirely successfully because some of the same problems that occurred during Operations Desert Shield and Desert Storm were repeated, as we have previously reported and other DOD and military service after-action studies have documented.<sup>3</sup>

## **Active RFID Tags Can Be More Efficiently Managed**

DOD's use of active RFID tags can be more efficiently managed, potentially avoiding millions of dollars in unnecessary tag purchases. DOD's current RFID policy does not require active tags to be returned or reused; DOD tag reuse data indicate that few active RFID tags have been returned or reused more than twice, and DOD does not routinely monitor reuse of or account for all active RFID tags.

### **DOD Policy Does Not Require Return or Reuse of Active Tags**

DOD's current policy on RFID does not require active RFID tags to be returned or reused. DOD's July 30, 2004, policy governing the return and reuse of active RFID tags "encourages" components to return these tags for reuse through the Defense Logistics Management Supplement Materiel Returns Program to receive

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<sup>3</sup> Department of Defense, *Conduct of the Persian Gulf War: Final Report to the Congress* (Washington, D.C.: Apr. 1992); GAO, *Operation Desert Storm: Lack of Accountability Over Materiel During Redeployment*, GAO/NSIAD-92-258 (Washington, D.C.: Sept. 23, 1992); U.S. Army Materiel Command (USAMC), *Operation Iraqi Freedom (OIF), Lessons Learned Conference* (Redstone Arsenal, Ala.: Sept. 10-11, 2003); GAO, *Defense Logistics: Preliminary Observations on the Effectiveness of Logistics Activities during Operation Iraqi Freedom*, GAO-04-305R (Washington, D.C.: Dec. 18, 2003); Department of Defense, *Objective Assessment of Logistics in Iraq: DUSD(L&MR) and Joint Staff (JSJ4) Sponsored Assessment to Review the Effectiveness and Efficiency of Selected Aspects of Logistics Operations During Operation Iraqi Freedom (OIF)* (Washington, D.C.: Mar. 2004); GAO, *Defense Inventory: Actions Needed to Improve the Availability of Critical Items during Current and Future Operations*, GAO-05-275 (Washington, D.C.: Apr. 8, 2005).

reimbursement of certain costs.<sup>4</sup> The policy also states that the services and other requisitioners and users “may opt” to establish their own retail operations for used tags. The policy, however, does not specifically direct that active tags be returned for reuse or require military services and other users to reuse tags.

#### Few Active Tags Have Been Returned or Reused

Army, Navy, Air Force, U.S. Transportation Command, and DLA officials informed us that few active RFID tags were being returned or reused. Army and DLA officials estimated that rates of tag returns had been 10 percent before Operations Iraqi Freedom and Enduring Freedom, and 3 percent after. DOD tag use data for the period May 2002 through May 2005, for 614,681 active RFID tags, shows that the majority of the tags (514,455 tags, or 84 percent) were used one or two times, while a small percentage of the tags (100,226 tags, or 16 percent) were reported to have been reused on more than two occasions. These data indicate that about 61 percent (372,863) of these active RFID tags had been used one time, and 23 percent (141,592) of them had been used twice. The remaining 16 percent (100,226 tags) had been used on more than two occasions, ranging from 3 to 51 times.

#### DOD Does Not Routinely Monitor or Account for Reuse of Active Tags

The military services and DLA do not routinely monitor or account for the return and reuse of active RFID tags because there are no procedures in place to do so.<sup>5</sup> For example, U.S. Transportation Command and Air Force officials told us that they could not account for active RFID tags after the tags have been used because they use the tags as if they were consumable or expendable items that have a one-time use. Furthermore, officials from the Army and DLA—the largest purchasers of active RFID tags—said that they were unaware of the status or location of the majority of previously used active RFID tags. However, active RFID tags were designed to be reused, and DOD’s RFID policy acknowledges the economic benefits of reusing these tags. DLA officials explained that active tags are lost or even discarded, which they recognized was not an economical practice. DOD nonetheless continues to spend millions of dollars purchasing large quantities of active RFID tags without having procedures to determine whether the purchase of new tags is needed or whether the demand could be met through reuse of existing tags.

DOD’s purchases of active RFID tags have increased significantly in recent years. Between December 1997 and early June 2005, as shown in table 1, DOD purchased over 1.3 million active RFID tags, with an average unit purchase price per tag of about \$100. DOD’s May 2002 through 2005 tag use data indicate that 84 percent of active tags are used only one or two times. If this reuse rate is applied to the total active RFID tags DOD has purchased since December 1997, this means that 1,101,816 tags,

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<sup>4</sup> If tags are returned through this program, services will be reimbursed for packaging, crating, handling, and transportation costs. Services will not be reimbursed for tags returned without going through this program.

<sup>5</sup> DOD policy does not require routine collection of reuse data or that components establish procedures to monitor tag reuse.

valued at over \$110 million, have been used only one or two times and are in an unknown status. These tags could potentially be reused if DOD revised its policy to require reuse of active tags.

Table 1: DOD Active RFID Tag Purchases from December 1997 through June 3, 2005

<b>Calendar year</b>	<b>Quantity purchased</b>	<b>Purchase costs</b>
1997 <sup>a</sup>	10 <sup>a</sup>	\$1,400 <sup>a</sup>
1998	23,762	\$3,755,732
1999	78,145	\$12,581,345
2000	27,836	\$3,857,648
2001	27,733	\$3,267,352
2002	58,286	\$5,747,210
2003	366,841	\$35,212,123
2004	475,717	\$47,085,115
2005 <sup>b</sup>	253,356 <sup>b</sup>	\$19,381,778 <sup>b</sup>
<b>Total</b>	<b>1,311,686</b>	<b>\$130,889,703</b>
Average purchase price per tag		<b>\$99.79</b>

Source: GAO analysis of data provided by Army Program Executive Office, Enterprise Information Systems, Product Manager Joint - Automatic Identification Technology Office.

<sup>a</sup>Data for 1997 reflects purchase quantities in December 1997.

<sup>b</sup>Data for 2005 reflects purchase quantities from January 1, 2005, through June 3, 2005.

If DOD had more effective policies and procedures governing the reuse of active RFID tags, including procedures to track and monitor use, it might avoid millions of dollars in unnecessary purchases.

## Conclusions

DOD spends millions of dollars annually purchasing active RFID tags, which are designed for repeated reuse, but most are not being reused by DOD routinely. In the absence of a policy requirement to return or reuse active RFID tags, DOD components may continue to treat these tags as expendable items and may not return or reuse the tags. Without improved procedures to track and monitor tag reuse, DOD and its components are likely to continue to invest heavily in the purchase of active RFID tags without knowing how many new tags are actually needed to meet overall goals, objectives, and strategies. If active tags were returned for reuse, and effective procedures established to monitor and track reuse of these tags, DOD could be more efficient in its use of existing tags and could avoid unnecessary future purchases of active RFID tags.

## Recommendations for Executive Action

We recommend that the Secretary of Defense direct the Under Secretary of Defense (Acquisition, Technology, and Logistics) to take the following two actions:

- Modify the July 30, 2004, RFID policy and other operational guidance to require that active RFID tags be returned for reuse or be reused by the military services and other users.
- Direct the secretaries of each military service and administrators of other components to establish procedures to track and monitor the use of active RFID tags, to include
  - determining requirements for the number of tags needed,
  - compiling an accurate inventory of the number of tags currently owned, and
  - establishing procedures to monitor and track tags, including purchases, reuse, losses, repairs, and any other categories that would assist management's oversight of these tags.

### **Agency Comments and Our Evaluation**

In written comments on a draft of this report, DOD concurred with our first recommendation to modify its RFID policy and guidance on active RFID tag return and reuse, and partially concurred with our second recommendation to require the services and other tag users to develop procedures to track and monitor use of active RFID tags. DOD's written comments are reprinted in their entirety in enclosure I.

DOD concurred with our recommendation to modify the July 30, 2004, RFID policy and other operational guidance to require that active RFID tags be returned for reuse or be reused by the military services and other users. The department stated that it recognizes the importance of reusing these tags to the maximum extent possible and that its policy establishes procedures for the return of tags. DOD also stated that its policy implicitly addresses that these tags should be reused at the local level and, when no longer required for local reuse, the policy directs that the tags be returned to the wholesale level for reuse. We disagree that DOD's RFID policy specifically directs components to return tags to the wholesale level for reuse. The existing policy only "encourages" components to use the Defense Logistics Management Supplement Materiel Returns Program to return tags no longer required and receive reimbursement for packaging, crating, handling, and transportation costs. The department stated that it will issue additional guidance on tag reuse by July 2006. The department said that its July 30, 2004, RFID policy will be institutionalized in the next update of the DOD 4140.1-R, DOD Supply Chain Materiel Management Regulation, in fiscal year 2007, which will make explicit reference to reuse of the tags. We believe that this action will satisfy our recommendation if the explicit reference in the updated policy guidance actually requires the services and other users to return tags for reuse or to reuse tags locally.

DOD partially concurred with our second recommendation directing the secretaries of each military service and administrators of other components to establish procedures to track and monitor the use of active RFID tags to include (1) determining requirements for the number of tags needed; (2) compiling an accurate inventory of the number of tags currently owned; and (3) establishing procedures to

monitor and track tags, including purchases, reuse, losses, repairs, and any other categories that would assist management's oversight of these tags. The department stated, as it said when concurring with our first recommendation, that it will direct the military services and U.S. Transportation Command to develop procedures by July 2006 to address the reuse of tags as well as procedures for return of the tags no longer required. The department also stated that active tag reuse is monitored by the Army Program Executive Office, Enterprise Information Systems, Product Manager Joint - Automatic Identification Technology Office and reports are generated that provide last tag read locations. The department said that it will ensure the components are aware of this capability so that they may better use these reports in managing RFID tag use. The department further stated that although many tags have been written to only once, there may be legitimate operational reasons for these occurrences and that the Office of the Assistant Deputy Under Secretary of Defense and the components will investigate the causes for low instances of tag reuse and the business processes contributing to the low reuse of tags.

The department, however, disagreed with the need to establish procedures to account for procurement, inventory, repairs, or losses of existing tags. It stated that active RFID tags are consumable items. Nonetheless, we continue to believe that DOD can potentially avoid millions of dollars in unnecessary active RFID tag purchases if the department and its components would establish accountability procedures to track and monitor active tag requirements, inventory, purchases, reuse, losses, and repairs as we recommended. DOD's July 20, 2004, RFID policy does not define active RFID tags as consumable items. Also, its policy emphasizes the capability of active tags to be reused and to even be refurbished. Moreover, the capability of active RFID tags to be reused would seem to preclude these tags from meeting DOD's definition of a "consumable item." For example, DOD regulation 4140.1-R defines a consumable item as "[a]n item of supply (except explosive ordnance and major end items of equipment) that is normally expended or used up beyond recovery in the use for which it is designed or intended." Because active RFID tags can be reused, they are not expended or used up beyond recovery, and thus we do not believe that they should be treated as consumable items in general operating environments. Consequently, we continue to believe our recommendation is merited and DOD should develop procedures to track and monitor its use of active RFID tags so that it has a sound basis for determining its current and future requirements and procurement actions for active RFID tags.

### **Scope and Methodology**

To evaluate DOD's reuse of active RFID tags, we relied on data gathered through our visits and interviews with key personnel within DLA; the Army Program Executive Office, Enterprise Information Systems, Product Manager Joint – Automatic Identification Technology Office; the Navy; the Air Force; and the U.S. Transportation Command. We reviewed DOD's RFID implementation policy and its concept of operations guidance for DOD components, and we obtained briefings to understand DOD's strategy for implementing active RFID technology into its supply chain processes. Additionally, we visited and observed the use of active RFID technology at DLA's Defense Distribution Depot in Susquehanna, Pennsylvania, and the Norfolk

Ocean Terminal initiative at the Navy's Fleet and Industrial Supply Center in Norfolk, Virginia. Although we did not verify the data provided, we determined that the data used were sufficiently reliable for the purposes of this review. Subsequent to our exit meeting, DOD provided us with a snapshot of active RFID tag reuse data covering May 2002 through May 2005. Because these new data were provided after audit work was completed, we did not assess their accuracy or examine the methodology by which the data were collected. We conducted our work in conjunction with our work on passive RFID from July 2004 to January 2006 in accordance with generally accepted government auditing standards.

We are sending copies of this report to the appropriate congressional committees; the Secretaries of the Army, Air Force, and the Navy; the Commandant of the Marine Corps; the Commander, U.S. Transportation Command; and the Director, Defense Logistics Agency. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

Please contact me at (202) 512-8365 or [solisw@gao.gov](mailto:solisw@gao.gov) if you or your staff have any questions concerning this report. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report were David A. Schmitt, Assistant Director; Renee S. Brown; James A. Driggins; Jeffrey R. Hubbard; Shvetal Khanna; Nicole Harms; Louis V. Modliszewski; Kenneth E. Patton; Charles W. Perdue; Keith A. Rhodes; Dudley C. Roache, Jr.; Yong Song; and Cheryl A. Weissman.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'W. Solis', with a large, stylized loop at the end.

William M. Solis, Director  
Defense Capabilities and Management

Enclosure



## Comments from the Department of Defense



DEPUTY UNDER SECRETARY OF DEFENSE FOR  
LOGISTICS AND MATERIEL READINESS  
3500 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3500

FEB 16 2006

Mr. William Solis  
Director, Defense Capabilities and Management  
U.S. Government Accountability Office  
441 G Street, N.W.  
Washington, DC 20548

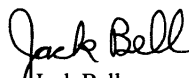
Dear Mr. Solis:

This is the Department of Defense (DoD) response to the GAO Draft Report GAO-06-366R, "DEFENSE LOGISTICS: More Efficient Use of Active RFID Tags Could Potentially Avoid Millions in Unnecessary Purchases," dated January 18, 2006 (GAO CODE 350690, Spin-off of GAO Code 350561). The Department concurs with Recommendation 1 and partially concurs with Recommendation 2. Attachment 1 contains our detailed response.

Radio Frequency Identification (RFID) is a critical transformational technology that will be deployed across the Department over the next several years. The Department is striving to ensure efficient utilization of active RFID tags and will ensure each component has developed internal operating procedures no later than July 2006 to address the issues identified in this report.

The Department appreciates the opportunity to comment on this audit. Should additional information be required, Mrs. Kathy Smith of my staff is the point of contact. She may be reached at (703) 604-0098x135.

Sincerely,

  
Jack Bell

Attachments:  
As Stated



**GAO DRAFT REPORT – DATED JANUARY 18, 2006  
GAO CODE 350690/GAO-06-366R**

**“DEFENSE LOGISTICS: More Efficient Use of Active RFID Tags Could Potentially Avoid  
Millions in Unnecessary Purchases”**

**DEPARTMENT OF DEFENSE COMMENTS  
TO THE RECOMMENDATIONS**

**RECOMMENDATION 1:** The GAO recommended that the Secretary of the Defense direct the Under Secretary of Defense (Acquisition, Technology and Logistics) to modify the July 30, 2004 RFID policy and other operational guidance to require that active RFID tags be returned for reuse or be reused by the military services and other users. (page 7/GAO Draft Report)

**DOD RESPONSE:** The Department concurs with this recommendation. The Department recognizes the importance of reusing these tags to the maximum extent possible and the July 30, 2004 policy sets forth procedures for the return of the tags that are no longer required. Implicit in the policy is that these tags should be reused at the local level and, when no longer required for local reuse, the policy then directs that the tags be returned to the wholesale level for reuse. While the current policy addresses reuse implicitly, the Department will issue additional guidance on reuse by July 2006. When the July 30, 2004 RFID policy is institutionalized in the next update of the DoD 4140.1-R, DoD Supply Chain Materiel Management Regulation, in FY07, we will also make explicit reference to reuse of the tags.

**RECOMMENDATION 2:** The GAO recommended that the Secretary of the Defense direct the Under Secretary of Defense (Acquisition, Technology and Logistics) to direct the secretaries of each military service and administrators of other components to establish procedures to track and monitor the use of active RFID tags, to include:

- determining requirements for the number of tags needed,
- compiling an accurate inventory of the number of tags currently owned, and
- establishing procedures to monitor and track tags, including purchases, reuse, losses, repairs, and any other categories that would assist management’s oversight of these tags. (page 7/GAO Draft Report)

**DOD RESPONSE:** The Department partially concurs with this recommendation. The Department will direct the Military Services and USTRANSCOM to develop procedures by July 2006 to address the reuse of the tags as well as procedures for return of the tags no longer required. However, the Department does not concur with establishing procedures to account for the procurement, inventory, repair, or losses of existing tags in the system. These tags are consumable items.

Active tag use and reuse is monitored by PM J-AIT and reports are generated that provide last tag read locations. These reports are available to the components. The Department will ensure the components are aware of this capability so they may better utilize these reports in managing active RFID tag use. In addition, although many tags have been written only once, there may be

## Enclosure I

legitimate operational reasons for these occurrences. The Office of the Assistant Deputy Under Secretary of Defense (Supply Chain Integration), along with the components, will investigate the causes for such low instances of tag reuse and analyze the business processes that may be contributing to this situation.

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