Department of Homeland Security
Office of Inspector General

**Management of DHS' Data Center
Consolidation Initiative Needs
Improvement**

**Homeland
Security**

SEP 2 7 2010

Preface

The Department of Homeland Security (DHS) Office of Inspector General (OIG) was established by the *Homeland Security Act of 2002* (Public Law 107-296) by amendment to the *Inspector General Act of 1978*. This is one of a series of audit, inspection, and special reports prepared as part of our oversight responsibilities to promote economy, efficiency, and effectiveness within the department.

This report addresses the strengths and weaknesses of the Office of the Chief Information Officer's data center consolidation initiative. It is based on interviews with employees and officials of relevant agencies and institutions, direct observations, and a review of applicable documents.

The recommendations herein have been developed to the best knowledge available to our office, and have been discussed in draft with those responsible for implementation. We trust this report will result in more effective, efficient, and economical operations. We express our appreciation to all of those who contributed to the preparation of this report.

Frank Deffer
Assistant Inspector General
Information Technology Audits

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Appendixes

Abbreviations

CBP	Customs and Border Protection
CIO	Chief Information Officer
DC1	Enterprise Data Center in Mississippi
DC2	Enterprise Data Center in Virginia
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAMS	Federal Air Marshal Service
FEMA	Federal Emergency Management Agency
FLETC	Federal Law Enforcement Training Center
FY	Fiscal Year
HSDN	Homeland Secure Data Network
ICE	Immigration and Customs Enforcement
IT	information technology
MGMT	Management Directorate
NPPD	National Protection and Programs Directorate
OCFO	Office of the Chief Financial Officer
OCIO	Office of the Chief Information Officer
OIG	Office of the Inspector General
OMB	Office of Management and Budget
S&T	Science and Technology
TSA	Transportation Security Administration
USCG	United States Coast Guard
USCIS	United States Citizenship and Immigration Services
USSS	United States Secret Service
US-VISIT	United States Visitor and Immigrant Status Indicator Technology

OIG

Department of Homeland Security
Office of Inspector General

Executive Summary

We reviewed the Department of Homeland Security's efforts to consolidate its components' data centers. Our objective was to determine the progress the department was making in meeting its consolidation objectives. Generally, the department has made some progress toward consolidating its data centers. For example, the department has established the Data Center Consolidation Division and two enterprise data centers. Additionally, the department has awarded contracts for the operations of these data centers and has migrated computing resources to these new facilities.

However, the department needs to take additional steps to improve the data center consolidation process. Specifically, the department has not developed a complete inventory of the components' data centers and the associated systems, hardware, and software. Additionally, the department should develop consolidated data center floor plans to guide the consolidation process.

Further, the department should update its enterprise-wide data center consolidation strategic plan. This plan should detail the process to decommission legacy component data centers and should conform to current government-wide efforts by the Office of Management and Budget to consolidate data centers. The department could also benefit by incorporating into its plans lessons learned from other successful data center consolidation efforts.

We are recommending that the department:

1. Perform the necessary discovery and validation efforts to obtain accurate inventories of its data centers, hardware, and systems.
2. Review government-wide efforts as well as industry best practices for data center consolidations, and develop a more comprehensive data center consolidation plan.

Background

The Department of Homeland Security's (DHS) Chief Information Officer (CIO) established the "One Infrastructure" vision to improve information sharing via an enterprise-wide, consolidated information technology (IT) infrastructure, supporting all of DHS' strategic goals and business objectives: awareness, prevention, protection, response, recovery, services, and organizational excellence.

To support this mission, DHS established under the Office of the Chief Information Officer (OCIO) the Information Technology Services Office and the Data Center Consolidation Division. These headquarters offices are responsible for the data center consolidation initiative. The objective of this initiative is to coordinate and oversee the provision of services and facilities to collocate and consolidate the numerous disparate computing facilities that currently support the DHS components. The project's strategic vision is to reduce the number of existing data centers to two secure, geographically diverse locations to minimize infrastructure while enhancing the department's disaster recovery posture.

According to the OCIO, collocation and consolidation will provide a number of benefits over the disparate environments that currently exist within the components' computing facilities. For example, reducing the overall computing asset footprint will result in reduced system maintenance, management, and administration costs, while merging existing operations and maintenance contracts will further reduce overhead and administrative costs. Additionally, the consolidation efforts will help to standardize IT resource acquisitions, as well as streamline maintenance and support contracts, allowing for less complex vendor support and expediting response times in the event of an emergency. Benefits derived from consolidation are expected to result in increased security and cost avoidance over time.

DHS' data center consolidation efforts are also a part of its efforts to remediate disaster recovery deficiencies cited in our May 2005 report.[1] We reported that DHS IT disaster recovery sites were not prepared to prevent service disruptions from potentially hindering DHS' ability to perform mission-essential functions. Further, these

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[1] *Disaster Recovery Planning for DHS Information Systems Needs Improvement* (OIG-05-22), May 2005.

disaster recovery deficiencies were occurring in part because DHS did not have a program in place to provide an enterprise-wide disaster recovery solution.

In response, the DHS CIO established the Infrastructure Transformation Project, which included the establishment and maintenance of two operational data centers with an active-active processing capability. The active-active processing capability of these two data centers was to ensure that each mission-critical system had a complete disaster recovery capability.

Utilizing both enterprise data centers will:

- Provide redundancy to ensure continuity of operations for enterprise data centers in the event of a disaster;
- Support mission requirements for synchronization of backup and production environments; and
- Support data center consolidation goals by providing for component disaster recovery requirements.

Finally, the Office of Management and Budget (OMB) has recognized the benefits of data center consolidation and has established the Federal Data Center Consolidation Initiative.[2] The DHS CIO was appointed the co-chair of this initiative. In April 2010, DHS held a lessons-learned forum for other federal agencies regarding data center consolidation. This government-wide initiative focuses on the following tasks:

- Promote the use of Green IT by reducing the overall energy and real estate footprint of government data centers;
- Reduce the cost of data center hardware, software, and operations;
- Increase the government's overall IT security posture; and
- Shift IT investments to more efficient computing platforms and technologies.

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[2] Office of Management and Budget, *Federal Data Center Consolidation Initiative*, February 26, 2010.

Results of Audit

DHS' Progress on Consolidating Its Data Centers

DHS has taken a number of steps toward consolidating its components' data centers. For example, the department has established a headquarters office, the Data Center Consolidation Division, within the OCIO to oversee this project. DHS has also established two enterprise data centers, DC1 in Mississippi and DC2 in Virginia. In December 2008, DHS provided to the Congress a Data Center Migration Plan for this initiative.

DHS has also migrated various computing resources, including all five legacy data centers, to its enterprise data centers. For example, the two enterprise data centers contain computing resources from the following components (table 1):

Table 1. Enterprise Data Center Occupants as of July 31, 2010

DC1	DC2
Customs and Border Protection (CBP)	CBP
DHS Headquarters	DHS Headquarters
Homeland Secure Data Network (HSDN)	HSDN
Federal Emergency Management Agency (FEMA)	FEMA
Immigration and Customs Enforcement (ICE)	ICE
Science and Technology (S&T)	S&T
United States Citizenship and Immigration Services (USCIS)	USCIS
Federal Law Enforcement Training Center (FLETC)	National Protection and Programs Directorate (NPPD)
	Transportation Security Administration (TSA)
	United States Visitor and Immigrant Status Indicator Technology (US-VISIT)

The following legacy data centers have moved completely to the enterprise data centers:

- CBP's National Recovery Facility
- Management Directorate's (MGMT) Ashburn Data Center
- MGMT's HSDN Fair Lakes facility
- MGMT's Stafford Data Center
- TSA's St. Louis Hosting Center

DHS is also taking steps to resolve a number of previously identified problems at these data centers. For example, electrical power deficiencies at DC1 are being addressed with the installation of a new 21 megavolt-ampere power line and with a new power substation due to be online in the second quarter of Fiscal Year (FY) 2011.

Further, the DHS OCIO has developed migration schedules, based on fiscal year and component, to move additional systems to these data centers. For example, the DHS OCIO created a FY 2010 data center migration schedule and spending plan for moving specific systems from components' legacy data centers and also performing improvements at the enterprise data centers. Appendix C summarizes the DHS FY 2010 Data Center Migration Spending Plans. Appendix D contains DHS' Multi-Year Data Center Migration Plans.[3]

Current DHS efforts are focused on physically consolidating component systems and hardware to DC1 and DC2 as funding is made available. For example, DHS has budgeted $195,244,000 for improvements at the enterprise data centers and for physically consolidating legacy data centers in FY 2010. This funding is in addition to the $362,659,205 that DHS obligated from FYs 2005 through 2009 for enterprise managed services and data center development, infrastructure, and construction costs.

In addition to coordinating, as co-chair, DHS is also responding to the OMB's Federal Data Center Consolidation Initiative. Specifically, DHS has already provided its Initial Asset Inventory and its Initial Data Center Consolidation Plan. According to OMB, the Initial Asset Inventory provides a high-level understanding of the scale and size of existing data centers, IT infrastructure assets, and applications supported by the data centers. The Initial Data Center Consolidation Plan identifies potential areas for consolidation, areas that can be optimized through server

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[3] Appendix D, Table D-1, contains the DHS Multi-Year Data Center Migration Plan from the DHS' *Congressional Data Center Migration Report, Quarter 1, Fiscal Year 2010 Report to Congress.* However, OCIO staff stated that this document was not provided to the Congress. Appendix D, Table D-2, contains the updated Multi-Year Data Center Migration Plan that was provided to the Congress in May 2010.

virtualization or cloud computing alternatives, and a high-level roadmap for transitioning to the consolidated end-state architecture.

OMB has also requested the Final Asset Inventory Baseline, which is due by July 30, 2010. According to OMB, this final asset inventory baseline will contain more detailed information. For example, OMB expanded the "total/used" storage fields by centralized storage types.

This final inventory will serve as the foundation for developing the Final Data Center Consolidation Plans. DHS is to develop its Final Data Center Consolidation Plans and incorporate them into its proposed FY 2012 budgets by August 30, 2010. The final plans are to include a technical roadmap and approach for achieving the targets for infrastructure utilization, energy efficiency, and cost efficiency.

Steps Needed to Improve DHS' Data Center Consolidation Process

Although DHS has made progress toward implementing its data center consolidation initiative, DHS' management of this initiative needs improvement. Specifically, DHS has not developed a complete inventory of its components' data centers and the associated systems, hardware, and software. Additionally, DHS should develop consolidated data center floor plans to guide the consolidation process.

Further, DHS should update its enterprise-wide data center consolidation strategic plan. Specifically, this plan should detail the process to decommission legacy component data centers and should follow OMB's Federal Data Center Consolidation Initiative guidance.[4] The department could also benefit by incorporating into its plans lessons learned from other successful data center consolidation efforts.

Data Center Inventory

Currently, DHS does not have a complete and accurate inventory of its components' data centers. Establishing a data center inventory is an activity in DHS' Data Center Migration Plan and in OMB's Federal Data Center Consolidation Initiative. DHS has developed several data center inventories, each producing a different number of department component data centers. For example, DHS provided an inventory of 29 data centers in its FY 2010 report to the Congress. However, DHS components

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[4] OMB's Federal Data Center Consolidation Initiative provides a framework that federal agencies should follow to help "…reduce the overall cost of data center operations."

provided an inventory of 60 data centers to OMB in response to an August 2009 data call.[5] Another inventory of 61 data centers is included in the OCIO's Migration Consolidation Management Plan.

Additionally, the same DHS data centers were counted differently in separate inventories. For example, in the OCIO's plan, the U.S. Department of Justice facilities in Rockville, MD, and Dallas, TX, are counted as two data centers. However, in the congressional submission, they are counted as six separate facilities: two data centers each for USCIS, ICE, and US-VISIT. Additionally, in the OCIO's plan, facilities in different cities are counted as one data center. For example, data centers in both Broomfield, CO, and Oak Ridge, TN, are listed as one facility. We reviewed these different inventories and compiled a combined inventory of 92 data centers.[6] Table 2 provides information on the different data center inventories.

Table 2. DHS Data Center Inventories

Source	Number of Data Centers
Data Center Migration Plan provided to Congress in December 2008	23
FY 2010 Multi-Year Data Center Migration Plan provided to the Congress in May 2010	29
Component responses to August 2009 OMB data call	60
OCIO's Data Center Consolidation Division Migration Consolidation Management Plan	61
Office of Inspector General (OIG) consolidation of OCIO inventories (see Appendix E, Tables E-2 and E-3)	92

Finally, not all of the components' data centers appear in these inventories. For example, some DHS offices, such as S&T, were not included in any of the data center inventories.

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[5] OMB Budget Data Request No. 09-41, *Inventory of Federal Data Center Activity*, August 10, 2009.
[6] The DHS Initial Data Center Consolidation Data System Location List, dated June 30, 2010, identified 102 computing infrastructure locations, which includes data centers, server rooms and closets. However, this inventory does not contain the FEMA New Orleans or Baton Rouge facilities.

Hardware and Systems Inventory

DHS has not validated the complete inventory of IT resources located at its components' legacy data centers. Specifically, DHS has not performed physical assessments at each component data center to establish an inventory of the facility's systems, hardware, and software.

OMB's guidance for its Federal Data Center Consolidation Initiative identifies six phases, the first two of which are IT Asset Inventory Baseline and Application Mapping. Within the first phase, agencies should gather metrics across four primary areas in order to derive a baseline state of their current data center environment. In the second phase, agencies should perform application mapping. This process will be the blueprint on which subsequent decommissioning, virtualization, consolidation, or migration analysis, plans, and actions will be based.

Unless facilities' systems inventories are validated, OCIO schedules for data center migration may be impacted. For example, a TSA Federal Air Marshal Service (FAMS) facility in Atlantic City, NJ, was included in the OCIO's FY 2010 first quarter report.[7] See Appendix D, Table D-1. However, according to internal DHS documents, only the non-Unix systems at this facility were scheduled to migrate in FY 2010, with the remainder scheduled to migrate in FY 2014. According to the May 2010 Data Center Migration Plan that was provided to the Congress, this facility is not scheduled to begin migration until FY 2013. See Appendix D, Table D-2. According to OCIO staff, this facility was removed from the FY 2010 migration schedule owing to (1) increased costs of purchasing as opposed to leasing and (2) the request by FAMS to implement a separate FAMS local area network at the enterprise data centers.

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[7] According to OCIO staff, the *Congressional Data Center Migration Report, Quarter 1, Fiscal Year 2010 Report to Congress*, was not provided to the Congress.

A complete and accurate data center inventory would help DHS to ensure that:

1) All hardware systems are properly accounted for,
2) A comprehensive schedule is developed for migrating components' systems to the department's enterprise data centers, and
3) Unplanned expenses for additional floor space are avoided.

Consolidated Data Center Floor Plans

Another deliverable in DHS' Data Center Migration Plan is a consolidated data center floor plan. Establishing consolidated data center floor plans would enable DHS staff to determine if they can physically consolidate all DHS data centers into DC1 and DC2.

We reported in April 2009 that the amount of usable computer room space at DC1 is not sufficient to handle the projected workload.[8] Since the report was issued, DHS has not fully addressed this concern. Specifically, the components' responses to OMB's August 2009 data call identified 165,587 gross square feet of floor space that would need to be consolidated into the enterprise data centers (see appendix E, table E-2).[9] However, the two enterprise data centers combined contain only approximately 124,000 gross square feet of space. Without preparing the end-state data center floor diagrams, DHS cannot determine if there is enough space at DC1 and DC2 to house all components' systems, hardware, and software.

Additionally, according to OMB's Agency Consolidation Plan Template, the department should:

> Determine the optimal use of gross square footage area to leverage economies of scale and consider the available expansion potential for accommodating long-term growth in demand (data center lifespan could be well over 20–30 years).

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[8] *DHS Progress in Disaster Recovery Planning for Information Systems* (OIG-09-60), April 2009.
[9] While the components' submission to OMB totaled 560,487 sq ft of floor space, the CIO's Management Response questioned the actual floor space at two FEMA facilities. We are using the latest information, provided by FEMA staff, for those two sites in this report.

DHS staff has stated that they could build an additional 100,000 square feet of floor space at both enterprise data centers if needed. However, this amount would not be sufficient to meet the space needs at each enterprise data center.

Enterprise-wide Data Center Consolidation Strategic Plan

The DHS enterprise-wide data center consolidation strategic plan does not detail the process to decommission legacy component data centers and is not fully consistent with OMB's Federal Data Center Consolidation Initiative guidance. DHS' strategic plan for consolidating its data centers is the Data Center Migration Plan, effective November 2007. This plan projects that DHS will migrate hardware and systems from component data centers to DHS' enterprise data centers by the end of FY 2011. While the Data Center Migration Plan recognizes the need to decommission legacy data centers, the plan does not include the activities or deliverables associated with this activity.

Without including decommissioning activities in its enterprise-wide data center consolidation strategic plan, DHS may not reap the full benefits of data center consolidation. That is, the value of an enterprise data center service may not be fully realized until the cost of existing redundant infrastructure and services is minimized or eliminated following decommissioning.

DHS' enterprise-wide data center consolidation strategic plan should also be revised to be more consistent with OMB's Federal Data Center Initiative process. For example, DHS' Data Center Migration Plan contains the following workstream for the migration of component data centers and systems:
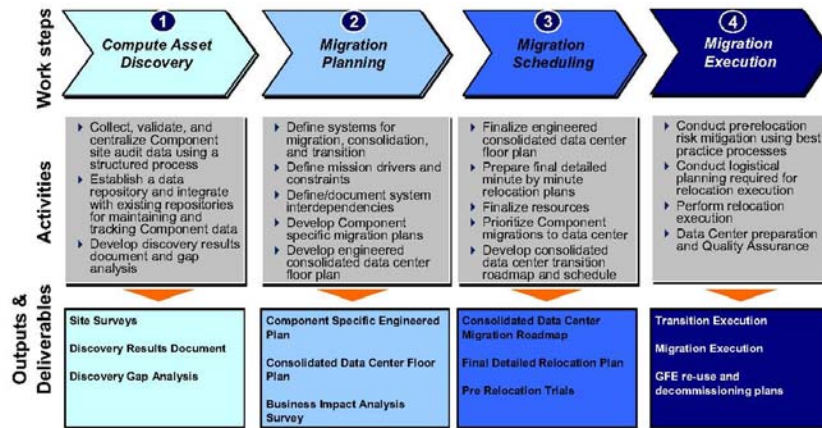
However, OMB's Federal Data Center Initiative guidance expands on DHS' Migration Planning workstream to include additional activities and deliverables. For example, OMB's guidance contains the Application Mapping phase, as outlined below:
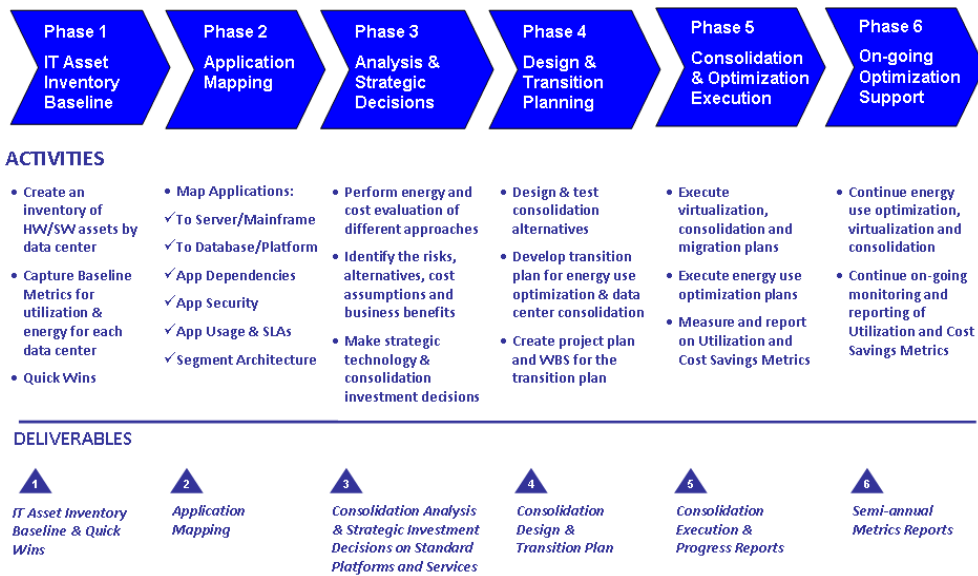
Application mapping deliverables could be used to identify "quick wins" for the data center consolidation project. Quick wins include identifying business applications that have not been used in a year, or servers that have not been used in a month, and decommissioning them. Application mapping work products are also the blueprint on which subsequent virtualization, consolidation or migration to cloud computing analysis, plans, and actions will be based. DHS should consider updating its Data

Center Migration Plan to include Application Mapping and other key areas from OMB's guidance.

Data Center Consolidation Best Practices

DHS may be able to improve its data center consolidation process by adopting best practices from the experiences of other government agencies. For example, the Department of Energy (DOE) OIG reported significant opportunities for savings in data center consolidation specifically in the areas of application hosting and virtualization.[10] Application hosting consists of a central or host organization providing full IT services, including housing, securing, operating, and maintaining the servers or other devices for client organizations. Application hosting eliminates or decreases the requirement for each organization to operate and support its own servers. As a result, according to the DOE OIG, overall costs are reduced.

The Environmental Protection Agency (EPA) used a contractor's analysis to help direct its efforts and resources as it began consolidation planning in FY 2008. EPA's contractor provided recommendations on data center consolidation, server consolidation, virtualization, and storage.

Additionally, while DHS is focusing on physically consolidating its systems at the enterprise data centers, some data center consolidation efforts focus on upgrading the systems before they migrate to the enterprise data centers. For example, the state of Texas used this approach.[11] Texas' goals for data center services included effective management of in-place services, migration of services to the consolidated data centers, and improvements to services, security, and disaster recovery capability.

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[10] U.S. Department of Energy Office of Inspector General, Audit Services, *Management of the Department's Data Centers at Contractor Sites* (DOE/IG-0803), October 2008.
[11] Texas Department of Information Resources, *Fiscal 2007 Data Center Services Report*, August 31, 2007.

Texas organized these activities into three overlapping phases:

- Transition: The transfer of data center services to the service provider. Includes transition of staff, equipment, and all third-party contracts.
- Transformation: Implementation of industry-standard tools and processes. Includes upgrades and enhancements to agency processes, new system monitoring and management tools, and consistency across the enterprise.
- Consolidation: Movement of agency operations to the consolidated data centers. Includes equipment consolidation, new equipment and facility enhancements.

Texas' data center consolidation project initially resulted in higher costs. However, as of February 2009, Texas reported a $9.7 million (3.65%) cost savings as a result of data center consolidation.[12]

Recommendations

We recommend that the Chief Information Officer:

Recommendation #1: Perform the necessary discovery and validation efforts to obtain accurate inventories of its data centers, hardware, and systems.

Recommendation #2: Review government-wide efforts as well as industry best practices for data center consolidations, and develop an updated comprehensive data center consolidation plan.

Management Comments and OIG Analysis

We obtained written comments on a draft of this report from the DHS CIO. The CIO generally agreed with our recommendations and provided additional information on how they addressed them. We evaluated the written comments received from the DHS CIO and have made changes to the report where deemed appropriate. A copy of the response is included as Appendix B.

Recommendation #1: The CIO concurs with this recommendation with a caveat. In his response the CIO states that

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[12] According to *Year 2: Data Center Services Program, Contract-to-Date Cost Assessment Report* (May 19, 2009), the $9.7 million savings were direct contract savings for the contract to date. However, several milestones have not been completed and continued delays may negatively impact future savings.

DHS will continue to follow its three phase approach for the discovery and validation of inventory. The CIO also states that "Data Center contents are dynamic and this three-phased approach provides a sufficient amount of detail minimizing inventory rework."

We agree that the steps DHS is taking, and plans to take, begin to satisfy this recommendation. However, we reviewed DHS' approach have concluded that the current OCIO process may significantly underestimate the inventory which is to be consolidated at the two enterprise data centers. This recommendation will remain open until DHS provides documentation to support that all planned corrective actions are completed

Recommendation #2: The DHS CIO concurs with this recommendation. In his response the CIO stated that OCIO is currently updating its data center consolidation plan to include industry best practices and lessons learned.

We agree that the steps DHS is taking, and plans to take, begin to satisfy this recommendation. This recommendation will remain open until DHS provides documentation to support that all planned corrective actions are completed.

In addition to responses to our recommendations, the DHS CIO identified the following four areas of concerns.

Issue #1: The CIO expressed concern about our statement that DHS does not have a complete inventory of component data centers. In his response, the CIO stated that various data calls have contributed to an inventory for current migration planning efforts. The CIO also stated that "Data center contents are dynamic, and this three-phased approach provides a sufficient amount of detail minimizing inventory rework." However, it is our opinion that this current process has not provided DHS with a complete inventory of its data centers. For example, the OCIO acknowledges that their latest inventory does not include two FEMA facilities that were included in the 2009 submission to OMB.

Issue #2: In our report we state that DHS needs to develop and/or update its DHS-wide Data Center Migration Plan to include application mapping and other key areas from OMB's guidance. The CIO stated that DHS is currently updating its migration plans

to include application information in its recent data inventory collection for planning purposes. We agree with this action.

Issue #3: In our report we state that DHS should adopt best practices from other government agencies. The CIO stated that DHS remains open to all best practices that address the primary concerns of DHS' consolidation effort (e.g., increased security, information sharing, disaster recovery enhancement, reduced footprint, long-term cost benefits, etc.). The CIO states that DHS is undertaking actions that correspond to our conclusion. We agree with this action.

Issue #4: In our report we state that there is an insufficient floor space available in DC1 and DC2 to consolidate all existing/known component data centers. The CIO questioned our reliance on DHS' responses to a 2009 OMB data call. Specifically, the CIO stated that the OCIO did not administer the data call, that the components responded directly to the OMB, and that the OCIO did not have the opportunity to validate the components' responses to this data call.

While the OCIO did not administer this data call, DHS' Office of the Chief Financial Officer (CFO) did administer this data call. The components did not respond directly to OMB, but provided their responses to the OCFO. Additionally, the OCIO provided information for this data call concerning DC1 and DC2.

The CIO also cited two FEMA facilities to show that the August 2009 data call was not accurate. In addition to questioning their floor space, the CIO stated that these facilities do not contain '…data application hosting space." Following receipt of the CIO's comments, we contacted FEMA staff at these facilities and we are using updated floor space information for these two facilities in this report. Additionally, FEMA staff report that these sites contain a total of 24 servers with 47 terabytes of associated storage.

Further, the CIO stated that 160,000 sq ft of space is within the consolidation capabilities of DC1 and DC2. However, the CIO did not provide estimates on the amount of floor space that would be required to migrate the resources of the 32 facilities listed in Table E-3 or the amount of floor space that is already in use. For example, in April 2009 we reported that 12,554 sq ft of space was already in use at DC1.

Additionally, DC1 and DC2 are to provide active-active processing capabilities for each other. If one data center fails, the other data center is to be designed to provide backup processing. While DHS should be allocating floor space for this capability, each data center may not need to be a complete mirror of the other. For example, test or development systems may not need complete redundancy. However, a percentage of floor space at each data center should be reserved for backing up the other facility. If DHS decides that 25% of the floor space at each center is needed for redundant processing, this would further reduce the floor space available for consolidation at the two enterprise data centers by approximately 30,000 sq ft.

Finally, the DHS OCIO has recommended using rack counts instead of floor space for estimates. However, rack count estimates raise questions about the ability of DC1 and DC2 to adequately consolidate all identified facilities. For example, in response to OMB's Federal Data Center Consolidation Initiative, the OCIO provided an Initial Asset Inventory that identified 3,000 racks as possible candidates for consolidation. However, in DHS' first quarter FY 2010 report, the OCIO reported that there were only 519 and 980 racks available at DC1 and DC2 respectively.

This audit is a follow-up audit to our reports *DHS' Progress on Disaster Recovery Planning for Information Systems* (OIG-09-60) and *Review of Management Agreements Developed for DHS' Primary Data Center* (OIG-10-56). These reports concerned DHS Management Directorate's efforts to establish two enterprise data centers. This report focuses on DHS' efforts to consolidate its legacy data centers into these new data centers.

The objective of our audit was to determine the progress DHS is making in consolidating its component data centers. We reviewed relevant legislation, DHS policies and procedures, planning documentation, budget submissions, data center inventories, floor plans, and prior audit reports. We also interviewed key personnel.

We conducted this performance audit between March and July 2010 pursuant to the *Inspector General Act of 1978*, as amended, and according to generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based upon our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based upon our audit objectives.

We provided DHS staff with briefings and presentations concerning the results of fieldwork and the information summarized in this report.

We appreciate the efforts of DHS management and staff to provide the information and access necessary to accomplish this audit. The principal OIG points of contact for the audit are Frank Deffer, Assistant Inspector General for Information Technology Audits, (202) 254-4100, and Sharon Huiswoud, Director, Information Systems Division, (202) 254 5451. Appendix F identifies major OIG contributors to the audit.

Appendix B
Management Comments to the Draft Report

Homeland
Security

SEP 0 9 2010

MEMORANDUM FOR: Richard L. Skinner
                    Inspector General

FROM: Richard A. Spires
                    Chief Information Officer

SUBJECT: Comment to OIG Draft Report 10-053-ITA-MGMT: "Management of
                    DHS' Data Center Consolidation Initiative Needs Improvement"

The Department of Homeland Security (DHS) Office of the Chief Information Officer (OCIO) has
reviewed the Office of the Inspector General Draft Report #10-053-ITA-MGMT, "Management of
DHS' Data Center Consolidation Initiative Needs Improvement," dated August 2010.

OCIO found 4 overarching areas of concern, as outlined below (please see Addendum for detailed
comments):

Issue #1: DHS does not have a complete inventory of Component data centers.

OCIO Comment: Various data calls have contributed to an inventory for current migration
planning efforts. Additionally, detailed project-level inventories are undertaken as part of the
migration discovery activity. Planning of migration activities is conducted in three phases. High
level system inventories are used to form budget estimates for migration, which are validated with
the Components that operate legacy centers. Then, Components provide more detailed inventory
data in task statements for migration contractors. That data is again validated by migration
contractors via discovery efforts. Data center contents are dynamic, and this three-phased approach
provides a sufficient amount of detail minimizing inventory rework.

**Issue #2: DHS needs to develop and/or update its Enterprise-wide Data Center Migration Plan
to include Application Mapping and other key areas from OMB's guidance.**

OCIO Comment: As part of the Federal Data Center Consolidation Initiative, DHS is currently
updating its migration plans to include application information in its recent data inventory collection
for planning purposes.

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Appendix B
Management Comments to the Draft Report

Issue #3: DHS should adopt best practices from other government agencies.

OCIO Comment: As part of the Federal Data Center Consolidation Initiative, DHS has provided its lessons learned to other government agencies. DHS remains open to all best practices that address the primary concerns of DHS consolidation effort (e.g., increased security, information sharing, disaster recovery enhancement, reduced footprint, long-term cost benefits, etc.). OCIO will research best practices from other government agencies and pursue incorporating methods where applicable.

Issue #4: There is insufficient floor space available in DC1 and DC2 to consolidate all existing/known Component data centers.

OCIO Comment: OIG refers to the OMB August 2009 data call throughout the report. OCIO believes reliance on information from this data call, particularly for the purpose of calculating floor space required in a consolidation effort, is problematic for the following reasons:

- OCIO did not administer the data call; Components were solicited and responded to OMB directly, and OCIO did not have the opportunity to validate Component responses.
- The OMB data call responses do not accurately represent data center space. For example, FEMA's response listed two facilities that account for about 400,000 square feet. Neither facility had been included in DHS data call responses and do not contain data application hosting space. This 400,000 square feet accounts for about 71% of the total reported space in the OMB data call.
- Omitting the erroneous 400,000 square feet, the OMB data call found about 160,000 square feet of space, which is well within the expected consolidation capabilities of DC1 and DC2.
  - Note: OCIO originally estimated 220,000 square feet of legacy data center space for initial data center consolidation planning purposes.

In addition, OCIO's responses to the recommendations outlined in the OIG report are below:

Recommendation #1: Perform the necessary discovery and validation efforts to obtain accurate inventories of its data centers, hardware, and systems.

OCIO Response: OCIO concurs with caveat. OCIO will continue to use a three-phased approach for the planning of migration activities. High level system inventories are used to form budget estimates for migration. These estimates are validated with Components that operate legacy centers. Then, Components provide more detailed inventory data in task statements for migration contractors. That data is validated by migrations contractors via discovery efforts. Data Center contents are dynamic and this three-phased approach provides a sufficient amount of detail minimizing inventory rework.

Recommendation #2: Review government-wide efforts as well as industry best practices for data center consolidations and then develop an updated comprehensive data center consolidation plan.

OCIO Response: OCIO concurs. OCIO is currently updating its data center consolidation plan as part of the Federal Data Center Consolidation Initiative. Upgrades to the plan will include industry best practices and lessons learned as possible.

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**Table C-1. Summary of DHS' FY 2010 Data Center Migration,
Project/Spend Plan by Component (November 2009)**

Component	Legacy Data Center	Estimated Total Cost	Totals
CBP	Newington, VA	$33,650,000	
CBP Total			$33,650,000
ICE	Dallas, TX	$6,000,000	
ICE	Rockville, MD	$13,000,000	
ICE	Other	$4,850,000	
ICE Total			$23,850,000
FEMA	Plano, TX	$1,658,145	
FEMA	Sterling, VA	$1,000,000	
FEMA	Denton, TX	$500,000	
FEMA	Mt. Weather, VA	$1,381,004	
FEMA	Other	$1,360,851	
FEMA Total			$5,900,000
TSA/FAMS	Atlantic City, NJ	$8,800,000	
TSA FAMS Total			$8,800,000
NPPD	Pensacola, Fl	$2,500,000	
NPPD	Other	$5,500,000	
NPPD Total			$8,000,000
USCIS	Dallas, TX	$5,500,000	
USCIS	Rockville, MD	$5,500,000	
USCIS Total			$11,000,000
DC1	DC1 Power upgrade	$38,589,150	
DC2	DC2 Development	$20,210,850	
DHS HQ Total			$58,800,000
Sub-Total Not Including US-VISIT			$150,000,000
US-VISIT	Dallas, TX	$15,081,333	
US-VISIT	Rockville, MD	$15,081,333	
US-VISIT	DC2	$15,081,333	
US-VISIT Total			$45,244,000
FY 2010 Total			$195,244,000

Table C-2. DHS' FY 2010 Data Center Migration, Project/Spend Plan by Component (June 2010)

Component	Estimated Total Cost
CBP	$9,700,000
ICE	$23,850,000
FEMA	$12,250,000
TSA	$8,800,000
NPPD	$8,000,000
USCIS	$22,000,000
DHS HQ	$65,400,000
Sub-Total not including US-VISIT	$150,000,000
US-VISIT	$45,244,000
Total	$195,244,000

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Table D-1. 1st Quarter FY 2010 Multi-Year Data Center Migration Plan (Prepared)[13]

DHS DATA CENTER MIGRATION SCHEDULE	DC1/DC2	FY2009 Q1	Q2	Q3	Q4	FY2010 Q1	Q2	Q3	Q4	FY2011 Q1	Q2	Q3	Q4	FY2012 Q1	Q2	Q3	Q4	FY2013 Q1	Q2	Q3	Q4
Customs and Border Protection (CBP)																					
National Data Center (Springfield/Newington, VA)	DC1/DC2	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	◇	
Disaster Recovery Facility (Undisclosed)	DC1	◆ Completed FY08																			
ACE (Tyson's Corner, VA)	DC1/DC2	█	█	█	█	█	█	█	◇												
DHS Headquarters (DHS HQ)																					
DHS/CIO (Bluemont, VA)	DC1/DC2	█	█	█	█	█	█	█	█	◇											
DHS Ashburn Data Center (Ashburn, VA)	DC1	◆ Completed FY08																			
DHS HSDN Fair Lakes (Fairfax, VA)	DC1/DC2				◆ Completed Q4 FY09																
DHS Stafford Data Center (Garrisonville, VA)	DC1	◆ Completed FY08																			
Immigration and Customs Enforcement (ICE - DOJ)																					
ICE - DOJ (Rockville, MD)	DC2		█	█	█	█	█	█	◇												
ICE - DOJ (Dallas, TX)	DC1		█	█	█	█	█	█	◇												
USCIS																					
USCIS - DOJ (Rockville, MD)	DC2		█	█	█	█	█	◇													
USCIS - DOJ (Dallas, TX)	DC1		█	█	█	█	█	◇													
USCIS TECC Verizon (Manassas, VA)	DC1/DC2					█	█	█	█	█	█	█	█	█	█	█	█	█	█	◇	
US-VISIT (DOJ)																					
US-VISIT - DOJ (Rockville, MD)	DC2		█	█	█	█	█	█	█	◇											
US-VISIT - (DOJ Dallas, TX)	DC1		█	█	█	█	█	█	◇												
Federal Emergency Management Agency (FEMA)																					
Information Technology Services Center (Bluemont, VA)	DC2		█	█	█	█	█	█	█	█	█	█	█	█	█	◇					
N. Va. Commercial Data Center - Savvis (Sterling, VA)	DC2		█	█	█	█	◇														
FEMA IT-EO-DO-TX (Denton, TX)	DC1/DC2									█	█	█	█	█	█	◇					
FEMA COOP (Plano, TX)	DC2		█	█	█	█	█	█	◇												
Transportation Security Administration (TSA)																					
IBM St. Louis Hosting Center (Hazelwood, MO)	DC2				◆ Completed Q3 FY09																
TSA Headquarters (Arlington, VA)	DC2					█	█	█	█	█	█	█	█	◇							
Annapolis Junction Data Center (Annapolis, MD)	DC2	TBD																			
Colorado Springs Data Center (Colorado Springs, CO)	DC2	TBD																			
Atlantic City Data Center (Atlantic City, NJ)	DC2					█	█	◇													
U.S. Coast Guard (USCG)																					
Aircraft Repair and Supply Center (Elizabeth City, NC)	DC1	TBD																			
OSC (Kearneysville, WV)	DC1	Waiver request																			
Coast Guard Finance Center (Chesapeake, VA)	DC1	TBD																			
OSC Disaster Recovery	DC2	TBD																			
U.S. Secret Service (USSS)																					
U.S. Secret Service (H Street, Washington D.C.)	DC1									█	█	█	█	◇							
U.S. Secret Service- DR/Back Up Data Center (Undisclosed)	DC2										█	█	█	█	█	█	█	█	◇		

◆	Completed
◇	Target Completion

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[13] According to OCIO staff, the *Congressional Data Center Migration Report, Quarter 1, Fiscal Year 2010 Report to Congress*, was not provided to the Congress.

Table D-2.   FY 2010 Multi-Year Data Center Migration Plan Provided to the Senate Appropriations Committee in May 2010

DHS DATA CENTER MIGRATION SCHEDULE	DC1/DC2	Timeline / Milestone
Customs and Border Protection (CBP)		
National Data Center (Springfield/Newington, VA)	DC1/DC2	FY2009 Q1 – FY2014 Q3 (◇ Target Completion FY2014 Q3)
Disaster Recovery Facility (Undisclosed)	DC1	◆ Completed FY08
ACE (Tysons Corner, VA)	DC1/DC2	FY2011 Q1 – FY2012 Q1 (◇ Target Completion FY2012 Q1)
DHS Headquarters (DHS HQ)		
DHS/CIO (Bluemont, VA)	DC1/DC2	FY2009 Q1 – FY2013 Q2 (◇ Target Completion FY2013 Q2)
DHS Ashburn Data Center (Ashburn, VA)	DC1	◆ Completed FY08
DHS HSDN Fair Lakes (Fairfax, VA)	DC1/DC2	◆ Completed Q4 FY09
DHS Stafford Data Center (Garrisonville, VA)	DC1	◆ Completed FY08
U.S. Immigration and Customs Enforcement (ICE)		
ICE - DOJ (Rockville, MD)	DC2	FY2009 Q2 – FY2011 Q1 (◇ Target Completion FY2011 Q1)
ICE - DOJ (Dallas, TX)	DC1	FY2009 Q2 – FY2011 Q1 (◇ Target Completion FY2011 Q1)
U.S. Citizenship and Immigration Services (USCIS)		
USCIS - DOJ (Rockville, MD)	DC2	FY2009 Q2 – FY2011 Q1 (◇ Target Completion FY2011 Q1)
USCIS - DOJ (Dallas, TX)	DC1	FY2009 Q2 – FY2011 Q1 (◇ Target Completion FY2011 Q1)
USCIS TECC Verizon (Manassas, VA)	DC1/DC2	FY2012 Q1 – FY2013 Q4 (◇ Target Completion FY2013 Q4)
U.S. Visitor and Immigrant Status Indicator Technology (US-VISIT)		
US-VISIT - DOJ (Rockville, MD)	DC2	FY2009 Q2 – FY2011 Q1 (◇ Target Completion FY2011 Q1)
US-VISIT - DOJ (Dallas, TX)	DC1	FY2009 Q2 – FY2010 Q4 (◇ Target Completion FY2010 Q4)
Federal Emergency Management Agency (FEMA)		
Information Technology Services Center (Bluemont, VA)	DC2	FY2009 Q2 – FY2012 Q3 (◇ Target Completion FY2012 Q3)
N. Va. Commercial Data Center - Sawis (Sterling, VA)	DC2	FY2009 Q2 – FY2010 Q4 (◇ Target Completion FY2010 Q4)
FEMA IT-EO-DO-TX (Denton, TX)	DC1/DC2	FY2009 Q2 – FY2012 Q3 (◇ Target Completion FY2012 Q3)
FEMA COOP (Plano, TX)	DC2	FY2009 Q2 – FY2010 Q4 (◇ Target Completion FY2010 Q4)
Transportation Security Administration (TSA)		
IBM St. Louis Hosting Center (Hazelwood, MO)	DC2	◆ Completed Q3 FY09
TSA Headquarters (Arlington, VA)	DC2	FY2010 Q1 – FY2011 Q3 (◇ Target Completion FY2011 Q3)
Annapolis Junction Data Center (Annapolis, MD)	DC2	FY2012 Q1 – FY2013 Q2 (◇ Target Completion FY2013 Q2)
Colorado Springs Data Center (Colorado Springs, CO)	DC2	FY2012 Q1 – FY2013 Q2 (◇ Target Completion FY2013 Q2)
Atlantic City Data Center (Atlantic City, NJ)	DC2	FY2013 Q1 – FY2014 Q2 (◇ Target Completion FY2014 Q2)
U.S. Coast Guard (USCG)**		
Aircraft Repair and Supply Center (Elizabeth City, NC)	DC1	FY2013 Q1 – FY2013 Q3 (◇ Target Completion FY2013 Q3)
OSC (Kearneysville, WV)	DC1	Waiver request
Coast Guard Finance Center (Chesapeake, VA)	DC1	FY2012 Q1 – FY2012 Q3 (◇ Target Completion FY2012 Q3)
OSC Disaster Recovery	DC2	TBD
U.S. Secret Service (USSS)		
U.S. Secret Service (H Street, Washington, D.C.)	DC1	FY2012 Q1 – FY2013 Q2 (◇ Target Completion FY2013 Q2)
U.S. Secret Service- DR/BackUp Center (Undisclosed)	DC2	FY2012 Q1 – FY2013 Q3 (◇ Target Completion FY2013 Q3)

◆ Completed
◇ Target Completion

Table E-1. Enterprise Data Centers

	Component	Data Center City	State	Gross Square Feet
DC1	MGMT	Stennis Space Center	MS	63,000
DC2	MGMT	Clarksville	VA	60,550

Total Gross Square Feet at Enterprise Data Centers: 123,550

Table E-2. List of Data Centers Submitted by Components in Response to OMB's August 2009 Data Call[14]

	Component	Data Center City	State	Gross Square Feet
1	CBP	Springfield	VA	54,000
2	FEMA	Anniston	AL	2,691
3	FEMA	Lakewood	CO	1,850
4	FEMA	Baton Rouge	LA	300*
5	FEMA	Harahan	LA	9,250
6	FEMA	New Orleans	LA	360*
7	FEMA	Cumberland	MD	100
8	FEMA	Frederick	MD	400
9	FEMA	Hyattsville	MD	1,100
10	FEMA	Ft. Monmouth	NJ	96
11	FEMA	Albany	NY	96
12	FEMA	New York	NY	440
13	FEMA	Hatorey	Puerto Rico	25
14	FEMA	Denton (1)	TX	894
15	FEMA	Denton (2)	TX	624
16	FEMA	Ft. Worth	TX	70
17	FEMA	Berryville (1)	VA	620
18	FEMA	Berryville (2)	VA	3,100
19	FEMA	Berryville (3)	VA	620
20	FEMA	Berryville (4)	VA	425
21	FEMA	Winchester (1)	VA	2,000
22	FEMA	Winchester (2)	VA	500
23	ICE	Denver	CO	3,000
24	ICE	Washington, DC (1)	DC	100
25	ICE	Washington, DC (2)	DC	1,500
26	ICE	Suitland	MD	3,000
27	ICE	Battle Creek	MI	3,000
28	ICE	Philadelphia	PA	3,000

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[14] According to OCIO staff, the OCIO did not administer this data call nor did they validate the information provided by the components.

29	ICE	Houston	TX	Unknown
30	ICE	Springfield	VA	Unknown
31	NPPD	Los Angeles	CA	86
32	NPPD	Pensacola (1)	FL	3,000
33	NPPD	Pensacola (2)	FL	3,000
34	NPPD	Argonne	IL	2,500
35	NPPD	Oak Ridge	TN	2,138
36	NPPD	Undisclosed	Undisclosed	1,200
37	NPPD	Arlington (1)	VA	2,400
38	NPPD	Arlington (2)	VA	275
39	NPPD	Chantilly	VA	100
40	NPPD	Fairfax	VA	480
41	NPPD	Sterling	VA	100
42	NPPD	Winchester	VA	600
43	NPPD – US-VISIT	Rockville	MD	Unknown
44	NPPD – US-VISIT	Dallas	TX	Unknown
45	TSA	Colorado Springs	CO	5,102
46	TSA	Annapolis Junction	MD	6,500
47	TSA	Atlantic City International Airport	NJ	1,852
48	TSA	Arlington (1)	VA	3,000
49	TSA	Ashburn (1)	VA	900
50	United States Coast Guard (USCG)	Elizabeth City	NC	2,356
51	USCG	Chesapeake	VA	2,607
52	USCG	**Kearneysville	WV	10,000
53	USCIS	Laguna Niguel	CA	1,200
54	USCIS	Lee's Summit	MO	1,400
55	USCIS	Lincoln	NE	1,200
56	USCIS	Dallas	TX	1,200
57	USCIS	Manassas VA	VA	2,500
58	USCIS	St. Albans	VT	1,000
59	United States Secret Service (USSS)	Washington, DC	DC	12,255
60	USSS	Olney	MD	3,475
	Total Gross Square Feet per OMB Submissions:			165,587

*Based upon DHS' Management Comments, we contacted FEMA staff for the correct size of the Baton Rouge and New Orleans server rooms.
**The USCG facility in Kearneysville, WV, is exempt from migration according to Homeland Security's FY 2010 Appropriation (P.L. 111-83).

Table E-3. DHS Data Centers Included in OCIO Inventories as of April 2010 But Not Included in the Components' Responses to the OMB August 2009 Data Call

	Component	Data Center City	State
1	CBP	Tysons Corner	VA
2	DHS MGMT	Bluemont	VA
3	FEMA	Denton (3)	TX
4	FEMA	Plano	TX
5	FEMA	Sterling	VA
6	FEMA	Unknown	VA
7	FEMA	Rocket Center	WV
8	FLETC	Glynco	GA
9	FLETC	Clinton	MD
10	FLETC	Artesia	NM
11	ICE	Broomfield	CO
12	ICE	Washington DC (3)	DC
13	ICE	Rockville	MD
14	ICE	Altoona	PA
15	ICE	Oakridge	TN
16	ICE	Dallas	TX
17	ICE	Fairfax	VA
18	NPPD/Federal Protective Service and other small sites	Unknown	Unknown
19	NPPD	College Station	TX
20	TSA	Little Rock	AR
21	TSA	Denver	CO
22	TSA	Atlantic City	NJ
23	TSA	Pittsburg	PA
24	TSA	Arlington (2)	VA
25	TSA	Ashburn (2)	VA
26	TSA	Bluemont	VA
27	TSA	Herndon	VA
28	TSA	Richland	WA
29	USCG	Undisclosed	Undisclosed
30	USCIS	Rockville	MD
31	USCIS	Dallas	TX
32	USCIS	Essex	VT

Sharon Huiswoud, Director, Department of Homeland Security, Information Technology Audits

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Matthew Worner, Senior Auditor, Department of Homeland Security, Information Technology Audits

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