United States Government Accountability Office

Report to Congressional Requesters

March 2015

BORDER SECURITY

Additional Efforts Needed to Address Persistent Challenges in Achieving Radio Interoperability

Accessible Version

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Additional Efforts Needed to Address Persistent Challenges in Achieving Radio Interoperability

Why GAO Did This Study

The lack of communications interoperability—the capability of different electronic communications systems (e.g., radios) to readily connect with one another to enable timely communications—can affect mission operations and the overall effectiveness of agencies responsible for securing the border. DHS continues to face challenges in achieving interoperable radio communications within and among federal, state, and local agencies despite investment by these agencies to improve their radio systems. GAO was asked to evaluate DHS border security and immigration tactical communications (TACCOM) programs and operational impacts resulting from interoperability challenges. This report addresses the extent to which (1) CBP and ICE have upgraded tactical communications equipment and infrastructure along the U.S. southwest border, (2) CBP and ICE have provided tactical communications training to radio users, and (3) DHS has taken actions to improve the interoperability of tactical communications along the U.S. southwest border and what challenges, if any, remain. GAO analyzed DHS documentation; visited four locations, selected for DHS prioritization of technology upgrade projects; and interviewed DHS officials.

What GAO Recommends

GAO recommends that CBP and ICE develop performance and program plans for their modernization programs, mechanisms to track training, and plans to address skills gaps in understanding radio systems. CBP and ICE concurred with the recommendations.

What GAO Found

The Department of Homeland Security (DHS), U.S. Customs and Border Protection (CBP), and U.S. Immigration and Customs Enforcement (ICE) have taken steps to upgrade tactical communications equipment and infrastructure, but could benefit by developing performance and program plans. Specifically, CBP has completed modernization projects in four of the nine sectors that compose the southwest border. Since rolling out upgrades—which include replacing and updating equipment and expanding infrastructure—CBP has not established an ongoing performance monitoring plan to determine whether the systems are working as intended. Without such a plan, CBP is not well positioned to assess whether its radio systems are functioning as intended in each location and are meeting user needs. In addition, ICE has taken some actions to modernize its tactical communications radio systems. However, ICE does not have a program plan to manage its portfolio of projects. By developing a program plan to guide ICE's overall tactical communications modernization program, ICE could better manage its program and achieve its program goals.

Additional efforts are needed to ensure that CBP and ICE agents and officers receive necessary training. CBP provided training to its agents and officers on upgraded radio systems in each southwest border location that received upgrades; however, 8 of 14 CBP radio user groups GAO met with suggested that radio users be provided with additional radio training to enhance their proficiency in using radio systems. Further, CBP does not know how many radio users are in need of training. Developing and implementing a plan to address any skills gaps related to the upgraded radio systems would help ensure more CBP radio users are able to effectively use their radios to accomplish the agency's mission. Further, developing a mechanism to identify CBP radio users in need of training would help CBP improve its ability to monitor radio user training needs. ICE provided training on the upgraded radio systems in one location, but 3 of the 4 ICE radio user groups GAO met with in field locations stated that additional training would help address challenges experienced by radio users. Further, ICE officials stated that they did not track the training that the agency provided. Developing and implementing a plan to address any skills gaps for ICE radio users related to understanding the upgraded radio systems would help ensure more ICE radio users are able to effectively use their radios to accomplish the agency's mission. Further, developing a mechanism to track training provided to ICE radio users would help ensure that the agency can address ICE radio user training needs.

DHS is taking actions to improve tactical communications interoperability among DHS components and with other federal, state, and local agencies, but it is too soon to assess whether these actions will address the various challenges CBP and ICE face in achieving interoperability. Specifically, among other actions, DHS developed a draft DHS Communications Interoperability Plan to more fully understand and address the department's underlying interoperability challenges. This draft plan outlines goals and initiatives aimed at addressing various types of interoperability challenges faced by DHS components, but since the plan has not been implemented, it is too soon to assess the extent to which this guidance will effectively address the interoperability challenges faced by DHS components.

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Abbreviations:

AES	Advanced Encryption Standard
CBP	U.S. Customs and Border Protection
DHS	Department of Homeland Security
DIP	Digital in Place
DOJ	Department of Justice
FEMA	Federal Emergency Management Agency
FLETC	Federal Law Enforcement Training Center
GHz	gigahertz
ICE	U.S. Immigration and Customs Enforcement
JWPMO	Joint Wireless Program Management Office
kHz	kilohertz
MHz	megahertz
MOU	memorandum of understanding
NIST	National Institute of Standards and Technology
NLECC	National Law Enforcement Communications Center
NTIA	National Telecommunications and Information Administration
OAM	Office of Air and Marine
OCIO	Office of the Chief Information Officer
OFO	Office of Field Operations
OTAR	Over-the-Air Rekeying
P25	Project 25
TACCOM	tactical communications
TACNET	Tactical Communications Network
TRAEN	Training Records and Enrollment Network
TSA	Transportation Security Administration
USCG	U.S. Coast Guard
USCIS	U.S. Citizenship and Immigration Services
USSS	U.S. Secret Service

March 23, 2015

Congressional Requesters

Following the terrorist attacks of September 11, 2001, and Hurricane Katrina in 2005, the lack of communications interoperability—the capability of different electronic communications systems to readily connect with one another to enable timely communications—hampered rescue efforts and the overall effectiveness of agency response operations. As we have previously reported, more than 10 years after the bipartisan 9/11 Commission reported that improvements to interoperable communications at all levels of government need to be addressed, the Department of Homeland Security (DHS) continues to face challenges in achieving interoperable communications within and among federal, state, and local agencies despite substantial investment by these agencies to improve their radio communications systems.[1] Within DHS, U.S. Customs and Border Protection (CBP) and U.S. Immigration and Customs Enforcement (ICE) agents and officers responsible for securing the southwest border depend on land mobile radio systems (radio systems) for secure, reliable, and timely exchanges of critical information to effectively carry out their mission. Since large areas of the U.S. southwest border are remote and composed of rugged terrain, it is vital to the safety and effectiveness of CBP and ICE agents and officers that their radio systems enable them to communicate with whomever they need to, when they need to, and when they are authorized to do so. The lack of interoperability can affect mission operations and put agents, officers, and the public at risk when responding officials cannot communicate with one another.[2] To effectively carry out their respective missions, CBP and ICE agents and officers require interoperable communications with one another and with state and local agencies. In 2008, DHS components, including CBP and ICE, initiated individual tactical communications (TACCOM) modernization programs to upgrade radio systems that were past expected service life to improve the performance of these systems

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[1]9/11 Commission, *The 9/11 Commission Report: Final Report of the National Commission on Terrorist Attacks Upon the United States* (Washington, D.C.: July 2004), and GAO, *Emergency Communications: Various Challenges Likely to Slow Implementation of a Public Safety Broadband Network,* GAO-12-343 (Washington, D.C.: Feb. 22, 2012).

[2]See, for example, GAO-12-343.

and to help achieve interoperability across federal, state, and local agencies that are responsible for securing the border.

You asked us to evaluate DHS border security and immigration TACCOM programs and operational impacts resulting from any interoperability challenges. This report examines the extent to which

1. CBP and ICE have upgraded tactical communications equipment and infrastructure that support the border security and immigration mission along the U.S. southwest border;

2. CBP and ICE have provided tactical communications training to radio users; and

3. DHS has taken actions to improve the interoperability of tactical communications along the U.S. southwest border and what challenges, if any, remain.

To address all of our objectives, we visited four locations along the U.S. southwest border. We selected the Tucson, Rio Grande Valley, and El Paso Border Patrol sectors based on CBP's prioritization of these modernization project sites.[3] We selected the San Diego Border Patrol sector because it has not yet received modernization upgrades, but has a significant amount of local collaboration efforts that depend on communications interoperability. These four locations also represent geographic diversity along the border in terms of terrain, and state and local governments. In each of these locations, we interviewed groups of Office of Air and Marine (OAM) agents, Office of Border Patrol (Border Patrol) agents, Office of Field Operations (OFO) officers, and ICE agents, as well as representatives from state and local agencies. In San Diego sector, we also met with the U.S. Coast Guard, attended a meeting of the San Diego Regional Coordinating Mechanism, and observed the Joint Harbor Operations Centers. We met with five to seven groups in each location; each group comprised between 3 and 14 agents or officers that were selected based on their availability during our visits. The information we obtained from these visits cannot be generalized to other Border Patrol sectors or ICE regions, but provided us with information on the perspectives of various radio system users who operate along the U.S.

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[3]CBP completed full modernization projects in five Border Patrol sectors across the United States, including Yuma, Tucson, Rio Grande Valley, El Paso, and Houlton. Because of its location on the U.S. northern border, Houlton is not within the scope of this review.

southwest border. We also interviewed knowledgeable agency officials from the CBP TACCOM program, the ICE TACCOM program, DHS's Joint Wireless Program Management Office, and DHS's Science and Technology Directorate about CBP's testing and performance monitoring efforts as well as to better understand how CBP and ICE prioritized and implemented upgrades to tactical communications equipment and infrastructure in locations along the U.S. southwest border.

To address our first objective, we analyzed CBP and ICE documents on their tactical communications equipment and infrastructure. For example, we analyzed CBP's limited user test reports for sectors along the southwest border and compared CBP's operational test events against key acquisition practices established by DHS's Acquisition Directive 102-01 and CBP's TACCOM Test and Evaluation Master Plan dated June 2013.[4] Further, to assess the extent to which CBP monitors radio system performance, we reviewed daily, weekly, and quarterly reports on radio system availability, which included information on system outages, maintained by officials from CBP's National Law Enforcement Communications Center (NLECC). We also reviewed internal ICE budget documentation and ICE's integrated master schedule, which included time frames and cost information for 58 ongoing, planned, and completed ICE modernization projects. Additionally, we evaluated CBP's performance monitoring efforts against standards in *Standards for Internal Control in the Federal Government* to determine the extent to which the agency has developed plans to monitor the performance of its deployed radio systems to evaluate the effectiveness of these systems.[5] We also compared ICE's program management activities against standards in the Project Management Institute's *The Standard for Program Management.*[6]

To address our second objective, we analyzed the amount and type of training CBP and ICE provided to radio users in locations along the U.S.

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[4]DHS, *Acquisition Management Instruction/Guidebook 102-01-001*, (Oct. 10, 2011). U.S. Customs and Border Protection, *Test and Evaluation Master Plan for the Tactical Communications Modernization Program* (June 26, 2013).

[5]GAO, *Standards for Internal Control in the Federal Government,* GAO/AIMD-00-21.3.1 (Washington, D.C.: Nov. 1, 1999).

[6]Project Management Institute, *The Standard for Program Management*, third edition (Newtown Square, Pa.: 2013).

southwest border. For both CBP and ICE, we analyzed samples of training materials for content of training provided to CBP and ICE radio users. In addition, for CBP, we analyzed training completion data for all CBP locations along the U.S. southwest border to determine the percentage of CBP radio users who received the training from 2009 through 2014. We assessed the reliability of the training data we used by interviewing officials responsible for recording training completion records in CBP's Training Records and Enrollment Network (TRAEN) about applicable quality control procedures to ensure the accuracy and integrity of the data. We determined these data were sufficiently reliable for the purposes of this report. We compared the extent to which CBP and ICE met radio user training needs with training guidance established by DHS's SAFECOM based on the Interoperability Continuum tool and CBP's Operational Requirements Document as well as against standards in *Standards for Internal Control in the Federal Government*.[7] We also interviewed groups of CBP and ICE radio users during our site visits to discuss the extent to which they received training on the functions of the upgraded radio systems as well as practices and protocols for conducting interoperable communications with other agencies and to obtain their views on the extent to which any training they received met their needs.

To address our third objective, we assessed actions taken by DHS to enhance interoperability among DHS components and compared these actions with guidance established by DHS's SAFECOM based on the Interoperability Continuum tool as well as the draft DHS Communications Interoperability Plan.[8] Further, we interviewed groups of CBP and ICE radio users we met during our site visits to obtain their views on challenges they face using the radio systems and conducting interoperable communications with other agencies as well as any mission impacts resulting from communication challenges, including the lack of interoperability. We also interviewed knowledgeable agency officials from headquarters offices, including Border Patrol, OFO, OAM, and ICE

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[7]DHS SAFECOM, *Operational Guide for the Interoperability Continuum Lessons Learned from RapidCom.* The DHS SAFECOM Interoperability Continuum is a tool that identifies elements critical to the advancement of interoperability. U.S. Customs and Border Protection, *Operational Requirements Document for CBP Tactical Communications Modernization* (January, 2012). CBP's Operational Requirements Document describes the capabilities that CBP's operational components need across the country. GAO/AIMD-00-21.3.1.

[8]DHS, DHS Communications Interoperability Plan, (December 2013).

Homeland Security Investigations, as well as the CBP and ICE TACCOM program offices, to obtain their perspectives on the challenges each office faces in achieving interoperability.

We conducted this performance audit from December 2013 to March 2015 in accordance with 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 on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

CBP and ICE Roles and Responsibilities

DHS is responsible for securing U.S. borders, in collaboration with other federal, state, local, and tribal entities. CBP, a component within DHS that is the lead agency for border security, is responsible for, among other things, preventing terrorists and their weapons from entering the United States and for interdicting persons and contraband crossing the border illegally. Within CBP, OFO is responsible for securing the border at ports of entry.[9] Border Patrol is the CBP component charged with ensuring security along border areas between the ports of entry. Additionally, CBP's OAM provides air and maritime support to secure the national border between the ports of entry, within maritime operating areas, and within the nation's borders. ICE, a component within DHS, is responsible for the investigation and enforcement of border control, customs, and immigration laws. Within ICE, Homeland Security Investigations is responsible for disrupting and dismantling transnational criminal organizations engaged in smuggling and other cross-border criminal activities that seek to exploit the United States' legitimate travel, trade, financial, and immigration systems for illicit purposes. DHS, CBP, and ICE components also coordinate their border security efforts with various other federal, state, local, and tribal entities. Figure 1 shows the Border Patrol sectors and ICE regions that represent geographic focus areas for

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[9]Ports of entry are officially designated places that provide for the arrival at, or departure from, the United States.

tactical communications modernization upgrade projects, within the southwestern United States.

Figure 1: Geographic Focus Areas for Border Patrol and Immigration and Customs Enforcement (ICE) Tactical Communications Modernization along the Southwest Border
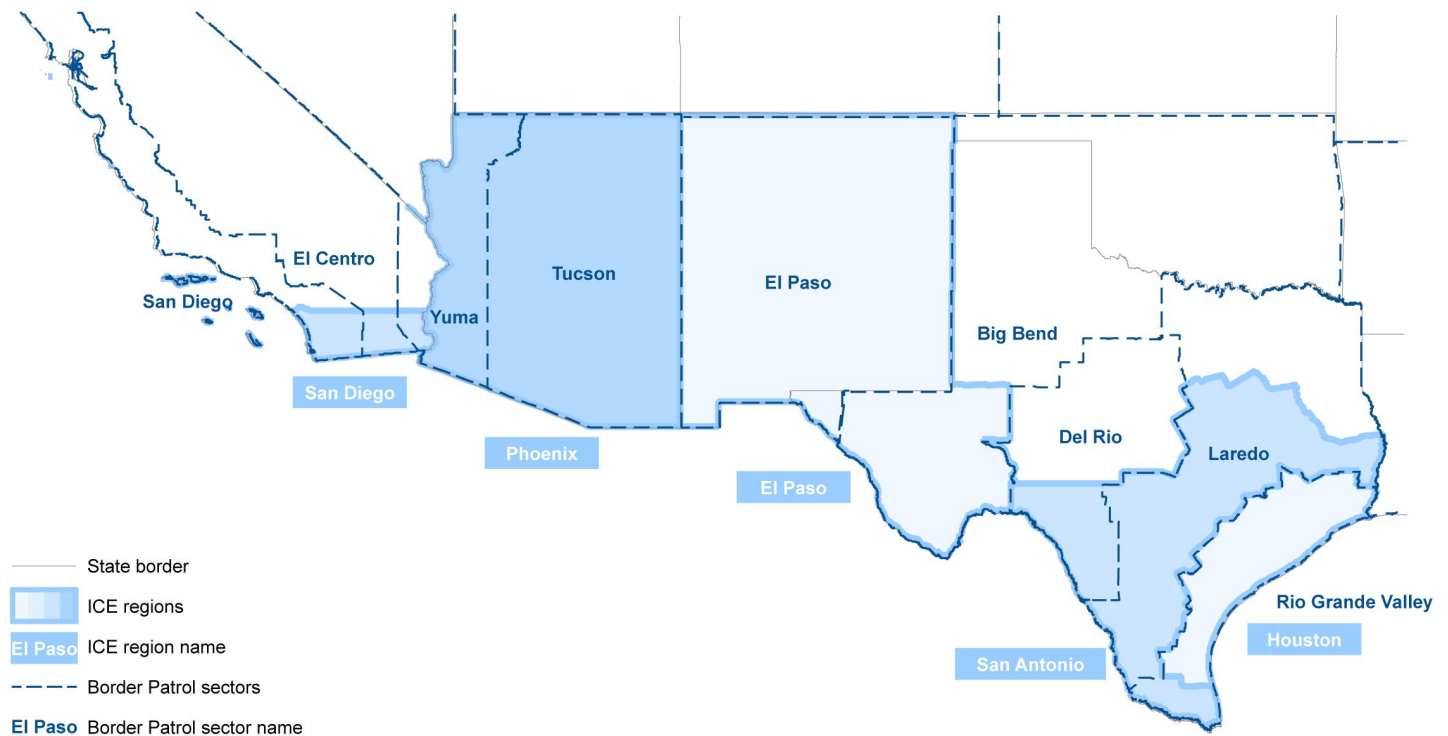
Source: GAO analysis of U.S. Customs and Border Protection and ICE information; MapInfo (map). | GAO-15-201

Note: The customers within each Border Patrol sector include Office of Field Operations and Office of Air and Marine as well as Border Patrol.

There are 20 Border Patrol sectors across the United States. The 9 Border Patrol sectors that constitute the southwest border are San Diego, El Centro, Yuma, Tucson, El Paso, Big Bend, Laredo, Del Rio, and Rio Grande Valley. There are 26 ICE regions across the United States. The 5 ICE regions that constitute the southwest border are San Diego, Phoenix, El Paso, San Antonio, and Houston.

## Overview of Land Mobile Radio Networks and Infrastructure

Along the southwest border, CBP and ICE primarily operate on CBP's radio network, which is controlled from and by NLECC, located in Orlando, Florida.[10] A land mobile radio system is the primary voice communications tool for agents and officers to communicate with one another and with dispatchers and typically consists of the following:

- **subscriber units:** portable radios used for handheld operation and mobile radios used for vehicular operation;

- **repeaters:** can be portable or fixed and are used for retransmitting radio user transmissions to extend the range for radio communications;

- **fixed site equipment:** used to provide single-site and wide-area coverage for radio operation and includes routers, antennas, and towers, among other things; and

- **key management facilities:** used to provide Over-the-Air Rekeying (OTAR) to allow for encrypted communications. CBP's OTAR system is located at the NLECC and generates, distributes, and manages national voice and data encryption keys for DHS agencies as well as other federal, state, and local law enforcement agencies.

Figure 2 illustrates the basic components of a radio system.

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[10]According to CBP officials, in the San Diego sector, the majority of CBP and ICE agents and officers operate on the Integrated Wireless Network, owned by the Department of Justice (DOJ). The Integrated Wireless Network was initially installed in California prior to the formation of DHS and was the first digital P25 encrypted narrowband system in the nation. While DOJ owns the Integrated Wireless Network, CBP is the largest customer on the network in San Diego, and DHS contributes funding to maintain the network. DHS is engaged with DOJ to transition the management of and operation of the San Diego Integrated Wireless Network capability to DHS, but officials have not yet determined a time frame for when this will be complete. CBP plans to make additional upgrades to the Integrated Wireless Network once the transition is complete. In 2001, the Integrated Wireless Network was initiated as a collaborative effort among DOJ, DHS, and the Department of the Treasury to provide secure, seamless, interoperable, and reliable nationwide wireless communication in support of federal agencies and officers engaged in law enforcement, protective services, homeland defense, and disaster response missions. However, GAO reported in December 2008 that the departments were no longer pursuing the Integrated Wireless Network as a joint development project and had begun independently modernizing their own wireless communications systems. See GAO, *2014 Annual Report: Additional Opportunities to Reduce Fragmentation, Overlap, and Duplication and Achieve Other Financial Benefits*, GAO-14-343SP (Washington, D.C.: Apr. 8, 2014).

Figure 2: Depiction of a Land Mobile Radio System
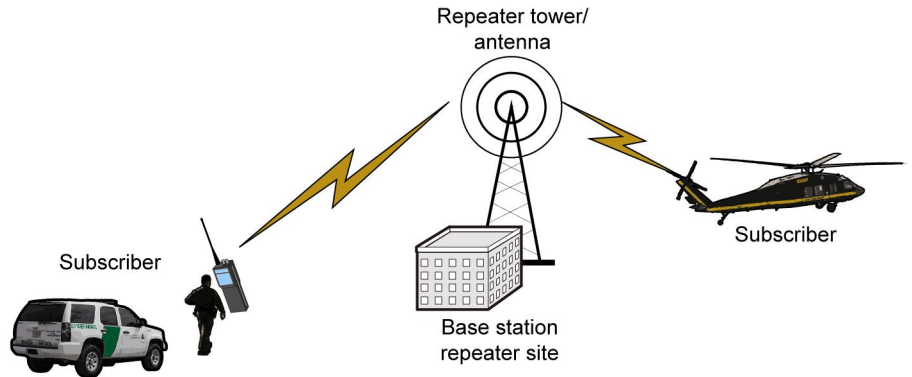
Source: GAO analysis of U.S. Customs and Border Protection information; Art Explosion (clip art). | GAO-15-201

Land Mobile Radio System Requirements and Mandates

DHS radio systems must meet three key requirements, as described below.

Narrowband mandate. In 1992, Congress passed the Telecommunications Authorization Act, title I of which established, within the Department of Commerce, the National Telecommunications and Information Administration (NTIA).[11] NTIA is led by the Assistant Secretary of Commerce for Communications and Information and, as relevant here, is tasked with advancing policies to foster effective use of

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[11]National Telecommunications and Information Administration Organization Act, Pub. L. No. 102-538, tit. I, 106 Stat. 3533, 3533-3542 (codified as amended at 47 U.S.C. §§ 901-904, 921-929, 941-942; and 42 U.S.C. § 254r note).

the radio spectrum by the federal government.[12] NTIA serves as the President's principal advisor on telecommunications and information policy and manages federally assigned spectrum. NTIA has authority to issue rules and regulations as may be necessary to ensure the effective, efficient, and equitable use of spectrum both nationally and internationally. As part of its authority under 47 U.S.C. § 902(b)(2)(A), NTIA developed the *Manual of Regulations and Procedures for Federal Radio Frequency Management* (NTIA Manual), which is the compilation of policies and procedures that govern the use of the radio frequency spectrum by the U.S. government.[13] Federal agencies must comply with the requirements set forth in the NTIA Manual.[14] With respect to land mobile systems, pursuant to the NTIA Manual, narrowband frequency modulation (FM) is conventional FM with channel spacing of 12.5 kilohertz (kHz) or less, instead of 25 kHz. In accordance with the NTIA Manual, the federal government is required to foster the development of, and standards for narrowband land mobile systems, and institute plans to narrowband land mobile systems operating in certain bands according to a specific schedule. With certain exceptions, the channel bandwidth in certain frequency bands used by federal agencies for radio systems was

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[12]47 U.S.C. § 901(c)(4). Among other functions, NTIA authorizes the U.S. government's use of the radio frequency spectrum, and is responsible to promote the best possible and most efficient use of electromagnetic spectrum resources across the federal government. 47 U.S.C. § 902(b)(2)(A), (U). The radio frequency spectrum is the part of the natural spectrum of electromagnetic radiation lying between the frequency limits of 3 kilohertz (kHz) and 300 gigahertz (GHz). Radio frequencies are grouped into bands and are measured in units of Hertz, or cycles per second. The term "kHz" refers to thousands of Hertz, "megahertz" (MHz) to millions of Hertz, and "GHz" to billions of Hertz. The Hertz unit of measurement is used to refer to both the quantity of spectrum (such as 500 MHz of spectrum) and the frequency bands (such as the 1710–1755 MHz band). In the U.S., responsibility for spectrum management is divided between NTIA and the Federal Communications Commission (FCC). NTIA and FCC jointly determine the amount of spectrum allocated for federal, nonfederal, and shared use. NTIA is responsible for managing the federal government's use of spectrum, while the FCC is responsible for managing nonfederal spectrum use.

[13]The NTIA Manual is issued by the Assistant Secretary of Commerce for Communications and Information, and is specifically designed to meet the Assistant Secretary's frequency management responsibilities under 47 U.S.C. §§ 901, et seq., and Exec. Order No. 12,046, 43 Fed. Reg. 13,349 (March 27, 1978). See 47 C.F.R. § 300.1(a).

[14]See 47 C.F.R. § 300.1(b); 47 U.S.C. §§ 902(b)(2)(D), 904(c)(1).

to be reduced from 25 to 12.5 kHz, effective January 1, 2008.[15] This reduction in channel bandwidth is referred to as narrowbanding.

Project 25. Since 1989, federal agencies have collaborated with public safety associations to establish common technical standards, called Project 25 (P25), for radio systems and devices. The purpose of these technical standards is to support interoperability among different radio systems, and to enable seamless communication across federal, state, and local agencies and jurisdictions. The P25 suite of standards is intended to promote interoperability by making radio systems and devices compatible regardless of the manufacturer. DHS Sensitive Systems Policy Directive 4300A, implementing DHS Management Directive 140-01, Information Technology System Security, requires compliance with P25 standards for all DHS tactical wireless communication systems procurements.

Advanced Encryption Standard (AES). DHS mandates the protection of all law-enforcement sensitive voice communications through the use of encryption. Encryption requires the use of an algorithm and a cryptographic key to encode messages at the origin and decode messages at the receiver. Federal departments and agencies are required to use encryption algorithms approved by the National Institute of Standards and Technology (NIST), such as the Advanced Encryption Standard used by DHS, for federal land mobile systems to protect sensitive information from being compromised.

Overview of DHS Border Security and Immigration TACCOM Programs

CBP and ICE have separate modernization efforts under each component's respective TACCOM program. These modernization efforts are focused on upgrading existing radio systems equipment and infrastructure to comply with DHS requirements and expand coverage and capacity.

CBP TACCOM. The CBP TACCOM modernization program, initiated in 2008, oversees the upgrade and modernization of existing outdated radio systems, to support more than 44,000 CBP law enforcement personnel in

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[15]Federal radio stations and systems that were already operational; procured prior to January 1, 2008; or that have been approved by NTIA will be allowed to operate in accordance with existing standards and without modification until the end of the life cycle of the equipment.

their daily operations across the nation. Through this program, CBP plans to modernize existing radio systems with digital technologies that provide AES while also meeting the federal narrowbanding mandate and P25 standards. For fiscal year 2009, CBP was appropriated $160 million in American Recovery and Reinvestment Act of 2009 (Recovery Act) funds for salaries and expenses, of which $100 million was for the procurement and deployment of new or replacement nonintrusive inspection systems, and $60 million was for procurement and deployment of TACCOM equipment and radios. Under the Recovery Act, CBP also received an additional $100 million for Border Security Fencing, Infrastructure, and Technology (BSFIT), for expedited development and deployment of border security technology on the southwest border.

ICE TACCOM. The ICE TACCOM modernization program aims to replace aging legacy tactical communications networks with digital P25 compliant upgrades that provide AES encryption capabilities and meet the federal narrowband mandate to improve communications, interoperability, and coordination for ICE personnel during field operations. Pursuant to the Recovery Act, for fiscal year 2009, ICE received $20 million for automation modernization, for the procurement and deployment of tactical communications equipment and radios. In addition to Recovery Act funds, the TACCOM program is funded out of the Automation Modernization account for new investments and ICE base budget for operations and maintenance. The ICE TACCOM program received $10 million in fiscal year 2009 and $8 million in fiscal year 2011 from the Automation Modernization account and has not received any funding for its modernization efforts since 2011.

DHS TACNET. In 2009, DHS estimated that it would cost $3 billion and take two decades to modernize the individual radio systems of all DHS components, including CBP and ICE. Accordingly, the DHS Acquisition Review Board mandated DHS components to work with the DHS Office of the Chief Information Officer to find alternatives to this approach. Conceived in 2011, the Tactical Communications Network (TACNET) is a separate program focused on developing next-generation communications technologies to meet DHS-wide interoperability needs, such as tactical broadband. However, as we have previously reported, while such a network would likely enhance interoperability, it would not support mission-critical voice capabilities for 10 or more years.[16] TACNET

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[16]GAO-12-343.

is currently unfunded, but the DHS Acquisition Review Board granted approval to pursue the technical demonstration project on March 31, 2011.[17] DHS intends for TACNET to eventually leverage this capability to consolidate individual DHS component TACCOM programs, including the components' separate modernization projects.

DHS SAFECOM

SAFECOM is a communications program that provides support, including research and development, to address interoperable communications issues. Led by an executive committee, SAFECOM has members from state and local emergency responders as well as intergovernmental and national public safety communications associations. DHS draws on this expertise to help develop guidance and policy. Among other activities, SAFECOM developed the Interoperability Continuum to assist emergency response agencies and policymakers to plan and implement interoperability solutions for data and voice communications. This tool identifies five critical success elements that must be addressed to achieve a sophisticated interoperability solution: governance, standard operating procedures, technology, training and exercises, and usage of interoperable communications.

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[17]The DHS Science and Technology Directorate is conducting technology demonstration pilot tests of currently available technology to provide for the ability to select technology solutions for TACNET.

DHS Components Have Taken Steps to Upgrade Tactical Communications Equipment and Infrastructure, but Could Benefit by Developing Performance and Program Plans

CBP Has Completed Most TACCOM Modernization Projects in Southwest Border Locations, but Could Benefit from Developing a Performance Monitoring Plan

From 2009 through 2013, CBP completed full modernization projects in 4 of the 9 sectors that constitute the southwest border. In these 4 sectors, Yuma, Tucson, Rio Grande Valley, and El Paso, CBP has

- upgraded outdated analog tactical communications equipment and infrastructure to digital systems that meet the narrowband mandate and are compliant with both P25 interoperability standards and AES encryption capabilities, and

- expanded coverage and provided capacity enhancements by procuring additional equipment and building out new tower sites in areas where CBP agents operate that were not previously covered with existing infrastructure.

In 2009, CBP determined that the TACCOM modernization program was not cost-effective and would take too long to complete. Accordingly, CBP revised its modernization approach for all remaining sectors, halting the addition of any new tower sites, and in conjunction with the approval of TACNET in 2011, adding a project known as Digital in Place (DIP) as a capstone to this program with the expectation that DIP would provide a digital baseline for TACNET. The scope of the DIP project entails upgrading the remaining analog radio sites to the P25 digital systems with AES encryption capabilities and does not provide additional coverage or capacity enhancements. This project provides one-for-one replacements of analog systems with digital systems. CBP plans to implement DIP in the remaining five sectors along the southwest border that did not receive full modernization upgrades. As of September 2014, DIP projects have

been completed in three of the five remaining sectors along the southwest border—Big Bend, Laredo, and Del Rio—and are currently under way in other locations across the nation. According to CBP, because DIP does not include new site build-outs or the need to obtain additional frequency licenses, this approach will greatly reduce the costs associated with the full modernization approach and will be completed in a relatively shorter time period. For example, in 2009, CBP estimated that full modernization of all CBP sites in the nation would cost $1.3 billion for development and implementation, not including life cycle costs, and would take 20 years to complete. In comparison, CBP estimated that the total cost, including life cycle costs, to implement DIP in the remaining sectors would be about $410 million in addition to the cost of the five original modernization projects—for a total life cycle cost of approximately $945 million, and would be completed by 2016. However, according to CBP officials, the agency currently anticipates that some of the infrastructure upgrades for these projects will be completed in 2018, because of resource constraints.

CBP developed a Test and Evaluation Master Plan, dated June 2013, for the Rio Grande Valley, El Paso, and DIP projects. The plan stated that the conceptual design for all projects under the TACCOM modernization program is based on commercial-off-the-shelf proven technology. According to DHS's Acquisition Directive 102-01 and its associated guidebook, operational testing results should be used to evaluate the degree to which the system meets its requirements and can operate in the real world with real users like CBP and ICE radio users. Moreover, this guidance states that even for commercial-off-the-shelf systems, operational test and evaluation should occur in the environmental conditions in which a system will be used before a full production decision for the system is made and the system is subsequently deployed. This guidance also states that for commercial-off-the-shelf systems, operational tests should be conducted to ensure that the systems satisfy user-defined requirements.

CBP initially had plans to conduct operational tests in multiple sectors; however, it conducted the operational test in one sector, Rio Grande Valley, and such testing was limited. CBP did not conduct operational testing in Yuma, Tucson, or El Paso, although the agency did perform some tests with users in real operational environments for each of these sectors. According to DHS and CBP officials, formal test plans were not executed in Tucson or Yuma because of resource constraints and changing agency priorities. In Rio Grande Valley, CBP conducted a limited user test, which served as the operational test and evaluation

event to determine whether TACCOM was operationally effective and suitable for deployment and met user needs. According to the Rio Grande Valley limited user test report, the radio system tested in Rio Grande Valley was found to be operationally effective and met the coverage and availability key performance requirements. However, the limited user test report also noted that operational suitability—which included assessments of interoperability, reliability, availability, and maintainability—was undetermined because insufficient data were collected to make a definitive determination. The Rio Grande Valley limited user test report also noted that since testing was conducted only at a singular focus area, system impacts and CBP agent and officer input from untested sites remain unknown. CBP officials stated that a separate operational test and evaluation event was not conducted for the El Paso focus area because the Rio Grande Valley results were used to evaluate both sectors, given that the same radio systems were deployed to El Paso and Rio Grande Valley. Despite these limitations, an official from the DHS Science and Technology Directorate who oversaw CBP's operational testing stated that the operational testing conducted by CBP in Rio Grande Valley provided reasonable assurance that CBP's radio system met key performance requirements in accordance with DHS acquisition guidance because the agency determined that Rio Grande Valley best represented the weather and terrain features across all four southwest border TACCOM project locations, which are the key variables that could affect test results based on location.

CBP has completed deployment of radio systems to four southwest border sectors—Rio Grande Valley, El Paso, Tucson, and Yuma—and has upgraded existing systems in three southwest border sectors—Big Bend, Laredo, and Del Rio—and both CBP and DHS officials stated that the agency does not plan to conduct additional testing on the deployed systems or conduct any operational testing for the DIP projects because the agency is replacing outdated equipment with commercial-off-the-shelf technology on a one-for-one basis. Moreover, CBP has taken other actions to assess the implementation of the systems deployed in those sectors. For example, in 2012, CBP completed an operational analysis of upgrades in Tucson and Yuma under the TACCOM modernization program to determine if the investment in those sectors was meeting its performance goals. According to the operational analysis report, the modernization upgrades completed in Tucson and Yuma delivered quantifiable benefits with the addition of 17 new radio sites, which provided additional coverage, and the replacement of outdated equipment with new digital equipment resulted in increased availability of radio systems. The report also included the results of an end user survey that

was conducted as part of the operational readiness review process in fiscal year 2011 to assess user satisfaction with the deployed system. While the user satisfaction survey indicated an acceptable level of satisfaction with the availability and usability of the system, the report also noted several operational issues experienced by users during the transition from the analog system to the digital system, including poor radio coverage in specific locations, the perception that the old analog system provided better coverage than the digital system because of signals fading in a different manner, and users experiencing communications bleed over between some sites, which occurs when radio transmissions are overheard by radio users who are not the intended recipients. However, CBP continued to move forward with the current modernization approach given the need for immediate improvements in communications capability and the lack of a viable alternative technology that could be deployed. Moreover, since the TACCOM investment would have a life cycle of at least 10 years, the report concluded that this investment would support CBP radio users through the transition period needed to establish a next-generation broadband network. In addition, CBP officials stated that the agency collects information on radio system availability and maintenance. For example, CBP NLECC officials track daily system outages for sites that have been upgraded and provide weekly reports to management on this information, including how long outages lasted and how issues were resolved. CBP also tracks and resolves radio hardware issues reported by users in the field.

While these are positive steps, CBP has not developed an agency-wide plan to monitor the performance of its radio systems. In particular, CBP has not yet collected sufficient data to determine how well the systems are functioning within and across sectors, and has not obtained perspectives from radio users since the systems were deployed in each location. Such information could help CBP better identify any challenges with use of the system and assess system performance. For example, although CBP collects information on radio system availability and maintenance, CBP officials stated that they have not used this information to assess overall system performance to determine the extent to which upgraded radio systems are meeting user needs or to identify areas in need of corrective action. According to CBP officials, the agency has not yet analyzed available data to determine the extent to which upgraded radio systems are meeting user needs or to identify areas in need of corrective action because complete operational data have not been collected for all sites to which radio systems were deployed and because these data are maintained across different repositories that are not

currently linked together. According to CBP officials, the agency recognizes the need to collect sufficient data to monitor radio system performance and is taking steps to address this need by collecting data in recently modernized sites, including El Paso. Once the data have been collected, the agency plans to consolidate these data in a central repository. While this may be a useful practice, a performance monitoring plan, including information on how data will be collected across all sites and how these data will be used to monitor the performance of deployed radio systems, could better position CBP to assess whether its radio systems are functioning as intended in each location or whether they are meeting user needs.

Moreover, most of the groups of CBP radio users we met with reported experiencing challenges relating to operational performance. For example, 7 of the 10 groups of CBP radio users we met with in the Tucson, Rio Grande Valley, and El Paso sectors stated that coverage gaps continued to affect their ability to communicate, even after the upgrades were completed. Specifically, 2 groups stated that coverage in some areas seemed to be worse after the upgrades were completed, 4 groups stated that coverage gaps had been reduced but continued to exist after the upgrades, and 1 group stated that while coverage had improved in some areas, the group did not receive the coverage enhancements it expected to receive, especially in critical areas. As another example, 10 of 14 CBP radio users we met with reported experiencing challenges related to frequency saturation—whereby too many users are operating simultaneously on one channel, blocking other users from being able to access that channel. CBP agents and officers we met with also reported instances in which operability challenges delayed or prevented their ability to communicate with agents or officers from other agencies, which resulted in missed apprehensions of suspects or inefficient use of resources. Specifically, 1 group of Border Patrol radio users we met with stated that a common practice is to assign a Border Patrol agent to work alongside agents or officers from other agencies, such as ICE, to facilitate interoperability by relaying interagency communications, which they cited as an inefficient use of agency resources. According to CBP officials, these challenges may also be attributed to lack of training or understanding of standard operating procedures, which we discuss later in this report.

Standards for Internal Control in the Federal Government calls for agencies to identify, capture, and distribute operational data to determine whether an agency is meeting its goals and effectively using resources.[18] This guidance also calls for agencies to ensure that ongoing monitoring occurs during the course of normal operations to help evaluate program effectiveness. According to CBP officials, the agency has not yet developed a performance monitoring plan because the system is not yet mature, but it is working to establish reliable system performance measures in the interim, and would initiate a formal performance plan once the system and support cultures mature. Officials were unable to provide specific details about what the performance plan would contain or a time frame for when they would establish the plan. However, as CBP agents and officers are currently using radio systems on a daily basis and given the operational testing limitations previously discussed, without a performance monitoring plan, CBP is not well positioned to identify issues experienced by current CBP users in a timely manner and actions that could address those identified issues.

ICE Has Taken Some Actions to Modernize Technology on the Southwest Border but Does Not Have Complete Information to Effectively Manage Its Program

ICE has 58 completed, ongoing, or planned projects under its TACCOM modernization program and has taken some actions to modernize its TACCOM radio systems, including along the southwest border. Specifically, according to ICE officials, the agency has replaced individual analog TACCOM radios and equipment with digital systems that comply with P25 standards and the narrowband mandate, and provide AES encryption capabilities across all 26 ICE regions, including the southwest border regions. In addition, while ICE has completed full modernization projects—which entail expanding coverage and capacity by building new sites—in other regions across the United States, it has not developed plans to modernize any southwest border regions. Instead, to meet the needs of ICE radio users in the southwest border regions, ICE officials stated that the agency's strategy has focused on leveraging other agency infrastructure in areas where ICE does not have infrastructure until funding is approved to initiate modernization projects in these regions. For example, in Yuma and Tucson, ICE officials stated that the agency primarily uses CBP's radio system. Moreover, ICE is a stakeholder on CBP's full modernization and DIP projects since ICE's primary means of tactical communication in these locations is on the CBP network.

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[18]GAO/AIMD-00-21.3.1.

Specifically, ICE officials stated that the agency provided 76 repeaters for installation at over 65 CBP sites located in Arizona, New Mexico, and Texas. Additionally, ICE is converting ICE radio users over to the CBP digital networks and implementing radio programming changes to enable ICE radio users to communicate on these networks. ICE officials also stated that the agency has entered into agreements with certain state and local agencies to use their channels in areas where ICE lacks radio coverage and also has a need to communicate daily with these mission partners.

ICE has developed some documentation for the individual projects, such as individual project plans, and provided us with an integrated master schedule for the 58 ongoing, planned, and completed projects. While these documents have helped ICE manage its individual projects in specific locations, ICE has not documented an overall plan to manage its TACCOM modernization program and provide oversight across all projects. For example, ICE officials were unable to provide documentation that all TACCOM equipment had been upgraded to digital systems.[19] A program plan could provide ICE with more information on how TACCOM resources have been expended and how projects are prioritized in a manner that meets ICE mission and user needs. CBP's TACCOM program developed program plan documentation, such as an acquisition plan, operational requirements document, and life cycle cost estimate, among others, to meet the requirements of DHS Acquisition Directive 102-01. However, according to ICE TACCOM officials, the agency has not developed such documentation because the ICE program was not required to develop acquisition documentation in accordance with the DHS acquisition directive because the program was already in sustainment—e.g., project implementation phase complete—prior to 2008, when the directive was issued.

Best practices in program management call for agencies to document fundamental program information. According to the Project Management Institute's *The Standard for Program Management*, programs should, among other things, be defined in terms of expected outcomes, resources needed, and the complexity of delivering the changes needed to

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[19]ICE TACCOM program officials stated that they could not locate this information because they do not have program documentation prior to 2009, when ICE's Office of the Chief Information Officer (OCIO) assumed responsibility for the ICE TACCOM program.

implement new capabilities across the organization.[20] The program plan contains many elements, includes many documents, and formally expresses the organization's concept, vision, mission, and expected benefits produced by the program; it also defines program-specific goals and objectives. The program plan is the overall documented reference by which the program will measure its success throughout its duration, including all phases, customer contracts, new business offers, and long-term goals and objectives. It should include the metrics for success, a method for measurement, and a clear definition of success.

An overarching TACCOM modernization program plan could better position ICE to manage its portfolio of projects, including proposed projects, under the TACCOM modernization program and provide documentation explaining TACCOM modernization program goals, critical mission needs, and how specific modernization projects are prioritized based on these needs. ICE has requested funding for TACCOM modernization projects along the southwest border in recent fiscal years. For example, ICE requested funding to modernize two southwest border regions in its fiscal year 2014 budget request. For fiscal year 2014, ICE TACCOM requested $21 million for upgrades in San Antonio and Houston, but did not receive any funding for this year. In its fiscal year 2015 budget request, ICE added two more southwest border regions, requesting $42 million to fully upgrade four of the five ICE regions along the southwest border—San Antonio, Houston, El Paso, and Phoenix.[21] A program plan could help ICE better oversee its prioritization of individual projects for resources and funding.

Moreover, a program plan could help ICE better determine whether the agency is prioritizing modernization projects and expending resources on technology upgrades in a manner that meets its radio user needs. ICE officials stated that since completing its initial coverage assessment in 2008, the number of ICE radio users has grown and exceeded the capacity of existing ICE infrastructure in southwest border locations. For example, according to data provided by ICE, the agency had 228 agents

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[20]Project Management Institute, *The Standard for Program Management,* third edition.

[21]According to officials, while there is a critical need to upgrade San Diego, ICE has not made any plans to do so until DHS takes over the management and control of the Integrated Wireless Network. ICE officials stated that they plan to work with CBP to determine how to upgrade the San Diego Integrated Wireless Network.

assigned to the El Paso region in 2009, which increased to 274 agents in 2014; and 292 agents assigned to the Phoenix region in 2009, which increased to 347 agents in 2014. Additionally, our interviews with groups of ICE radio users showed that agency efforts to upgrade its TACCOM technology may not be supporting ICE radio user needs along the southwest border. For example, two of the three groups of ICE radio users we met with in Tucson, Rio Grande Valley, and El Paso that operate on CBP land mobile radio networks stated that coverage was worse after the upgrades or did not meet ICE radio user needs because the new system did not provide the capabilities the agency promised to deliver. The third group stated that CBP's modernization project upgrades enhanced coverage in a limited capacity but created new challenges for ICE because of the increase in communication traffic. Specifically, ICE radio users in this location stated that since they are using CBP channels, Border Patrol has priority of use, so when there is too much traffic on a channel, ICE radio users are unable to access the channel or get kicked off the system and hear a busy signal when attempting to use their radios. All four groups of ICE radio users we met with stated that operability and interoperability challenges frequently compromised their investigations and resulted in unacceptable risks to officer safety.

According to ICE officials, the agency recognizes that ICE radio user coverage needs have not been met in the southwest border areas and is currently taking steps to assess radio user needs in these locations. Specifically, ICE officials stated that they are soliciting information from radio users on their operational needs and briefing ICE management to inform future decisions about ICE coverage and funding needs. However, ICE officials stated that there are no plans for creating a program plan to guide and document these efforts. By developing a program plan to guide ICE's overall TACCOM modernization program, ICE could more clearly articulate radio user needs, resource needs, and the goals of the program, as well as allow officials to identify any corrective actions needed to ensure that ICE radio systems are meeting ICE user needs.

Additional Efforts Are Needed to Ensure That CBP and ICE Agents and Officers Receive Necessary Training

CBP Training

CBP provided training to Border Patrol, OAM, and OFO agents and officers on its upgraded digital systems in each southwest border location that received modernization upgrades, but could do more to ensure it is meeting the training needs of all CBP radio users. According to the DHS SAFECOM Interoperability Continuum, effective training and exercise programs to practice communications interoperability are essential for ensuring that the technology works and responders are able to effectively communicate during emergencies. The DHS SAFECOM *Operational Guide for the Interoperability Continuum* specifically highlights the importance of training when new technology is procured, stating "when a region procures new equipment, that region should plan training and conduct exercises to learn how to make the best use of that equipment."[22] CBP's TACCOM Modernization Operational Requirements Document states that agents will receive training at the time that equipment is deployed and that refresher training will be provided as required because of either system reconfigurations or personnel turnover. This document further states that user training will be provided in a classroom setting to agents and officers in the field locations as close to deployment as possible.

To help ensure radio users understood the functions and capabilities of the newly upgraded digital systems in each of the four areas along the southwest border where modernization projects were completed, CBP provided training to Border Patrol agents and OFO officers on the functions of radio equipment and systems, encryption policies and processes for conducting secure communications, unique coverage maps depicting specific location information where radio users can expect their

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[22]DHS SAFECOM, *Operational Guide for the Interoperability Continuum Lessons Learned from RapidCom.*

radios to operate, how to troubleshoot common technical challenges, and information about practices and protocols for conducting interoperable communications with other agencies.[23] However, CBP radio users we met with reported experiencing communication challenges that they identified could be addressed with additional training to enhance their skills and help them overcome these communication challenges. Specifically, 8 of 14 CBP radio user groups we met with suggested that radio users be provided with additional radio training to enhance their proficiency in using radio systems. Two groups also noted that CBP agents receive intensive firearm training and must demonstrate proficiency with their firearms on a quarterly basis, yet they use their radios far more frequently than they do their firearms and are not required to demonstrate proficiency in using their radios. Moreover, although CBP provided training in each location, 3 groups stated that they did not receive any formal training and learned how to use their radios on the job. Further, according to CBP's limited user test report for Rio Grande Valley, analysis of user surveys and test team observations indicated that training on the new TACCOM system can be improved and that full use of TACCOM capabilities will require better training. Specifically, the test report indicated that CBP agents and officers received varying degrees of TACCOM system training, a fact that may affect the ability of the operational test agent to conduct a thorough evaluation of TACCOM system training.

According to a CBP official responsible for training, Border Patrol agents may transfer or be deployed to different sectors, which makes it difficult to estimate training needs because the agency does not determine whether agents had received training in a previous duty station or are in need of training. Further, CBP officials stated that the amount of training provided to CBP radio users can vary because of availability of funding or locally based CBP field support personnel, and support from local management for prioritizing and addressing user training needs. For example, CBP headquarters officials stated that some local managers may determine that training is not a priority, or that CBP offices responsible for providing training do not have sufficient resources to provide training to radio users. Federal regulations require that agencies establish priorities for training

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[23]Training on the upgraded radio systems was provided by CBP's Office of Information and Technology. In addition to this training, OFO has included a module on radio fundamentals in the post academy training course that is mandatory for all officer trainees who have successfully completed basic training.

employees and allocate resources according to those priorities, as well as develop and maintain plans and programs that, among other things, identify mission-critical occupations and competencies, identify workforce competency gaps, and include strategies for closing competency gaps.[24] By developing and implementing a plan to address any identified skills gaps related to understanding the new digital radio systems and interagency radio use protocols, CBP could help ensure that more of its radio users have the skills needed to overcome challenges that hinder interoperable communications.
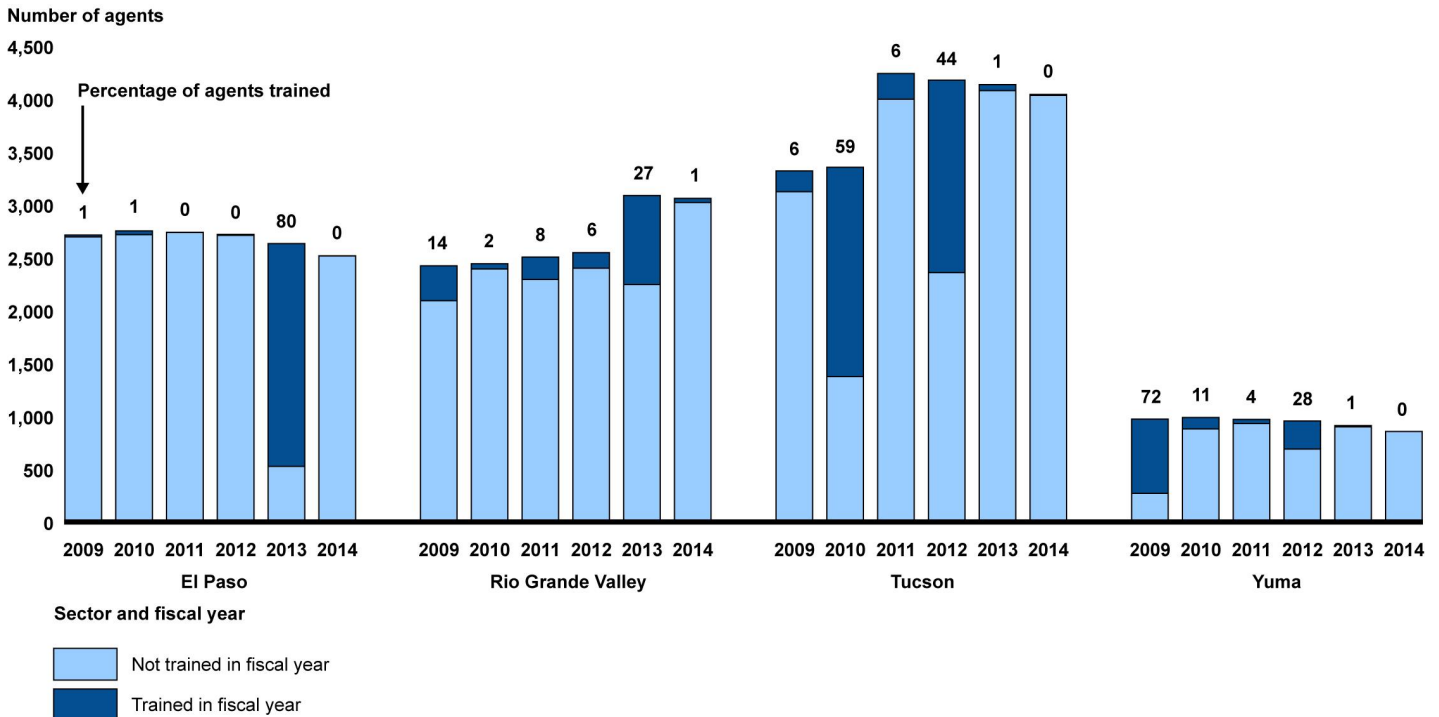
Additionally, while CBP records the number of radio users that have received radio-specific training, CBP does not know the extent to which all users have received training because it does not calculate this information, nor does it require that all radio users complete radio training for all three CBP components. Accordingly, the amount of training that CBP provided to its radio users varied by component, sector, and year. According to OAM officials, all OAM agents have received training because every air and marine interdiction agent must be certified on radio system communications before commanding an aircraft or vessel and is required to take annual refresher training, which includes information on operating radio systems. For Border Patrol, our analysis of CBP's training data shows that training provided to Border Patrol agents varied by sector and year. For example, in 2009, CBP trained 72 percent of Border Patrol agents assigned to the Yuma sector that year, and 6 percent of Border Patrol agents assigned to the Tucson sector, while in 2013, CBP trained 80 percent of Border Patrol agents assigned to the El Paso sector that year, and 27 percent of Border Patrol agents assigned to the Rio Grande Valley sector, as shown in figure 3.[25] Since Border Patrol agents are frequently reassigned to different sectors, the specific agents assigned to a specific sector in a specific year are not likely to be the same agents assigned to that sector in each subsequent year. Accordingly, these percentages may reflect new agents assigned to the region in a specific year, or may include agents who received the training more than once and were thus double-counted. Further, CBP officials explained that Border Patrol agents may not have been trained in the sector to which

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[24]See 5 C.F.R. § 410.201(c), (d).

[25]To calculate these percentages, we divided the number of agents trained in each year by the number of Border Patrol agents (radio users) onboard at the end of the year, for each sector.

they were assigned. For example, they explained that Border Patrol agents assigned to the El Paso sector may have been deployed to the Tucson sector for training. Given challenges related to Border Patrol agents deploying across sectors and since CBP does not specifically track whether agents in each sector have been trained, CBP was not able to provide information on the number of Border Patrol agents who had not received training. However, as shown in figure 3, CBP was able to provide information on the number of Border Patrol agents who were trained in each year, by sector. We then compared these numbers with the number of Border Patrol agents onboard at the end of each year, for each sector. However, these percentages do not reflect the cumulative total number of Border Patrol agents that have not received any training, since agents that were trained in previous years may not need to receive training in subsequent years.

Figure 3: Border Patrol Agents Trained on Upgraded Digital Systems from Fiscal Years 2009 to 2014, by Modernized Sector

Source: GAO analysis of U.S. Customs and Border Protection data. | GAO-15-201

Note: To calculate the above percentages, we divided the number of agents trained in each year by the number of Border Patrol agents (radio users) onboard at the end of the year, for each sector. Further, while the above figures represent the number of Border Patrol agents trained in each year, this does not reflect the cumulative total number of trained Border Patrol agents, as it may not be necessary for all agents to receive training each year if they were trained in a previous year.

The amount of training that CBP provided for each OFO field office also varied by office and year. For example, in 2011, CBP trained 33 percent of OFO officers assigned to the Tucson field office that year, and 1 percent of OFO officers assigned to the El Paso field office, while in 2013, CBP trained 46 percent of officers assigned to the El Paso field office that year and 0 percent of officers assigned to the Tucson field office, as shown in figure 4.[26] However, a CBP official responsible for training noted that Border Patrol and OFO training may have been combined for smaller offices. Further, as noted above, because CBP was unable to provide information on the number of OFO officers who did not receive training and officers may not need to receive training each year, these percentages do not reflect the cumulative total number of OFO officers who have not received any training.

[26]To calculate these percentages, we divided the number of officers trained in each year by the number of officers (radio users) onboard at the end of the year, for each sector.

Figure 4: Office of Field Operations (OFO) Officers Trained on Upgraded Digital Systems from Fiscal Years 2009 to 2014, by OFO Field Office
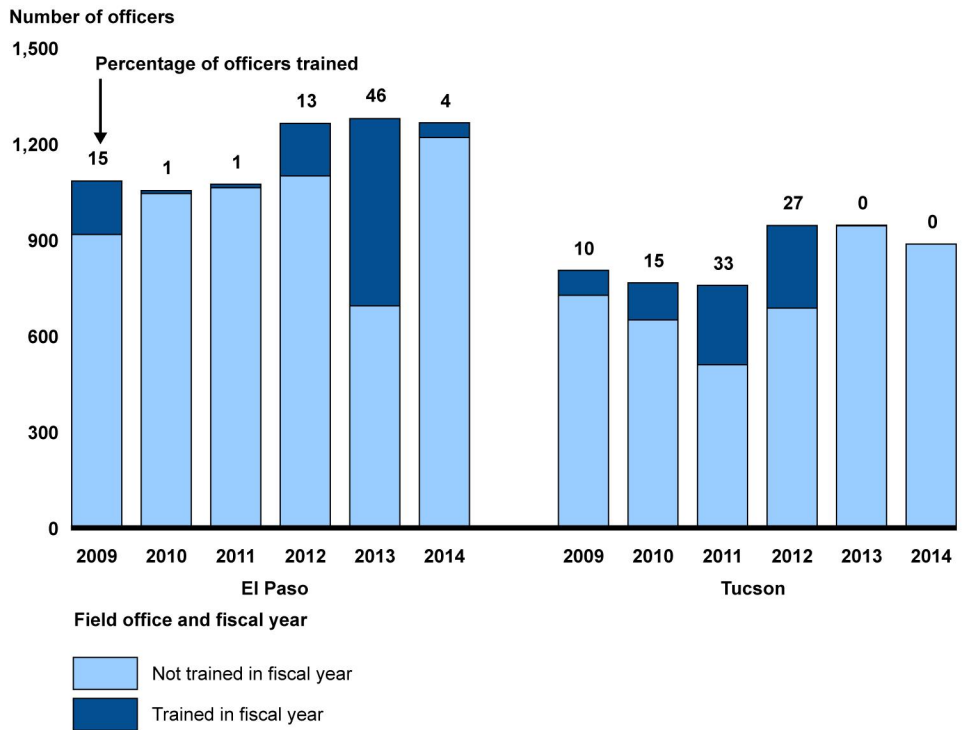

Source: GAO analysis of U.S. Customs and Border Protection data. | GAO-15-201

Note: To calculate the above percentages, we divided the number of officers trained in each year by the number of officers (radio users) onboard at the end of the year, for each office. Further, while the above figures represent the number of OFO officers trained in each year, this does not reflect the cumulative total number of trained OFO officers, as it may not be necessary for all officers to receive training each year if they were trained in a previous year.

While CBP mostly provided training in the sectors that completed modernization upgrades, CBP also provided some training in other sectors where modernization projects were still under way. For example, in 2014, CBP trained 76 percent of Border Patrol agents assigned to the Del Rio sector that year, 39 percent of agents assigned to the Big Bend sector, and 45 percent of agents assigned to the Laredo sector—sectors that received DIP upgrades during 2014. CBP also provided some training in sectors that have not yet received modernization upgrades. For example, CBP trained about 3 percent of Border Patrol agents assigned to the San Diego sector in 2011. Developing a mechanism to verify that all Border Patrol and OFO radio users receive radio training could help CBP improve its ability to monitor and address radio user training needs.

ICE Training

ICE provided training on the upgraded digital system in one location, but has not assessed radio user training needs to identify radio user skills gaps, developed a plan to ensure training needs are met, or tracked the training that it provided. As stated above, effective training and exercise programs to practice communications interoperability are essential for ensuring that the technology works and responders are able to effectively communicate during emergencies, according to the DHS SAFECOM Interoperability Continuum. Also, the DHS OEC *Operational Guide for the Interoperability Continuum* specifically highlights the importance of training when new technology is procured, stating "when a region procures new equipment, that region should plan training and conduct exercises to learn how to make the best use of that equipment," as stated above. Moreover, ICE's fiscal year 2013 congressional budget justification states that the ICE TACCOM modernization project will provide infrastructure and subscriber unit training for ICE agents and officers, ensuring users understand how to use the modernized communications systems to support their mission-critical operations. According to ICE officials, training was provided to radio users in only one location along the southwest border—Rio Grande Valley—because of a lack of resources. However, as stated above, federal regulations require that agencies establish priorities for training employees and allocate resources according to those priorities. Moreover, three of the four groups of ICE radio user groups we met with in field locations stated that additional training would help address challenges experienced by radio users. One of these four groups also stated that formal training would improve their ability to overcome challenges affecting their ability to communicate, such as not being able to locate proper channels used by other components. In addition, agents in that user group stated that they were not aware of all the capabilities of the new digital radio systems. Without a plan to address radio user skills gaps, ICE is not well positioned to ensure that it is meeting the training needs of its agents.

Further, *Standards for Internal Control in the Federal Government* states that control activities—such as policies, procedures, and management supervision—help to ensure that all transactions are completely and accurately recorded.[27] However, while ICE officials provided training to radio users in Rio Grande Valley, they stated that they did not track or

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[27] GAO/AIMD-00-21.3.1.

record which ICE radio users received this training.[28] Officials stated that it would be beneficial for agents to demonstrate radio proficiency before entering the field and explained that they plan to improve ICE training efforts by increasing hands-on radio training during basic training and developing training for radio users in the field using ICE's online training system, which tracks individual employee training records. However, officials noted that it will be a challenge to develop an online course for radio training because it would need to be tailored to each location, given differing channel frequencies in each region. While officials stated that they are considering these efforts, they did not provide any documentation for these plans or time frames for when these actions would be implemented, or any plans for tracking training that is provided in its current format. Developing a mechanism to verify that all ICE radio users receive radio training could help ICE improve its ability to monitor and address ICE radio user training needs.

DHS Is Taking Actions Aimed at Improving Tactical Communications Interoperability, but It Is Too Soon to Determine Whether These Actions Will Address Persistent Challenges

DHS is taking actions to improve tactical communications interoperability among DHS components and with other federal, state, and local agencies, but it is too soon to assess whether these actions will address the various challenges CBP and ICE face in achieving interoperability. Achieving tactical communications interoperability is a documented agency goal. CBP's TACCOM Operational Requirements Document states that having interoperable communications among CBP components and with other federal agencies is a required mission need. Additionally, according to the DHS Tactical Communications Mission Needs Statement, DHS must provide users with connectivity and interoperability that allow all users and mission partners to securely share the information they need, when they need it, and in a form they can understand and act on with confidence. To help meet this goal, DHS established the Joint Wireless Program Management Office (JWPMO) in 2011, which is a coordinating body for the programmatic and technical functions of eight DHS components that collaborate voluntarily through

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[28]This training included information on the functions of radio equipment and systems, encryption policies and processes for conducting secure communications, unique coverage maps depicting specific location information where radio users can expect their radios to operate, how to troubleshoot common technical challenges, and information about practices and protocols for conducting interoperable communications with other agencies.

this body.[29] JWPMO establishes governance procedures for current and future projects, including CBP and ICE's TACCOM modernization projects and TACNET.

According to the 2012 DHS Operational Analysis Report for the TACCOM modernization program, DHS's current approach of modernizing its radio systems to the P25 standard provides limited interoperability improvements and most DHS end users do not have interoperable communications capabilities. In an effort to more fully understand and address the department's underlying interoperability challenges, DHS has developed a draft DHS Communications Interoperability Plan. Specifically, this draft plan outlines goals and initiatives aimed at addressing various types of interoperability challenges faced by DHS components. This draft plan further states that some DHS-internal standard operating procedures are insufficient and additional DHS-external standard operating procedures are needed to support current requirements. It also states that key barriers to effective standard operating procedure development and improvement include procedural (e.g., unclear authority), proficiency (e.g., limited knowledge), and awareness issues (e.g., understanding need). This plan calls for DHS components to improve awareness of standard operating procedures and to formalize training on TACCOM equipment and standard operating procedures, among other things.

The draft DHS Communications Interoperability Plan is based on the DHS SAFECOM Interoperability Continuum, which DHS developed as a guide for jurisdictions across the nation to track progress in strengthening interoperable communications. The SAFECOM Interoperability Continuum identifies five critical success elements that must be addressed to achieve a sophisticated interoperability solution: governance, standard operating procedures, technology, training and exercises, and usage of interoperable communications. The Interoperability Continuum states that usage refers to how often interoperable communications technologies are used and identifies four

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[29]In addition to CBP and ICE, JWPMO volunteer members include the U.S. Coast Guard (USCG), Federal Emergency Management Agency (FEMA), U.S. Secret Service (USSS), Transportation Security Administration (TSA), Federal Law Enforcement Training Center (FLETC) and U.S. Citizenship and Immigration Services (USCIS). According to CBP officials, funding for JWPMO was included in both the fiscal year 2014 and fiscal year 2015 budget requests for DHS but was denied for both years. CBP is currently funding JWPMO operational costs, including staffing and administrative costs.

basic types of interoperability: planned events—such as athletic events that involve multiple responding agencies; localized emergency incidents—such as a vehicle collision on an interstate highway; regional incident management—such as routine coordination of responders across a region that includes disaster response; and daily use throughout region—whereby interoperability systems are used every day for managing routine as well as emergency incidents and users are familiar with the operation of the system and routinely work in concert with one another. Similarly, the draft DHS Communications Interoperability Plan states that during mission operations, DHS components require interoperability for a variety of scenarios, including planned events, day-to-day operations, and mutual aid operations.

Three of 18 CBP and ICE radio user groups we met with in southwest border locations stated that interoperability solutions generally work well during planned events but are not available or do not work well during unplanned responses to incidents. Moreover, the draft DHS Communications Interoperability Plan states that for planned events, the standard operating procedures to achieve interoperability are generally well documented in advance of the event and then distributed to the components. However, it further states that standard operating procedures for interoperability during unplanned events, including day-to-day operations and mutual aid operations, are not well documented and that an operation is at risk of failure without a vetted, documented, and standardized procedure. For unplanned events, we found that CBP and ICE radio users in southwest border locations faced various challenges relating primarily to a lack of standard operating procedures resulting in radio users adopting inconsistent practices that hinder the department's goal to achieve interoperability, as illustrated by the following examples:

- According to CBP and ICE headquarters officials, both components encourage and allow frequencies and encryption keys to be shared across DHS components.[30] However, sharing of frequencies and encryption keys between CBP and ICE radio users, as well as awareness of policies governing the use of frequencies and encryption keys, was inconsistent in the locations we visited along the U.S. southwest border.

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[30]The use of encryption keys ensures that potentially sensitive communications are secure from compromise.

- According to encryption key subscription data across all southwestern border areas of responsibility (Arizona, California, New Mexico, and Texas) through September 2014, we found that 45 Border Patrol radios across all southwest border locations were programmed with ICE encryption keys, representing less than 1 percent of all Border Patrol agents assigned to southwest Border Patrol sectors. In addition, we found that 248 ICE radios across all southwest border locations were programmed with CBP's common channel encryption key, representing about 14 percent of all ICE agents assigned to southwest border regions, while 5 ICE radios were programmed with the Border Patrol tactical encryption key, representing less than 1 percent of all ICE agents assigned to southwest border regions.

- According to CBP officials, the DHS common encryption key, which is intended for interoperability, is programmed into all CBP radios and should be programmed into all other DHS component radios for interoperable communications. However, of the 18 groups of CBP and ICE radio users that we met with, 7 groups stated that CBP and ICE do not share frequencies and encryption keys, a fact that they said hinders interoperable communications between these two components. Moreover, of the 7 groups that stated that CBP and ICE do not share frequencies and encryption keys, 4 groups suggested that sharing frequencies and encryptions keys between CBP and ICE would enhance interoperability between the components. Further, some radio users we met with either were unaware of the DHS common key or specifically did not use it for mission operations. For example, 4 of the 18 groups of CBP and ICE radio users we met with suggested that having a dedicated frequency for interoperability would improve interoperable communications. Additionally, 3 of the 18 groups said that they do not use the DHS common key for mission operations, with 1 group noting that Border Patrol specifically requires the use of the Border Patrol tactical key for all mission operations.

- CBP officials stated that if ICE radio users do not have CBP frequencies or encryption keys, it is because they did not request access or were not aware of frequency-sharing protocols. ICE officials stated that while sharing is encouraged, local management is responsible for deciding whether to request access to specific radio keys. Because these decisions are made at the local level, local relationships between CBP and ICE management may affect decisions to request or provide access to local radios keys. Additionally, ICE officials stated that while the

majority of ICE encryption keys can be shared with CBP, a small number of these keys are reserved for ICE internal affairs investigations and could not be shared with other agencies.

- CBP and ICE components have multiple names for multiple channels and encryption keys, adding to the complexity of radio communications, and hindering communications interoperability across components. Each CBP component—Border Patrol, OAM, and OFO—uses different names for the same channels and encryption keys used in each location, even for national channels. ICE also uses different names for channels and encryption keys used to communicate with CBP components. Nine of the 18 groups of radio users we met with stated that the lack of a standardized channel and encryption key naming convention across DHS components hinders communications interoperability and suggested that DHS develop a standardized naming convention across the department to reduce confusion among DHS radio users. Specifically, 4 of 4 OAM radio user groups stated that inconsistent use of channel names often compromises their ability to provide air support to other CBP components because of time delays associated with trying to locate channels being used by other components. Further, 3 of 4 ICE radio user groups we met with stated that the lack of standardization particularly affects their ability to complete missions that cross different areas of responsibility. ICE headquarters officials stated that it would be difficult to coordinate among independent components to standardize channel and encryption key names. Accordingly, DHS would need to require the components to take this action.

- Achieving interoperability among DHS components and state and local agencies presents unique challenges because many state and local agency radio systems operate on different frequency bands that are incompatible with federal radio systems. Various solutions are available for CBP and ICE to communicate with these agencies, including using portable equipment to connect incompatible radio systems, calling dispatchers to connect users operating on incompatible radio systems, using designated interoperability channels, and loaning federal handheld radios to state or local agency mission partners. CBP and ICE have each established memorandums of understanding (MOU) to govern radio communications with state and local partners that identify specific frequencies that may be used, provide authority to use those frequencies, and establish basic radio protocols to facilitate communication. However, radio user groups we met with stated that understanding and use of these interoperability solutions varies by location and component, and having consistent guidance for interagency communications would help ensure radio

users are aware of proper protocols and available mechanisms for communicating with state and local agencies.

CBP and ICE agents and officers we met with along the U.S. southwest border reported instances in which the interoperability challenges discussed above delayed or prevented their ability to communicate, causing these agents and officers to miss opportunities to apprehend suspects or risk their safety by continuing to pursue a suspect without being able to call for backup assistance in the event of an altercation. For example:

- Twelve of the 18 groups of CBP and ICE radios users we met with stated that communications challenges caused them to miss apprehending a suspect.
- Fourteen of the 18 groups of CBP and ICE radios users we met stated that they were involved in an incident in which a communications challenge jeopardized their safety.

According to CBP officials, these challenges may also be attributed to lack of training or understanding of standard operating procedures. Given the challenge of coordinating across independent agencies to establish consistent policies and protocols on sharing and using encryption keys, labeling channel names, and communicating with state and local agencies, implementing the draft DHS Communications Interoperability Plan may help improve interoperability by providing leadership support and reducing local jurisdictional disagreements. However, since the DHS Communications Interoperability Plan has not yet been finalized, it is too soon to assess the extent to which this guidance will effectively address the interoperability challenges discussed above. According to DHS officials, the department intends to finalize the plan and aims to accomplish the goals outlined in the DHS Communications Interoperability Plan within 3 to 5 years.

Conclusions

Interoperable communications have presented long-standing challenges for DHS. Thirteen years after the terrorist attacks of September 11, 2001, and more than 10 years after the bipartisan 9/11 Commission reported that interoperable communications need to be improved at all levels of government, DHS continues to face challenges achieving interoperable communications. Achieving interoperability depends on having radio systems that function as intended in each operating environment. Given that the limited operational testing conducted by CBP to ensure that its

upgraded radio systems are operating as intended could not make a definitive determination on operational suitability, and since CBP agents and officers are currently using radio systems on a daily basis, a performance monitoring plan would help CBP identify issues experienced by current CBP users and actions that could address those identified issues. Moreover, CBP can do more to meet the training needs of all CBP radio users. Developing and implementing a plan to address any skills gaps for Border Patrol agents and OFO officers related to understanding the new digital radio systems and interagency radio use protocols could help CBP ensure that all its agents and officers operating along the southwest border have the skills needed to overcome challenges that affect their ability to communicate with agents and officers from other components. Further, since CBP does not have a mechanism to verify that all Border Patrol and OFO radio users receive radio training, the agency is unable to fully monitor and address radio user training needs.

ICE officials stated that the agency has upgraded its TACCOM radio equipment but were unable to verify this with documentation. Although ICE TACCOM officials were able to provide detailed planning documentation for modernization projects that were completed in other locations, the agency does not have complete information on how the program is being managed, including for locations on the southwest border. Without a program plan to guide ICE's TACCOM modernization program efforts, ICE does not have the ability to determine whether its technology investments are meeting user needs and contributing to achieving the agency's mission. Further, ICE has not provided sufficient training to agents operating along the southwest border to ensure these agents have the skills needed to overcome the interoperability challenges they face. Developing and implementing a plan to address radio user skills gaps, and developing a mechanism to verify that all ICE radio users receive radio training, would help ensure that the agency can better monitor and address ICE radio user training needs.

Recommendations for Executive Action

To ensure that CBP's land mobile radio systems are functioning as intended in each location and are meeting user needs, we recommend that the CBP Commissioner develop a plan to monitor the performance of its deployed radio systems.

To ensure the ICE TACCOM program is effectively managed, we recommend that the Assistant Secretary of ICE develop a program plan to ensure that the agency establishes the appropriate documentation of

resource needs, program goals, and measures to monitor the performance of its deployed radio systems.

To improve CBP training efforts, we recommend that the CBP Commissioner take the following two actions:

- develop and implement a plan to address any skills gaps for CBP agents and officers related to understanding the new digital radio systems and interagency radio use protocols, and

- develop a mechanism to verify that all Border Patrol and OFO radio users receive radio training.

To improve ICE training efforts, we recommend that the Assistant Secretary of ICE take the following two actions:

- develop and implement a plan to address any skills gaps for ICE agents related to understanding the new digital radio systems and interagency radio use protocols, and

- develop a mechanism to verify that all ICE radio users receive radio training.

Agency Comments and Our Evaluation

We provided a draft of this report to DHS for review and comment. On March 11, 2015, DHS provided written comments, which are reprinted in appendix I and provided technical comments, which we incorporated as appropriate. DHS concurred with our six recommendations and described actions taken, under way, or planned to address them. Specifically,

- In response to our recommendation that CBP develop a plan to monitor the performance of its deployed radio systems, DHS stated that CBP will work to complete a CBP Land Mobile Radio System Performance Monitoring Plan by December 31, 2015.

- In response to our recommendation that ICE develop a program plan to ensure appropriate documentation of resource needs, program goals, and measures to monitor the performance of its deployed radio systems, DHS stated that ICE's Office of the Chief Information Officer (OCIO) will develop a program to facilitate, coordinate, and maintain ICE's deployed radio systems. DHS further stated that in developing this program, ICE OCIO will ensure that the agency establishes the proper documentation of resource needs, defines program goals, and establishes measures to monitor performance. DHS estimated a completion date of January 31, 2016.

- In response to our recommendation that CBP develop and implement a plan to address any skills gaps for CBP agents and officers related to understanding the new digital radio systems and interagency radio use protocols, DHS stated that CBP will work to develop and implement an action plan to address skills gaps for CBP agents and officers related to understanding the new digital radio systems and interagency radio use protocols. DHS further stated that CBP will explore options such as remote training using virtual learning and other distributive learning tools to best implement the training. DHS estimated a completion date of March 31, 2016.

- In response to our recommendation that CBP develop a mechanism to verify that all Border Patrol and OFO radio users receive radio training, DHS stated that CBP will explore options to verify that all Border Patrol and OFO radio users receive radio training as part of its effort to develop and implement an action plan in response to our third recommendation. DHS estimated a completion date of March 31, 2016.

- In response to our recommendation that ICE develop and implement a plan to address any skills gaps for ICE agents related to understanding the new digital radio systems and interagency radio use protocols, DHS stated that ICE Homeland Security Investigations (HSI) will propose an increase in training for new HSI special agents at the HSI training academy and plans to provide radios to new agents to be used during this training. DHS further stated that the ICE Office of Training will develop online training for ICE personnel. DHS estimated a completion date of March 31, 2016.

- In response to our recommendation that ICE develop a mechanism to verify that all ICE radio users receive radio training, DHS stated that ICE will establish a new training plan for all special agents to ensure they receive proper radio training. DHS further stated that the training plan will include new users who will receive radios at the academy, as well as existing users in the field. In addition, DHS stated that in January 2015, HSI TACCOM personnel met with representatives of the HSI Academy to discuss these efforts. DHS estimated a completion date of March 31, 2016.

These planned actions, if implemented effectively, should address the intent of our recommendations.

We are sending copies of this report to the Secretary of Homeland Security, the CBP Commissioner, the Assistant Secretary of ICE, the House Homeland Security Committee, the House Subcommittee on Oversight and Management Efficiency, the House Subcommittee on Emergency Preparedness, Response, and Communications, and other interested parties. In addition, the report is available at no charge on the GAO web-site at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-8777 or gamblerr@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix II.

Rebecca Gambler
Director, Homeland Security and Justice Issues

List of Requesters

The Honorable Michael T. McCaul
Chairman
Committee on Homeland Security
House of Representatives

The Honorable Scott Perry
Chairman
The Honorable Bonnie Watson Coleman
Ranking Member
Subcommittee on Oversight and Management Efficiency
Committee on Homeland Security
House of Representatives

The Honorable Martha McSally
Chairman
Subcommittee on Emergency Preparedness, Response,
  and Communications
Committee on Homeland Security
House of Representatives

The Honorable Jeff Duncan
House of Representatives

Appendix I: Comments from the Department of Homeland Security

Homeland Security

March 11, 2015

Rebecca Gambler
Director, Homeland Security and Justice Issues
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Re: Draft Report GAO-15-201, "BORDER SECURITY: Additional Efforts Needed to
       Address Persistent Challenges in Achieving Radio Interoperability"

Dear Ms. Gambler:

Thank you for the opportunity to review and comment on this draft report. The U.S.
Department of Homeland Security (DHS) appreciates the U.S. Government
Accountability Office's (GAO's) work in planning and conducting its review and issuing
this report.

The Department appreciates GAO's acknowledgement of the significant steps that U.S.
Customs and Border Protection's (CBP's) Office of Information and Technology (OIT)
and U.S. Immigration and Customs Enforcement's (ICE's) Homeland Security
Investigations (HSI) have taken to upgrade tactical communications equipment and
infrastructure, and improve radio interoperability. Feedback derived from GAO radio
user group field interviews will also aid in tailoring training and standard operating
procedures to further enhance operations.

DHS recognizes the benefits of having a formal plan to enhance and further document the
ongoing performance monitoring of the land mobile radio (LMR) system. The
Department also recognizes that upgrades to tactical communications (TACCOM) will
require ongoing training of the radio user community. Efforts will continue to ensure that
all TACCOM users receive the training necessary to achieve proficiency in using radio
systems to fully leverage available operability and interoperability capabilities.

The draft report contained six recommendations with which the Department concurs.
Specifically, GAO recommended that the:

Recommendation 1: CBP Commissioner develop a plan to monitor the performance of
its deployed radio systems.

Response: Concur. The CBP OIT Wireless System Program Division will work closely with the CBP tactical radio users, Enterprise Networks and Technology Support Directorate, the Field Support Directorate, and Facilities Management and Engineering to develop a CBP Land Mobile Radio (LMR) System Performance Monitoring Plan. Estimated Completion Date (ECD): December 31, 2015.

Recommendation 2: Assistant Secretary of ICE develop a program to ensure that the agency establishes the appropriate documentation of resource needs, program goals, and measures to monitor the performance of its deployed radio systems.

Response: Concur. ICE's Office of the Chief Information Officer (OCIO) will develop a program to facilitate, coordinate, and maintain ICE's deployed radio systems. In developing this program, ICE OCIO will ensure that they establish the proper documentation of resource needs, define program goals, and establish measures to monitor performance. ECD: January 31, 2016.

Recommendation 3: CBP Commissioner develop and implement a plan to address any skills gaps for CBP agents and officers related to understanding the new digital radio systems and interagency radio use protocols.

Response: Concur. Due to the sheer number of officers needing training, the number of ports and stations throughout the U.S., the complexities of the existing radio networks, and the limited number of qualified trainers on staff, CBP OIT will work collaboratively to develop and implement an action plan to address skills gaps for CBP agents and officers related to understanding the new digital radio systems and interagency radio use protocols. CBP OIT will also explore options such as remote training using virtual learning and other distributive learning tools to best implement the training. ECD: March 31, 2016.

Recommendation 4: CBP Commissioner develop a mechanism to verify that all Border Patrol and OFO [Office of Field Operations] radio users receive radio training.

Response: Concur. Through the development and implementation of an action plan in response to Recommendation 3, CBP OIT will also explore options to verify that all Border Patrol and OFO radio users receive radio training. ECD: March 31, 2016.

Recommendation 5: Assistant Secretary of ICE develop and implement a plan to address any skills gaps for ICE agents related to understanding the new digital radio systems and interagency radio use protocols.

Response: Concur. ICE HSI will propose an increase in training for HSI Special Agents which includes providing radios to new agents at the HSI Academy in Brunswick,
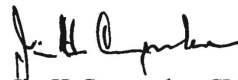
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Georgia, so the radios can be used during ICE Special Agent Training. The radios will be issued to the students during the first week of class. The students will receive instructions and guiding principles from headquarters TACCOM personnel to use for the remainder of their training. The ICE Office of Training will also develop on-line training for ICE personnel. ECD: March 31, 2016.

Recommendation 6: Assistant Secretary of ICE develop a mechanism to verify that all ICE radio users receive radio training.

Response: Concur. ICE will establish a new training plan for all Special Agents to ensure they receive proper radio training. The training plan will include new users who will receive radios at the academy, as well as existing users already in the field. On January 15, 2015, HSI TACCOM personnel met with representatives of the HSI Academy to collaborate on efforts to enhance TACCOM training for tactical communications and the use and operation of radio equipment. ECD: March 31, 2016.

Again, thank you for the opportunity to review and comment on this draft report. Technical comments were previously provided under separate cover. Please feel free to contact me if you have any questions. We look forward to working with you in the future.

Sincerely,

Jim H. Crumpacker, CIA, CFE
Director
Departmental GAO-OIG Liaison Office

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Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

Rebecca Gambler at (202) 512-8777 or at gamblerr@gao.gov.

Staff Acknowledgments

In addition to the contact named above, Stephen L. Caldwell, Director; Kirk Kiester, Assistant Director; Carissa Bryant; Michele Fejfar; Christine Hanson; Rich Hung; Jon Najmi; Jessica Orr; and Carl Potenzieri made key contributions to this report.

Appendix III: Accessible Data

Data Table for Figure 3: Border Patrol Agents Trained on Upgraded Digital Systems from Fiscal Years 2009 to 2014, by Modernized Sector

Sector	Fiscal year	Number of agents		Percentage of agents trained
		Not trained in fiscal year	Trained in fiscal year	
El Paso	2009	2,694	18	1
	2010	2,715	37	1
	2011	2,737	1	0
	2012	2,710	8	0
	2013	525	2,106	80
	2014	2,515	1	0
Rio Grande Valley	2009	2,091	331	14
	2010	2,391	50	2
	2011	2,293	211	8
	2012	2,399	147	6
	2013	2,245	841	27
	2014	3,020	39	1
Tucson	2009	3,122	196	6
	2010	1,374	1,979	59
	2011	3,997	242	6
	2012	2,357	1,819	44
	2013	4,078	57	1
	2014	4,032	10	0
Yuma	2009	270	702	72
	2010	879	108	11
	2011	931	38	4
	2012	689	265	28
	2013	899	12	1
	2014	855	0	0

Source: GAO analysis of U.S. Customs and Border Protection data. GAO-15-201.

Note: To calculate the above percentages, we divided the number of agents trained in each year by the number of Border Patrol agents (radio users) onboard at the end of the year, for each sector. Further, while the above figures represent the number of Border Patrol agents trained in each year, this does not reflect the cumulative total number of trained Border Patrol agents, as it may not be necessary for all agents to receive training each year if they were trained in a previous year.

Data Table for Figure 4: Office of Field Operations (OFO) Officers Trained on Upgraded Digital Systems from Fiscal Years 2009 to 2014, by OFO Field Office

Field office	Fiscal year	Number of officers		Percentage of officers trained
		Not trained in fiscal year	Trained in fiscal year	
El Paso	2009	917	167	15
	2010	1,045	9	1
	2011	1,063	11	1
	2012	1,100	164	13
	2013	694	585	46
	2014	1,220	46	4
Tucson	2009	727	78	10
	2010	650	116	15
	2011	510	248	33
	2012	687	258	27
	2013	944	2	0
	2014	887	0	0

Source: GAO analysis of U.S. Customs and Border Protection data. GAO-15-201.

Note: To calculate the above percentages, we divided the number of officers trained in each year by the number of officers (radio users) onboard at the end of the year, for each office. Further, while the above figures represent the number of OFO officers trained in each year, this does not reflect the cumulative total number of trained OFO officers, as it may not be necessary for all officers to receive training each year if they were trained in a previous year.

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