U.S. DEPARTMENT OF TRANSPORTATION

OFFICE OF INSPECTOR GENERAL

DOT's Fiscal Year 2020 Top Management Challenges

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Report No. PT2020003

October 23, 2019

U.S. DEPARTMENT OF TRANSPORTATION
OFFICE OF INSPECTOR GENERAL

Highlights

DOT's Fiscal Year 2020 Top Management Challenges

Required by the Reports Consolidation Act of 2000 and OMB Circular A-136

Office of the Secretary of Transportation| PT2020003 | October 23, 2019

What We Looked At

As required by law, we report annually on the Department of Transportation's (DOT) most significant challenges to meeting its mission. We considered several criteria in identifying DOT's top management challenges for fiscal year 2020, including their impact on safety, documented vulnerabilities, large dollar implications, and the ability of the Department to effect change.

What We Found

We identified the following top management challenge areas for fiscal year 2020:

- **Aircraft certification.** Key challenges: resolving certification issues related to the Boeing 737 MAX aircraft and enhancing oversight of aircraft certification processes.
- **Air carrier safety oversight.** Key challenges: balancing collaboration and enforcement and overseeing air carriers' new systems for managing safety risks.
- **Airspace modernization.** Key challenges: sustaining and modernizing the ERAM system, realizing the anticipated benefits of ADS-B, implementing new flight procedures, and auctioning off electromagnetic spectrum frequencies to finance and deploy new radars.
- **Cybersecurity.** Key challenges: addressing longstanding vulnerabilities in DOT systems, strengthening internal controls, and implementing mandated aviation cybersecurity initiatives.
- **Pipeline and hazardous materials safety.** Key challenges: hiring and retaining staff to oversee the safety of pipelines facilities and referring allegations of violations to OIG.
- **Commercial vehicle safety.** Key challenges: ensuring commercial drivers are qualified, prioritizing motor carriers for interventions, and estimating the impact of driver detention.
- **Railroad safety.** Key challenges: reducing railroad grade crossing and trespassing fatalities and overseeing railroads' implementation of positive train control systems.
- **Surface infrastructure investments.** Key challenges: targeting oversight resources and managing risks, capitalizing on oversight support, and improving project delivery.
- **The future of transportation.** Key challenges: preparing for emerging vehicle automation technologies, safely integrating Unmanned Aircraft Systems and the commercial space industry, leveraging innovative financing, supporting R&D, and reshaping the workplace.

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Memorandum

Date: October 23, 2019

Subject: INFORMATION: DOT's Fiscal Year 2020 Top Management Challenges
Report No. PT2020003

From: Calvin L. Scovel III
Inspector General

To: The Secretary
Acting Deputy Secretary

A safe, efficient, and modern transportation system is fundamental to our Nation's economy and the quality of life for American people and communities. The Department of Transportation (DOT) invests nearly $80 billion annually to build, maintain, and enhance this system. Since 1978, the Office of Inspector General (OIG) has supported the Department's mission through audits and investigations that improve the performance and integrity of our Nation's wide-ranging transportation programs. As required by law, we report annually on DOT's top management challenges to help the Department focus attention on the most serious management and performance issues it will face in the coming year.

DOT's top priority is to make the U.S. transportation system the safest in the world. In support of this goal, the Federal Aviation Administration (FAA) has updated its strategy for overseeing the safety of air carriers in recent years. Yet recent events have highlighted challenges FAA faces in meeting its safety mission, including two devastating fatal crashes and the subsequent March 2019 grounding of the Boeing 737 MAX aircraft. FAA must effectively balance collaboration with enforcement as it oversees air carriers' safety programs, while also working to restore public confidence in its aircraft certification processes.

Another critical aspect of DOT's goal is to enhance the safety of our Nation's roads, pipelines, and rail lines. The number of commercial vehicle-related fatalities increased 11 percent between 2013 and 2018. Ensuring commercial drivers are qualified to safely operate large trucks and buses, while prioritizing motor carriers for interventions, will be key to improving safety. At the same time, the Department can do more to oversee and enforce the safety of aging pipeline infrastructure, in part by improving how it targets management and inspection resources. In addition, the Department must continue its efforts to reduce

railroad incidents and fatalities by improving safety at railroad grade crossings and overseeing railroads' ongoing implementation of safety-critical Positive Train Control systems.

The Department also faces challenges to meet its strategic priorities of improving transportation infrastructure and fostering accountability. This includes maximizing its ongoing multibillion-dollar investment in modernizing the Nation's air traffic control systems to improve safety and efficiency. To meet this goal, FAA must focus on ensuring its new capabilities achieve their expected benefits in a cost-effective manner. FAA will also need to devote sustained management attention to address risks associated with its ongoing effort to partner with other Government agencies to finance and deploy new radar systems at an estimated cost of $12 billion.

Furthermore, the Department must continue to pursue effective stewardship of the more than $50 billion it invests each year in building, maintaining, and repairing our Nation's surface infrastructure. To safeguard taxpayer dollars, DOT can enhance its processes for targeting oversight and managing risks for its many contract and grant programs, including those for Federal-aid highway projects and high-speed rail. The Department can also promote accountability by capitalizing on oversight assistance, such as the Federal Transit Administration's use of integrity monitors to help oversee disaster recovery projects.

Finally, the Department has a number of opportunities to pursue its strategic goal of innovation as it works to prepare for the future of transportation. To better position itself for the future, DOT must first ensure it has adequately resolved longstanding cybersecurity weaknesses—some of which we have reported for 10 years. Implementing effective oversight and internal controls will be critical to protect DOT's more than 450 information technology systems from increasingly complex and evolving cyber threats.

As the Fixing America's Surface Transportation (FAST) Act of 2015[1] concludes and a new authorization begins, the Department's challenge will be to address the impact of emerging technologies and rapidly growing industries, including automated vehicles, Unmanned Aircraft Systems, and commercial space activities. Further, the Department can better meet the increasing and evolving demands on the Nation's transportation system by effectively leveraging innovative financing, including public-private partnerships; supporting research and development; and reshaping its workplaces to meet future needs.

We considered several criteria to identify the Department's top management challenges for fiscal year 2020, including safety impact, documented

[1] Pub. L. No. 114-94.

vulnerabilities, large dollar implications, and the Department's ability to effect change. In the enclosed report, we identify and discuss the following challenges:

- Restoring Confidence in FAA's Aircraft Certification Process
- Effectively Leveraging Collaboration and Enforcement in FAA's Evolving Air Carrier Safety Oversight Approach
- Maximizing FAA's Airspace Modernization Investments and Ensuring New Capabilities Achieve Expected Benefits
- Enhancing Oversight and Internal Controls To Address Longstanding Cybersecurity Vulnerabilities
- Maintaining and Enforcing Pipeline and Hazardous Materials Safety
- Enhancing Enforcement and Data Analysis To Reduce Commercial Vehicle-Related Fatalities
- Continuing National Efforts To Improve Railroad Safety
- Effectively Overseeing Billions in Surface Infrastructure Investments
- Preparing for the Future of Transportation

As always, we will continue to work closely with DOT officials to support the Department's efforts to improve safety, enhance efficiency, and protect resources. We appreciate the Department's commitment to prompt action in response to the challenges we have identified. The final report and the Department's response will be included in DOT's Annual Financial Report, as required by law.

If you have any questions regarding this report, please contact me at (202) 366-1959. You may also contact Joseph W. Comé, Principal Assistant Inspector General for Auditing and Evaluation, at (202) 366-1427.

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cc: DOT Audit Liaison, M-1

Index of DOT Operating Administrations Discussed in Each Chapter

Mode	Chapter Reference
Federal Aviation Administration	1, 2, 3, 4, 9
Federal Highway Administration	8, 9
Federal Motor Carrier Safety Administration	6
Federal Railroad Administration	5, 7, 8
Federal Transit Administration	8
Maritime Administration	4
National Highway Traffic Safety Administration	9
Pipeline and Hazardous Materials Safety Administration	5
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Chapter 1

Restoring Confidence in FAA's Aircraft Certification Process

The Federal Aviation Administration (FAA) is charged with overseeing the safety and certification of all civilian aircraft manufactured and operated in the United States.[2] This is a significant undertaking given that the U.S. civil aviation industry encompasses more than 230,000 aircraft, 1,600 approved manufacturers, and 5,200 aircraft operators, among others. While FAA has historically maintained an excellent safety record, two fatal accidents in October 2018 and March 2019 and the subsequent grounding of Boeing 737 MAX aircraft have raised significant concerns about the certification of the 737 MAX and FAA's use of delegation authority to certify new aircraft designs.

Key Challenges

- Resolving certification issues related to the Boeing 737 MAX aircraft
- Enhancing FAA's oversight of aircraft certification processes

Resolving Certification Issues Related to the Boeing 737 MAX Aircraft

On October 29, 2018, Lion Air Flight 610 crashed into the Java Sea shortly after departing Jakarta, Indonesia, resulting in 189 fatalities. Five months later, on March 10, 2019, Ethiopian Air Flight 302 crashed shortly after departing Addis

[2] 49 U.S.C. 44702.

Ababa, Ethiopia, resulting in 157 fatalities, including 8 Americans. Both accidents involved the Boeing 737 MAX 8 aircraft, a newer model aircraft that received FAA certification in March 2017.

While investigations into the causes of these accidents are ongoing, early indications point to a software component, the Maneuvering Characteristics Augmentation System (MCAS), as being at least a contributing factor. This software can cause the aircraft's horizontal stabilizer[3] to move without pilot input. Further, certain assumptions Boeing and FAA made about how pilots would respond to uncommanded stabilizer movement have been called into question. On November 7, 2018, FAA issued an Emergency Airworthiness Directive requiring operators of the 737 MAX to revise their flight manuals to reinforce to flight crews how to recognize and respond to uncommanded stabilizer movement. Boeing also began working on a software fix related to MCAS. After the second accident, FAA decided on March 13, 2019, to ground all 737 MAX airplanes operated by U.S. airlines or in U.S. territory pending further investigation. According to FAA, the Agency is working with aviation authorities in other countries, which also grounded the MAX, on efforts to ensure that the aircraft is safe before flights can resume.

In March 2019, Secretary of Transportation Elaine L. Chao requested that we initiate an audit to compile an objective and detailed factual history of the activities that resulted in the certification of the Boeing 737 MAX 8. We also received a series of congressional requests to review aspects of FAA's process to certify the MAX series of aircraft, including human factors and pilot training issues, as well as the Agency's actions following each of the two accidents. We launched our review immediately, and it is currently ongoing. Other groups, such as the National Transportation Safety Board and a panel of experts, are also reviewing the aircraft certification process and will likely make recommendations. Resolving any identified issues related to the certification of the Boeing 737 MAX aircraft will be a key challenge for the Department and FAA as they work to restore confidence in the overall aircraft certification process.

Enhancing FAA's Oversight of Aircraft Certification Processes

Recognizing that it is not possible for FAA employees to oversee every facet of such a large industry, Federal law[4] allows the Agency to delegate certain functions to private individuals or organizations. Designees can perform a substantial amount of critical certification work on FAA's behalf. For example, in 2018, one aircraft manufacturer approved about 95 percent of the certification activities for its own aircraft. In 2009, FAA fully implemented the Organization Designation Authorization (ODA) program to standardize its oversight of

[3] A control surface near the tail of the airplane that controls up and down movement of the airplane.
[4] 49 U.S.C § 44702 (d).

organizations (e.g., manufacturers) that are approved to perform certain delegated functions on its behalf.

While delegation is an essential part of meeting FAA's certification goals, the Agency faces the significant oversight challenge of ensuring that ODA companies maintain high standards and comply with FAA safety regulations. Our work over the years on the ODA program has identified management weaknesses with a number of FAA's oversight processes. For example, our 2011 report identified inconsistencies in how FAA aircraft certification offices interpreted FAA's role and tracked ODA personnel for oversight. In response to our findings, FAA improved its training and guidance for FAA engineers responsible for overseeing ODA employees, leaving them better positioned to detect regulatory noncompliances and take enforcement actions.

In 2015, we reported that FAA's oversight of ODA program controls was not systems- and risk-based,[5] as recommended by an aviation rulemaking committee,[6] but rather was more focused on individual engineering projects and areas that were low risk. For example, FAA had not provided oversight teams with tools or guidance on data they should use to identify the highest risk areas. Another gap in FAA's oversight pertained to companies that produce and supply components to other manufacturers. FAA performed oversight of only 4 percent of personnel conducting certification work on the Agency's behalf at suppliers in the period we reviewed.

In responding to our 2015 report, FAA recognized the need to improve its oversight of organizations performing certifications or other functions on its behalf. By March 2020, FAA plans to introduce a new process that represents a significant change in its approach to overseeing ODA companies. For example, the new process will include identifying critical system elements and developing new evaluation criteria. While revamping FAA's oversight process will be an important step, continued management attention will be key to ensure the Agency identifies and monitors the highest-risk and safety-critical areas of aircraft certification.

[5] Systems-based oversight shifts from focusing on individual project engineering work to holistically assessing whether ODA companies have the people, processes, procedures, and facilities in place to produce safe products, thus allowing FAA to focus its oversight on the highest-risk areas, such as new, innovative aircraft designs.
[6] Aircraft Certification Process Review and Reform Aviation Rulemaking Committee, a joint FAA and industry group, formed in response to a congressional mandate to study the aircraft certification process.

Related Documents and Recommendations

The following related documents as well as the current status of OIG recommendations can be found on our website at http://www.oig.dot.gov.

Title	Total Recommendations	Open Recommendations
Perspectives on Overseeing the Safety of the U.S. Air Transportation System (March 27, 2019)	0	0
FAA Lacks an Effective Staffing Model and Risk-Based Oversight Process for Organization Designation Authorization (October 15, 2015)	9	1
FAA Needs To Strengthen Its Risk Assessment and Oversight Approach for Organization Designation Authorization and Risk-Based Resource Targeting Programs (June 29, 2011)	6	0
Total	**15**	**1**

For more information on the issues identified in this chapter, please contact Matthew E. Hampton, Assistant Inspector General for Aviation Audits, at (202) 366-0500.

Chapter 2

Effectively Leveraging Collaboration and Enforcement in FAA's Evolving Air Carrier Safety Oversight Approach

The Federal Aviation Administration (FAA) is responsible for maintaining the safety of a diverse, complex, and rapidly evolving aviation industry. Notwithstanding the Nation's air carrier safety record, recent events have highlighted challenges that FAA faces in its safety oversight and garnered both public interest and congressional attention. These include the April 2018 Southwest Airlines engine failure—which resulted in the first fatality at a U.S. commercial passenger air carrier[7] in over 9 years—and several safety incidents at airports, such as the near miss of an Air Canada Flight in San Francisco in July 2017. In recent years, FAA's systems and strategies for safety oversight have evolved, with air carriers taking on a larger role in identifying and mitigating safety risks. However, to maintain the highest level of safety, FAA must strike an effective balance between collaboration and enforcement when overseeing critical air carrier safety programs.

Key Challenges

- Balancing collaboration and enforcement through FAA's Compliance Program
- Overseeing air carriers' new systems for managing safety risks

[7] This was the first passenger fatality at a 14 CFR Part 121 (Operating Requirements: Domestic, Flag, and Supplemental Operations) air carrier since February 12, 2009.

Balancing Collaborating and Enforcement Through FAA's Compliance Program

For the last several years, FAA has worked to revamp its strategy for overseeing the safety of the aviation industry. In particular, FAA has increasingly shifted to working with the industry to meet shared safety goals. However, as FAA establishes a more collaborative approach to safety oversight, strong management attention is critical to ensure the Agency's evolving strategy advances its safety mission.

In 2015, FAA implemented a new Compliance Philosophy as part of its safety oversight strategy. The Compliance Program, as it is now known, works from the premise that the greatest safety risks in the industry do not arise from specific events or outcomes, but from operators that are unwilling or unable to comply with safety rules and best practices. The program's goals are to achieve rapid compliance, eliminate safety risks, and ensure positive and permanent changes. The Compliance Program also emphasizes FAA's preference for collaborating with air carriers through education and training over penalizing carriers as a means to address violations. Through the program, FAA works with air carriers to address the root causes of safety violations rather than imposing enforcement actions—a significant change in the way FAA and the airlines address compliance and safety issues.

Preliminary results from our ongoing audit of FAA's oversight of Allegiant Air highlights the complex challenges the Agency faces in implementing this oversight approach and addressing the root cause of air carrier maintenance violations. For example, a longstanding maintenance issue at Allegiant Air resulted in a series of in-flight engine shutdowns and unscheduled landings, indicating that the root cause of the maintenance issue had not been assessed or corrected.

Our ongoing work also focuses on whether FAA provides inspectors with the guidance and tools they need to effectively oversee air carriers via the Compliance Program. For example, under the program, inspectors do not consider the severity of maintenance errors when determining whether to initiate punitive action. However, serious violations—including failure to complete a required inspection—might warrant a more stringent oversight approach, such as assessing monetary penalties. Furthermore, FAA's guidance allows inspectors to close out compliance actions before ensuring that the carrier actually took any corrective actions.

While FAA's Compliance Program offers a new strategy for addressing risk, such as insufficient maintenance practices, the Agency will face challenges in keeping its oversight robust to ensure airlines assess root causes and implement effective actions to correct deficiencies in a timely manner. One issue we will assess in future work is FAA's implementation of the Compliance Program across the

industry, including whether the philosophy is appropriate for all air carriers, regardless of current working relationships, business models, and operating environments.

Overseeing Air Carriers' New Systems for Managing Safety Risks

Parallel to FAA's implementation of its Compliance Program, the Agency established requirements for part 121 air carriers[8] to implement safety management systems (SMS)—a formal, top-down approach to managing safety risks. Under SMS, carriers must identify the root causes of hazards and proactively manage risk to prevent accidents. While FAA required air carriers to implement SMS by March 2018, recent events—including the April 2018 Southwest Airlines fatal engine failure—have raised concerns that FAA's oversight may not ensure that air carriers meet risk-mitigation responsibilities. The National Transportation Safety Board is currently investigating the Southwest Airlines engine failure. Preliminary reports indicate similarities with an engine incident on a Southwest Airlines aircraft in 2016.

In our ongoing assessment of FAA's oversight of Southwest Airlines' systems for managing risk, we are focusing on a number of safety-related concerns raised through an OIG hotline complaint. These concerns include aircraft weight and balance inaccuracies that can affect flight phases, missed maintenance requirements, and the process FAA uses to verify the airworthiness of used aircraft prior to allowing them to enter revenue service.

Ultimately, while air carriers' SMS are important for the safety of the National Airspace System, FAA must exercise regulatory oversight and intervene in a timely manner to ensure that carriers take actions to identify and reduce safety risks. Enhancing risk-based oversight, effectively leveraging industry collaboration and enforcement, and fostering a strong safety culture will remain key challenges for FAA as it works to implement its new oversight strategies and ensure the safety of the traveling public.

[8] 14 CFR Part 121.

Related Documents and Recommendations

The following documents as well as the current status of OIG recommendations can be found on our website at http://www.oig.dot.gov.

Title	Total Recommendations	Open Recommendations
Perspectives on Overseeing the Safety of the U.S. Air Transportation System (March 27, 2019)	0	0
Total	**0**	**0**

For more information on the issues identified in this chapter, please contact Matthew E. Hampton, Assistant Inspector General for Aviation Audits, at (202) 366-0500.

Chapter 3

Maximizing FAA's Airspace Modernization Investments and Ensuring New Capabilities Achieve Expected Benefits

The Federal Aviation Administration (FAA) continues to modernize the National Airspace System (NAS) through the multibillion-dollar Next Generation Air Transportation System (NextGen) program. As envisioned, NextGen will provide safer, more efficient air traffic management by 2025. However, while it has implemented new capabilities, FAA still faces challenges in upgrading aging infrastructure, continuing NextGen's deployment, and achieving intended benefits in a cost-effective manner.

Key Challenges

- Sustaining and modernizing the En Route Automation Modernization (ERAM) system while integrating new capabilities
- Realizing the anticipated benefits of Automatic Dependent Surveillance-Broadcast (ADS-B) investments

- Resolving obstacles to implementing new flight procedures and delivering benefits to airspace users
- Auctioning off electromagnetic spectrum to finance and deploy new radars

Sustaining and Modernizing ERAM While Integrating New Capabilities

Controllers rely on ERAM at 20 facilities nationwide to manage high-altitude air traffic. ERAM is a foundational system for NextGen that supports adding new capabilities central to improving the efficiency of the NAS, such as satellite-based navigation and high-altitude data communications. FAA has begun sustainment and software enhancement efforts for ERAM that will replace the system's original hardware, add enhanced system capabilities, and introduce improvements for the controller workforce through 2025 and beyond. The Agency is also integrating another key NextGen capability—Data Communications (DataComm)—with ERAM. DataComm will provide high-altitude, two-way digital communications between controllers and flight crews to reduce radio voice communications, improving accuracy and safety. Working with the airlines, FAA had originally planned to implement DataComm for controllers and pilots at high-altitude facilities from 2019 through 2021. However, air-to-ground network problems and aircraft avionics issues have resulted in the Agency delaying operational deployment by at least 4 months. As a result, FAA faces significant challenges in deploying DataComm while replacing ERAM's aging hardware, implementing other software enhancements, and resolving aircraft avionics concerns.

Realizing the Anticipated Benefits of ADS-B Investments

Another cornerstone of NextGen is the ADS-B system, a Global Positioning System technology that would allow FAA to transition from a ground-based radar to a more precise satellite-based surveillance system. In addition to increasing safety, the technology is intended to allow controllers to reduce separation between aircraft, generating increased capacity and operational efficiencies for airspace operators while reducing FAA's operating and legacy costs with existing radar. According to FAA, it has initiatives ongoing that will capitalize on the operational and safety benefits envisioned when the ADS-B program was launched. However, it is uncertain when these potential benefits will be realized.

While FAA has invested over a billion dollars for the ground infrastructure to implement ADS-B, airspace users must purchase and install new avionics on their aircraft to utilize it. To encourage these installations, FAA issued a final rule in May 2010 requiring operators that fly in most controlled airspace to install ADS-B *Out*[9]—which provides the capability to broadcast an aircraft's flight position data

[9] ADS-B's *In* capability displays flight information, including the locations of other aircraft, in the cockpit. FAA has not mandated installation of ADS-B *In*.

to ADS-B's ground system and controller displays—by January 1, 2020. Although some segments of the industry were initially slow to equip, preliminary results from our ongoing audit have found that nearly 79,000 commercial, international, and general aviation operators had ADS-B *Out* on their aircraft, an increase of nearly 81 percent since May 1, 2018. FAA and industry officials anticipate that most operators who intend on flying in ADS-B airspace will meet the 2020 deadline.

However, despite its considerable investment, FAA still faces challenges in realizing the operational benefits and cost savings of ADS-B. These challenges include implementing procedures to take advantage of increased airspace capacity and implementing plans to reduce its radar infrastructure.

Resolving Obstacles to Implementing New Flight Procedures and Delivering Benefits to Airspace Users

Performance-Based Navigation (PBN) is a top investment priority for FAA and industry under NextGen. New PBN flight procedures can provide significant benefits to airspace users—including more direct flight paths, increased airspace capacity, improved on-time airport arrival rates, and reduced aircraft emissions and fuel burn.

In 2010, as part of its PBN implementation efforts, FAA established the Metroplex program to increase efficiency in congested metropolitan areas with multiple airports. While FAA has completed Metroplex implementation at 7 of the 12 Metroplex locations, the Agency does not expect to complete the remaining sites until 2021—4 years later than originally planned.

Our past and current work has identified challenges to implementing PBN and achieving expected program timeframes and outcomes. These challenges include addressing increased community concerns about aircraft noise and resolving key barriers, such as the lack of automated decision support tools for controllers, unclear terminology used by pilots and controllers for referring to flight paths, and the lengthy procedure amendment process.

Further, as we recently reported, Metroplex benefits to airspace users have fallen well short of predictions. Although FAA expected numerous benefits from Metroplex, such as fuel savings, post-implementation analyses show estimated annual benefits of $31.1 million, which is $30.5 million (49.5 percent) less than the initial minimum amount FAA expected at each completed site. Most sites did not achieve expected fuel savings for various reasons, including designs that increased time and distance flown for some procedures, and factors not initially considered, such as changes in wind speeds. FAA officials stated that the Agency has achieved other benefits that are difficult to quantify, such as increased safety, reduced controller-pilot task complexity, and de-conflicted air traffic routes.

Airspace users acknowledge they received some benefits, but FAA continues to face challenges in meeting program expectations.

Auctioning Electromagnetic Spectrum To Finance and Deploy New Radars

FAA depends on a vast but aging network of radar systems to manage air traffic and collect weather information. This infrastructure, which has been in service longer than originally planned, is increasingly difficult and expensive to maintain. FAA has partnered with three other Agencies—the National Oceanic and Atmospheric Administration (NOAA), Department of Defense, and Department of Homeland Security—in the Spectrum Efficient National Surveillance Radar (SENSR)[10] program. SENSR will auction Government-owned electromagnetic spectrum frequencies and use the revenue to finance and deploy new radars to meet the needs of all Agencies for surveillance for air traffic, weather, law enforcement, and national defense. FAA currently plans to award a contract in 2021 and auction the spectrum in 2024.

Although the program is still in the early stages, we recently reported that the Agency faces a number of high risks and challenges in advancing SENSR, including an aggressive schedule and uncertainties regarding how much revenue the auction will generate. We made recommendations to improve the coordination, planning, and risk mitigation of the SENSR program, which is currently estimated to cost $12 billion. As it works to address risks and advance the program, FAA faces a significant challenge in the complex coordination it will need to combine the diverse goals and requirements of each of its Agency partners into a single program. Given the anticipated schedule, costs, and complexity of integrating a new multibillion-dollar system into the NAS, sustained management attention is needed to address these challenges and achieve SENSR's envisioned capabilities.

[10] In August 2018, NOAA largely withdrew from the program due to the associated risks, but plans to remain in an advisory role.

Related Documents and Recommendations

The following documents as well as the current status of OIG recommendations can be found on our website at http://www.oig.dot.gov.

Title	Total Recommendations	Open Recommendations
Letter to Chairmen DeFazio and Larson and Ranking Members Graves and Graves Regarding ADS-B Out Equipage (September 12, 2019)	0	0
FAA Has Made Progress in Implementing Its Metroplex Program, but Benefits for Airspace Users Have Fallen Short of Expectations (August 27, 2019)	5	5
FAA Has Taken Steps To Advance the SENSR Program, but Opportunities and Risks Remain (April 23, 2019)	2	2
FAA Has Taken Steps To Address ERAM Outages, but Some Vulnerabilities Remain (November 7, 2018)	3	3
FAA Needs To Strengthen Its Management Controls Over the Use and Oversight of NextGen Developmental Funding (March 6, 2018)	6	4
FAA Has Made Progress Implementing NextGen Priorities, but Additional Actions Are Needed To Improve Risk Management (October 18, 2017)	0	0
FAA Has Not Effectively Deployed Controller Automation Tools That Optimize Benefits of Performance-Based Navigation (August 20, 2015)	4	0
FAA Faces Significant Obstacles in Advancing the Implementation and Use of Performance-Based Navigation Procedures (June 17, 2014)	3	0
Total	**23**	**14**

For more information on the issues identified in this chapter, please contact Matthew E. Hampton, Assistant Inspector General for Aviation Audits, at (202) 366-0500.

Chapter 4

Enhancing Oversight and Internal Controls To Address Longstanding Cybersecurity Vulnerabilities

The Department of Transportation's cybersecurity program is critical to protect its vast network of information technology (IT) systems from malicious attacks or other breaches that may inhibit DOT's ability to carry out its mission. However, the Department faces challenges in strengthening its oversight and internal controls to resolve longstanding cybersecurity vulnerabilities, some of which we have reported for more than 10 years. In addition, the Federal Aviation Administration (FAA) must work to implement congressionally mandated initiatives aimed at protecting critical systems within the National Airspace System (NAS).

Key Challenges

- Addressing longstanding cybersecurity vulnerabilities and strengthening internal controls
- Implementing congressionally mandated aviation cybersecurity initiatives to protect flight-critical systems

Addressing Longstanding Cybersecurity Vulnerabilities and Strengthening Internal Controls

DOT relies on over 450 IT systems to perform and support its mission. However, the Department's cybersecurity program remains ineffective. To protect its information and information systems and ensure they operate properly and continue to operate during disruptions, the Department's Office of the Chief Information Officer (OCIO) must establish effective internal controls, especially continuous management oversight.

For the past decade, we have identified and reported significant deficiencies in the Department's cybersecurity posture during our annual reviews of the Department's information security program under the Federal Information Security Management Act of 2002 (FISMA).[11] Many of these deficiencies have appeared in our FISMA reports numerous times (see table).

Table. Significant DOT Cybersecurity Deficiencies Identified and Number of Times Reported in OIG FISMA Reports Since 2009

Significant Deficiency	Number of Years Reported
Inadequate inventory of hardware and/or software assets	10
High numbers of systems operating without proper authorization	10
Insufficient visibility into DOT networks in order to maintain an effective incident response capability	10
Inability to provide adequate security awareness training and/or specialized training as required	10
Incomplete deployment of personal identity verification cards and/or multi-factor identification	9
Insufficient or untimely weakness remediation	10
Inadequate or lack of evidence of testing of current security control assessments or monitoring of system security controls	10
Inadequate configuration management	10
Inadequate management of common or shared controls	10
Incomplete execution of controls pertaining to privacy related systems	8

Source: OIG analysis.

[11] The Federal Information Security Management Act (FISMA) of 2002, as amended in 2014 (Pub. L. No. 113-283), requires agencies to develop, implement, and document Departmentwide information security programs. FISMA also requires inspectors general to annually evaluate the effectiveness of these programs and report the results to the Office of Management and Budget.

During this period, the Department established an effective process to develop cybersecurity policy. As a result, it has reached level two in the Office of Management and Budget and Department of Homeland Security's five-level FISMA maturity model, meaning it has issued policy to define its security program. However, the number of longstanding and unresolved weaknesses demonstrates that the Department has not implemented sound internal controls. One important challenge to successful policy and control implementation that remains is strengthening OCIO's program oversight.

In the past, the Department expanded the use of its FISMA reporting and oversight tool, known as the Cyber Security Assessment and Management tool (CSAM), to improve its cybersecurity posture. However, as we noted in our most recent FISMA report, CSAM contains inaccurate data, is missing information, is not updated in a timely manner or at all, and is not checked for accuracy. For example, in fiscal year 2018, the number of plans of action and milestones (POA&M)—which detail the Department's plans to remediate detected security weaknesses—jumped from 4,529 to 9,793 because 5,264 POA&Ms were not reported timely. These data inaccuracies inhibit OCIO's ability to use CSAM to assess the status of and oversee its cybersecurity program.

DOT policy states that OCIO should conduct program performance oversight and reviews of Operating Administrations' (OA) cybersecurity programs. This oversight and analysis covers several aspects of FISMA, including whether the OAs' systems: (1) are authorized to operate and have required security upgrades and tested controls, (2) are categorized at the appropriate security impact levels, (3) have established and tested contingency plans, (4) conform to established baseline security configuration standards, and (5) have been remediated for vulnerabilities. However, in our two most recent FISMA audits, we have found that OCIO was not conducting this oversight and analysis of the OAs. This lack of oversight likely contributes to the recurrence of numerous weaknesses and to DOT's lack of awareness of some of these vulnerabilities.

Since our last FISMA audit, we have found instances in which the absence of proper controls has resulted in exploitable weaknesses. During our audit testing, we have been able to, among other things,

- penetrate networks,
- use hacking techniques to obtain personnel's private information,
- locate millions of records with personally identifiable information,
- identify thousands of system vulnerabilities, and
- use social engineering to obtain passwords.

Without OCIO oversight to establish effective cybersecurity internal controls, DOT will continue to face challenges in reducing the risk of external cyberattacks or insider threats that may expose sensitive information and compromise the Department's safety mission.

Implementing Aviation Cybersecurity Initiatives To Protect Flight-Critical Systems

Like the Department overall, FAA operates a complex array of information technology systems that range from legacy radar systems to the integration of new satellite-based systems used for tracking aircraft and communication between pilots and controllers. While these systems allow for the efficient distribution of information, their interconnectivity creates exposure to cybersecurity vulnerabilities outside FAA's control. The Agency will face challenges in protecting these systems from rapidly evolving cyber-based threats in an expanding environment that requires the cooperation of aviation industry stakeholders from airlines, airports, and manufacturers.

In 2016, the FAA Extension, Safety, and Security Act[12] directed the Agency to establish a new "total systems" approach[13] to enhance its ongoing efforts to secure the NAS. In March 2019, we reported that FAA must improve its efforts to protect flight-critical systems and therefore the safety of aviation passengers from cyberattacks. While FAA has taken initial steps to address cybersecurity, it has not completed a comprehensive and strategic framework of policies designed to identify and mitigate cybersecurity risks. In August 2016, a working group made 30 recommendations covering cybersecurity rulemaking and regulatory areas that FAA is considering for its framework. We reported that FAA had addressed 15 of the 30 recommendations, had 11 in progress, and had not decided whether to implement the final 4.[14] We are currently reviewing cybersecurity coordination and collaboration activities between FAA and the Departments of Defense and Homeland Security aimed at identifying and mitigating cybersecurity vulnerabilities in systems affecting the aviation industry and the public.

[12] Pub. L. No. 114-190 (2016).
[13] A total systems approach takes into account the interactions and interdependence of aircraft system components and the NAS.
[14] Status as of August 2018.

Related Documents and Recommendations

The following documents as well as the current status of OIG recommendations can be found on our website at http://www.oig.dot.gov.

Title	Total Recommendations	Open Recommendations
FAA Has Made Progress But Additional Actions Remain To Implement Congressionally Mandated Cyber Initiatives (March 20, 2019)	3	3
The Maritime Administration's Information Technology Infrastructure Is at Risk for Compromise (July 24, 2019)	19	19
FISMA 2018: DOT's Information Security Program and Practices (March 20, 2019)	12	12
FISMA 2017 DOT's Information Security Posture Is Still Not Effective (January 24, 2018)	8	8
FISMA 2016: DOT Continues To Make Progress, but the Department's Information Security Posture Is Still Not Effective (November 9, 2016)	8	8
FISMA 2015: DOT Has Major Success in PIV Implementation, but Problems Persist in Other Cybersecurity Areas (November 5, 2015)	9	4
FISMA 2014: DOT Has Made Progress but Significant Weaknesses in Its Information Security Remain (November 14, 2014)	16	3
FISMA 2013: DOT Has Made Progress, but Its Systems Remain Vulnerable to Significant Security Threats (November 22, 2013)	8	4
FISMA 2012: Ongoing Weaknesses Impede DOT's Progress Toward Effective Information Security (November 14, 2012)	5	0
FISMA 2011: Persistent Weaknesses in DOT's Controls Challenge the Protection and Security of Its Information Systems (November 14, 2011)	5	2
FISMA 2010: Timely Actions Needed To Improve DOT's Cybersecurity (November 15, 2010)	27	1
FISMA 2009: Audit of Information Security Program (November 18, 2009)	27	0
Total	**147**	**64**

For more information on the issues identified in this chapter, please contact Louis C. King, Assistant Inspector General for Financial and Information Technology Audits, at (202) 366-1407, and Matthew E. Hampton, Assistant Inspector General for Aviation Audits, at (202) 366-0500.

Chapter 5

Maintaining and Enforcing Pipeline and Hazardous Materials Safety

The Pipeline and Hazardous Materials Safety Administration (PHMSA) regulates a vast network of facilities, including nearly 3,500 companies that operate 2.8 million miles of pipelines, 157 liquefied natural gas (LNG) plants, 403 underground gas storage facilities, and 8,240 hazardous liquid breakout tanks. The Agency also oversees the companies that send more than 1 million daily shipments of hazardous materials (hazmat) via land, sea, and air. Pipeline incidents can have far-reaching consequences, resulting in fatalities and injuries and causing property and environmental damage. For example, in September 2018, natural gas explosions in Massachusetts's Merrimack Valley resulted in 1 fatality and 21 serious injuries, and the destruction of 131 structures. The natural gas distribution system involved in this incident had been installed in the early 1900s and partially upgraded after the 1940s. Safety oversight of the Nation's aging pipeline infrastructure is an ongoing public concern, and PHMSA recognizes the need for repair and replacement efforts. An overall challenge for the Agency is targeting management and inspection resources to ensure its State, local, and private counterparts comply with safety-related laws and requirements. PHMSA can further protect the public by referring allegations of criminal violations of pipeline and hazmat laws and regulations to OIG for investigation in a more consistent manner.

Key Challenges

- Hiring and retaining staff to oversee the safety of pipelines facilities, including LNG plants
- Referring allegations of violations of Federal laws that regulate pipeline safety and hazardous materials to OIG for investigation

Hiring and Retaining Staff To Oversee the Safety of Pipelines Facilities, Including LNG Plants

PHMSA's Office of Pipeline Safety works with State inspectors to administer the Department's national regulatory program to ensure the safe transportation of natural gas, petroleum, and other hazardous liquids by pipeline. Demand for PHMSA oversight of LNG facilities is likely to increase over time, as daily LNG exports from the United States are projected to rise from about 2 billion cubic feet in 2017 to 14 billion cubic feet in 2030.[15] In addition, PHMSA is taking on an expanded role by reviewing permits for LNG export terminals and inspecting them for compliance with DOT's LNG safety regulations and industry standards.

In 2017, we reported that because PHMSA had not updated its workforce plan since 2005, it could not be sure it had aligned its staffing resources to meet its mission. We also determined that industry-specific conditions had created recruitment challenges for PHMSA, and even direct hiring authority might not provide the tools the Agency needs in a competitive environment driven by salary. Moreover, PHMSA does not have the authority to establish higher rates of basic pay to address recruiting and retention challenges. In response to our recommendation, and in anticipation of its expanded role with LNG terminals, PHMSA has improved its workforce management plans but still faces challenges associated with hiring and retaining a highly qualified workforce. For example, in 2018, PHMSA issued a comprehensive Strategic Work Force Plan. However, the Agency still must complete an in-depth compensation study comparing regional salaries to determine whether it should use a special rate of pay for general engineers. According to PHMSA officials, that study will become the business case for requesting approval for the higher rates of basic pay from DOT and the Office of Personnel Management.

We have two ongoing audits examining potential challenges within PHMSA's workforce culture that could impact the Agency's safety mission, as well its oversight of LNG facilities' compliance with Federal standards.

[15] According to the U.S. Energy Information Agency.

Referring Allegations of Criminal Violations of Federal Laws That Regulate Pipeline Safety and Hazardous Materials to OIG for Investigation

OIG plays a crucial role in fulfilling PHMSA's and DOT's mission by detecting and preventing waste, fraud, abuse, and mismanagement, as well as providing criminal enforcement for violations of law to complement broader civil and administrative efforts. In order for OIG to fulfill this role, it is necessary that PHMSA and other Operating Administrations notify us whenever circumstances appear to indicate a potential criminal violation.

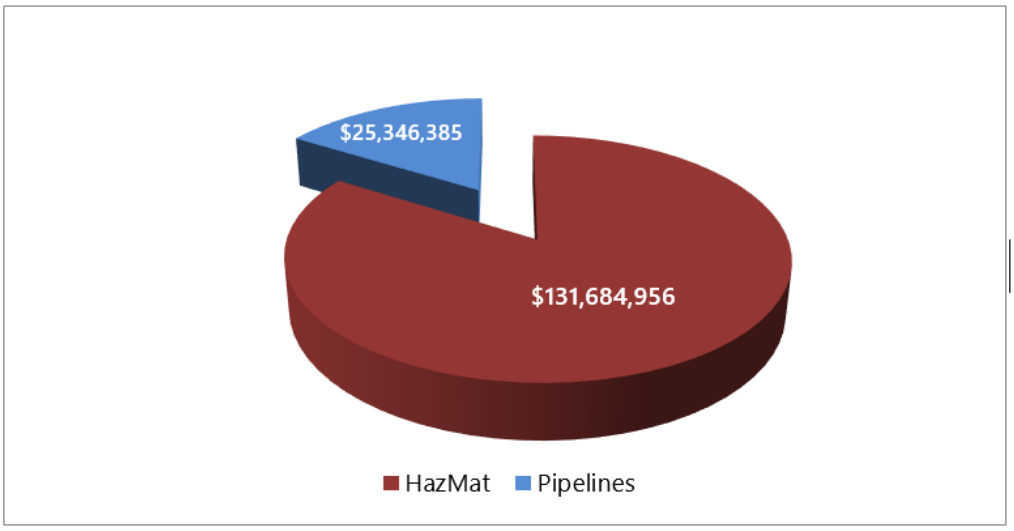
Our recent audit work on DOT's process for making criminal referrals to OIG shows the benefits that a robust OIG referral process may have for DOT. For example, the Federal Railroad Administration (FRA) made changes to its process in April 2016 after we identified referral weaknesses, and the number of FRA-related referrals to OIG greatly increased. At PHMSA, both the Office of Pipeline Safety and the Office of Hazardous Materials Safety require that all referrals arising from enforcement activities of a regulated entity first go through the Agency's Office of Chief Counsel, while internal agency complaints may be reported directly to OIG. This prescribed process is contrary to DOT Order 8000.5A, which requires referrals to be made without delay, and, as a result, PHMSA may not consistently refer violations of the Pipeline Safety Act to our office. OIG's two audit recommendations remain open: to update DOT Orders 8000.8 and 8000.5A and make them available to DOT employees and to require that Operating Administrations align any criminal referral procedures with updated DOT Orders.

The need for a robust process at PHMSA is reinforced by our investigators' enforcement of Federal laws regulating pipelines and shipments of hazardous materials. From January 2014 through July 2019, PHMSA reported 1,712 significant incidents, which caused 63 fatalities, 377 injuries, and over $2.5 billion in costs, as well as 1,072 civil administrative enforcement cases filed against pipeline owners and operators. During this same timeframe, however, PHMSA sent our office only 11 referrals for criminal investigations of incidents involving pipeline safety. For example, when activists intentionally damaged a pipeline in July 2017, PHMSA personnel contacted another Federal law enforcement agency but did not also notify OIG. This disparity between serious pipeline incidents and the number of cases we receive suggests better procedures and awareness could improve reporting of potentially criminal activities to OIG, and thereby allow PHMSA to harness OIG's extensive experience in pipeline investigations to strengthen enforcement of criminal and civil penalties.

Since 2014, our Office of Investigations has conducted several pipeline and hazmat safety investigations with impactful results (see figure). Our investigations into pipeline safety violations have resulted in two criminal charges, two

convictions, over $25 million in financial recoveries, and 13 years of probation. Our hazmat safety investigations have had an even greater impact: 89 criminal charges, 64 convictions, over $131 million in financial recoveries, over 57 years of incarceration, and 170 years of probation and supervised release. For example, in November 2018, five employees of an explosives recycling facility, who had illegally transported and stored over 15 million pounds of explosive munitions, were sentenced to a combined 23 years in prison and over $35 million in restitution.

Figure. Hazardous Material and Pipeline Investigations: Financial Results Since 2014



Source: OIG analysis.

As of July 2019, our Office of Investigations was conducting seven open investigations into violations of the Pipeline Safety Act; two of the seven cases arose from PHMSA referrals. In addition, we had 29 open investigations related to hazmat violations. Given the widespread impact that pipeline and hazmat incidents can have on public safety, enforcement of applicable laws and regulations—bolstered by a robust referral process with our office—remains an ongoing challenge for the Department.

Related Documents and Recommendations

The following documents as well as the current status of OIG recommendations can be found on our website at http://www.oig.dot.gov.

Title	Total Recommendations	Open Recommendations
DOT Operating Administrations Can Better Enable Referral of Potentially Criminal Activity to OIG (August 22, 2018)	3	3
PHMSA Has an Opportunity To Refine Its Guidance and Performance Reporting for the Pipeline Safety Research and Development Program May 30, 2018)	3	1
PHMSA Has Improved Its Workforce Management but Planning, Hiring, and Retention Challenges Remain (November 21, 2017)	3	1
Insufficient Guidance, Oversight, and Coordination Hinder PHMSA's Full Implementation of Mandates and Recommendations (October 14, 2016)	5	0
PHMSA'S State Pipeline Safety Program Lacks Effective Management and Oversight (May 7, 2014)	7	0
Total	**21**	**5**

For more information on the issues identified in this chapter, please contact Barry DeWeese, Assistant Inspector General for Surface Transportation Audits, at (202) 366-5630.

Chapter 6

Enhancing Enforcement and Data Analysis To Reduce Commercial Vehicle-Related Fatalities

To enhance the safety of our Nation's roadways, the Federal Motor Carrier Safety Administration (FMCSA) must address the increase in fatalities involving large trucks and buses. According to FMCSA, these fatalities have consistently risen in recent years—from 4,455 fatalities in 2013 to 4,949 in 2018, an 11 percent increase.[16] Enhanced enforcement and data analysis are important tools for improving the safety performance of commercial motor carriers and their drivers and vehicles.

Key Challenges

- Ensuring commercial drivers are qualified to operate large trucks and buses
- Prioritizing motor carriers for interventions
- Estimating the impact of driver detention on the motor carrier industry

Ensuring Commercial Drivers Are Qualified To Operate Large Trucks and Buses

Qualified commercial drivers are important for safe highways and the traveling public. Because of the volume of drivers and differences in States' commercial driver's license (CDL) programs, FMCSA faces challenges in ensuring both drivers and States comply with Federal requirements. In particular, the Commercial

[16] Based on FMCSA data as of June 30, 2019. States are expected to report crash data to FMCSA within 90 days of the crash. Data are considered preliminary for 22 months to allow for changes.

Motor Vehicle Safety Act of 1986 requires States to exchange information on commercial drivers through a nationwide information system, and establishes penalties, including CDL disqualification, for serious traffic violations. Yet weaknesses in timely information sharing have led to unqualified drivers remaining on roads. For example, a driver with a Massachusetts CDL was recently arrested in Connecticut for operating under the influence; 6 weeks later, he was involved in a fatal crash in New Hampshire. The violation in Connecticut should have resulted in disqualification of the driver's CDL. An internal review conducted by the Massachusetts Registry of Motor Vehicles (RMV) revealed that RMV officials did not timely review notifications of numerous out-of-State violations. Furthermore, a flaw in RMV's electronic registry system inappropriately "kicked out" some notifications from other States. RMV has since issued suspensions of over 2,000 CDLs after reviewing its backlog. To enhance safety, FMCSA will need to refocus its efforts to ensure that States report and act on notifications of violations committed by CDL holders.

FMCSA must also take action to ensure that commercial drivers maintain valid medical certificates. These certificates confirm that the driver is healthy enough to safely operate a commercial motor vehicle. Since August 2014, our investigations of the medical certification process have resulted in eight indictments and six convictions related to fraud. For example, in January 2019, an Alabama chiropractor[17] was sentenced to 37 months' imprisonment and a $10,000 fine for his role in a scheme to submit falsified DOT-mandated CDL medical examinations to FMCSA's National Registry. As a result of the investigation, over 2,000 drivers were required to retest for medical suitability. Enhancing FMCSA's oversight will depend in part on collecting and maintaining quality information on drivers' medical certificates. As such, we are currently conducting an audit examining FMCSA's oversight of medical certificate data quality and validation of information in its National Registry of Certified Medical Examiners.

In addition to CDL certificate fraud by medical doctors, our investigations have uncovered numerous instances of fraud committed by State Departments of Motor Vehicles' (DMV) examiners, driving schools, and third-party examiners. For example, between September 2018 and July 2019, two trucking company employees and a former California DMV employee were sentenced for their roles in a scheme to issue fraudulent permits to drivers who had either failed required written tests or not taken the tests. Our investigation revealed that between September 2014 and June 2017, the owner of a trucking school bribed California DMV employees to access and alter database records regarding the school's test results. As a result of our investigations, 28 individuals have been indicted and 19 convicted for CDL fraud committed by DMV examiners since August 2014;

[17] A DOT medical examination must be conducted by a licensed medical examiner listed on FMCSA's National Registry, which includes medical doctors, doctors of osteopathy, physician assistants, advanced practice nurses, and doctors of chiropractic.

14 individuals have been indicted, 11 convicted for CDL fraud committed by driving schools and third-party examiners, and 172 CDLs have been revoked, and the drivers were required to retest. As these investigations show, enhancing FMCSA's oversight and its ability to identify, enforce, and prevent CDL fraud remains a critical challenge for the Department.

Prioritizing Motor Carriers for Interventions

An ongoing challenge FMCSA faces is identifying and prioritizing high-risk motor carriers for interventions. Currently, FMCSA uses a data-driven safety compliance and enforcement program called the Compliance, Safety, and Accountability (CSA) program. This program consists of the Safety Measurement System (SMS),[18] an interventions process, and safety fitness determinations that identify carriers that are not fit to operate commercial motor vehicles. FMCSA commissioned the National Academy of Sciences (NAS) to study the CSA program and developed a corrective action plan to address NAS's recommendations.

Our recent audit on FMCSA's corrective action plan found that the Agency has addressed some, but not all, of the NAS recommendations. For example, NAS recommended that FMCSA develop an Item Response Theory (IRT) model[19] over the next 2 years, and if it performs well in identifying motor carriers for intervention, to use the model to replace SMS. To address this recommendation, FMCSA has developed and tested IRT to gauge its suitability for prioritizing motor carrier safety interventions and plans to decide whether it will adopt IRT by September 2020.

Further, FMCSA's corrective action plan lacked implementation details to address NAS recommendations on improving the transparency of the Agency's data. It also lacked details on improving its assessment of motor carrier safety rankings, such as the use of percentile rankings and relative and absolute measures,[20] to support decisions regarding which carriers receive safety alerts. FMCSA plans to address these areas once it decides whether to adopt IRT to prioritize carrier safety interventions.

[18] SMS is a prioritization algorithm that allows FMCSA to identify motor carriers that warrant intervention due to safety compliance problems. FMCSA uses the SMS algorithm to identify carriers for intervention by computing percentile rankings for each carrier in seven categories, including Crashes, Unsafe Driving, Hours of Service Compliance, Vehicle Maintenance, Controlled Substances/Alcohol, Hazardous Materials Compliance, and Driver Fitness.

[19] An IRT model is a formal statistical model used to measure unobserved characteristics of an individual or firm.

[20] NAS recommended that FMCSA use both absolute and relative measures to prioritize carriers for intervention and compute percentile ranks conditionally within groups of similar carriers and among all motor carriers. A relative measure helps push for progressively safer performance; an absolute measure requires a set standard.

Estimating the Impact of Driver Detention on the Motor Carrier Industry

FMCSA's efforts to improve commercial vehicle safety also depend on obtaining an accurate understanding of the role of driver detention within the industry. Specifically, to reduce driver fatigue and fatigue-related crashes, FMCSA's hours-of-service regulations limit the number of hours a driver can work. Drivers who experience excessive delays at shipping and receiving facilities—known as driver detention—may violate hours-of-service regulations or drive unsafely due to fatigue or the desire to recover lost income, increasing the risk of crashes that result in fatalities, injuries, and financial costs.

The Fixing America's Surface Transportation Act of 2015 directed FMCSA to issue regulations that cover the collection of data on delays experienced by commercial vehicle operators before the loading and unloading of their vehicles. However, in 2018, we reported that accurate industrywide data on driver detention do not exist. These data are not available because most industry stakeholders only measure time spent at shippers' and receivers' facilities beyond the limit established in shipping contracts. Available electronic data cannot readily discern detention time from legitimate loading and unloading tasks, and are unavailable for a large segment of the industry.

We also reported in 2018 that FMCSA had not conducted a study of the safety and operational impact of driver detention on work hours, hours-of-service violations, and crashes. However, our analysis of available FMCSA data estimated that driver detention increases the likelihood of truck crashes involving fatalities, significant injuries, or vehicle towing. We estimated that a 15-minute increase in average dwell time—the total time spent by a truck at a facility—increases the average expected crash rate by 6.2 percent. We also estimated that detention is associated with reductions in annual earnings of $1.1 billion to $1.3 billion for for-hire commercial motor vehicle drivers in the truckload sector.

Without accurate and representative data, FMCSA faces challenges in accurately describing how the diverse trucking industry experiences driver detention. FMCSA concurred with our recommendation to collaborate with industry stakeholders to develop and implement a plan to collect and analyze reliable data on the frequency and severity of driver detention. As part of this effort, FMCSA has requested information from stakeholders that could lead to better understanding of driver detention and its impact on road safety, including data sources, methodologies, and potential technologies that could provide insight into loading and unloading delays.

Related Documents and Recommendations

The following documents as well as the current status of OIG recommendations be found on our website at http://www.oig.dot.gov.

Title	Total Recommendations	Open Recommendations
FMCSA's Plan Addresses Recommendations on Prioritizing Safety Interventions but Lacks Implementation Details (September 25, 2019)	2	2
Estimates Show Commercial Driver Detention Increases Crash Risks and Costs, but Current Data Limit Further Analysis (January 31, 2018)	1	1
FMCSA Strengthened Controls for Timely and Quality Reviews of High-Risk Carriers, but Data Challenges Remain to Assess Effectiveness (July 26, 2017)	2	0
FMCSA Adequately Monitored Its NAFTA Cross-Border Trucking Pilot Program but Lacked a Representative Sample To Project Overall Safety Performance (December 10, 2014)	0	0
Actions Are Needed To Strengthen FMCSA's Compliance, Safety, Accountability Program (March 5, 2014)	6	0
Total	**11**	**3**

For more information on the issues identified in this chapter, please contact Barry DeWeese, Assistant Inspector General for Surface Transportation Audits, at (202) 366-5630.

Chapter 7

Continuing National Efforts To Improve Railroad Safety

Reducing railroad incidents and fatalities—many resulting from motor vehicle collisions with trains at grade crossings or trespassers on the railroad right-of-way—remains a top safety challenge for the Department. Although the Federal Railroad Administration (FRA) has taken steps to address these fatalities, our work continues to identify improvements FRA can make to enhance railroad safety. This includes overseeing industry's ongoing efforts to implement Positive Train Control (PTC)—advanced systems that can help prevent train-to-train collisions, overspeed derailments, and other incidents.

Key Challenges

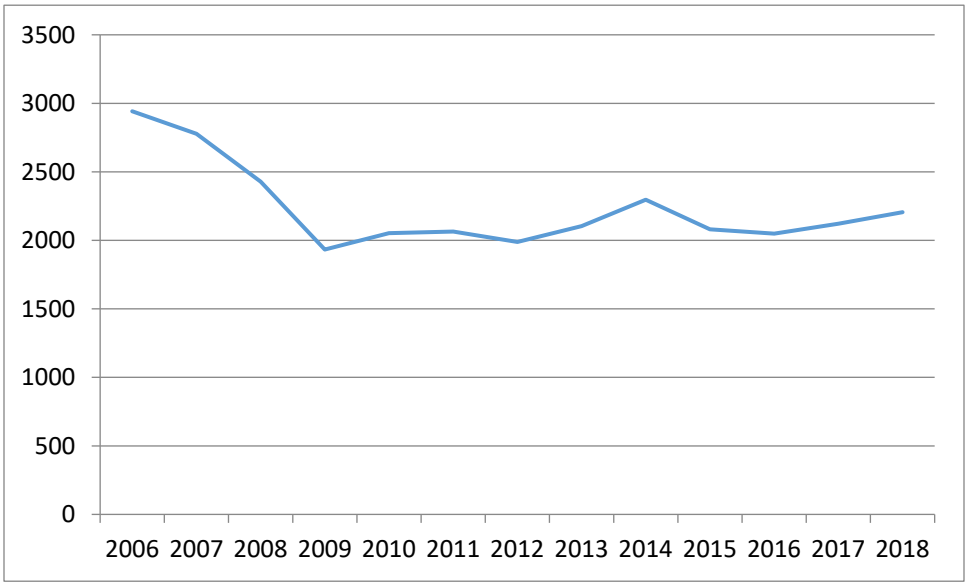
- Reducing railroad grade crossing and trespassing fatalities
- Overseeing railroads' implementation of PTC systems

Reducing Railroad Grade Crossing and Trespassing Fatalities

The vast majority of railroad fatalities occur when vehicles cross railroad tracks at-grade or when trespassers are on the tracks or surrounding right-of-way. The risk of these incidents grows as highway and train traffic increase. Since 2006, railroad

accidents have resulted in 10,449 fatalities. Of those, 3,643 (35 percent) occurred at grade crossings. Between 2006 and 2009, the numbers of incidents at grade crossings declined by over 34 percent. However, after 2009, the numbers rose again until they fell in 2015 and then leveled off at 2,000-plus incidents per year through 2018 (see figure). Combined, railroad grade crossing and trespasser deaths accounted for approximately 95 percent of all rail-related deaths from 2008 to 2018.

Figure. Number of Incidents at Grade Crossings in the United States, 2006–2018



Source: FRA data obtained May 1, 2019.

According to FRA, almost all fatalities and injuries from grade-crossing accidents could have been prevented. Our recent analysis of FRA's grade-crossing accident investigation reports found that in 83 of 93 analyzed reports the primary cause could be attributed to the behavior of the highway driver. Given that trains cannot change directions or stop quickly, reducing these accidents presents a significant safety challenge for FRA. The Agency will need to continue to encourage State and local governments and railroads to use technology to prevent incidents and increase driver and trespasser awareness of the hazards they face.

Overseeing Railroads' Implementation of PTC Systems

Over the last decade, the U.S. rail industry has responded to fatal rail accidents and a Federal statutory mandate by committing to implementing PTC systems on the required main lines. Using communication- or processor-based train control technology, PTC systems must reliably and functionally prevent train-to-train

collisions, overspeed derailments, incursions into established work zone limits, and movements of trains through switches in the wrong position. The Rail Safety Improvement Act of 2008 (RSIA)[21] required PTC systems to be implemented across a significant portion of the Nation's rail system by December 31, 2015, including Class I railroads' main lines that handle poisonous or toxic-by-inhalation hazardous materials and any railroad's main lines that provide regularly scheduled intercity passenger or commuter rail service. Citing funding and technical challenges, the industry did not meet this deadline, and Congress and the President extended it to at least December 31, 2018, in the Positive Train Control Enforcement and Implementation Act of 2015.[22] The Act also authorized railroads to use an "alternative schedule and sequence" with a full implementation deadline after December 31, 2018, but not later than December 31, 2020. The Act required FRA to approve a railroad's request for an alternative schedule, if a railroad met the statutory criteria set forth in the Act.

FRA has taken several actions to support railroads' implementation of PTC. For example, the Department has provided nearly $2.6 billion in grants and loans to support implementation of PTC systems; built a PTC testbed at FRA's Transportation Technology Center near Pueblo, CO; established a PTC task force of Federal staff and contractors with expertise in railroad signal and train control systems; and provided industrywide guidance in six collaboration sessions during 2018 and 2019. Railroads have reported progress with implementation, but significant work remains to activate PTC systems on the remaining main lines and to ensure interoperability among the individual PTC systems. On December 31, 2018, the Department reported that 4 of 41 railroads had fully implemented an FRA-certified and interoperable PTC system on all of their required main lines. The other 37 railroads subject to the statutory PTC mandate in 2018 had asked FRA to approve an alternative schedule. This includes all seven Class I railroads, which operate the majority of commercial freight tracks in North America; Amtrak; 24 commuter railroads; and 5 other freight railroads that host Amtrak or commuter rail transportation. FRA continues to provide technical assistance to railroads as they manage the task of achieving full system functionality on every track segment to which the mandate applies. FRA's efforts to monitor the rail industry's progress will be a workload challenge as it oversees the railroads' implementation of these critical safety systems; certifies host railroads' PTC systems; and assesses whether railroads fulfill technical, procedural, and operational milestones and requirements.

[21] Pub. L. No. 110-432 (2008).
[22] 49 U.S.C. § 20157.

Related Documents and Recommendations

The following documents as well as the current status of OIG recommendations can be found on our website at http://www.oig.dot.gov.

Title	Total Recommendations	Open Recommendations
FRA Collects Reliable Grade Crossing Incident Data, But Has Not Updated its Accident Prediction Model and Lacks Comprehensive Guidance for Using the Data To Focus Inspections (September 4, 2019)	2	2
Federal Funding Support for Positive Train Control Implementation (March 28, 2018)	0	0
Observations on Federal Funding Support for Positive Train Control Implementation (March 1, 2018)	0	0
Total	**2**	**2**

For more information on the issues identified in this chapter, please contact Barry DeWeese, Assistant Inspector General for Surface Transportation Audits, at (202) 366-5630.

Chapter 8

Effectively Overseeing Billions in Surface Infrastructure Investments

The Department oversees the more than $50 billion it provides each year for building and maintaining the Nation's surface infrastructure, including millions of miles of roads, bridges, tunnels, and tracks. DOT also oversees additional funding to address the impact of natural disasters. To ensure these Federal dollars are used effectively, the Department must focus its oversight on areas of greatest national impact and safety, such as protection of major infrastructure investments and improvements in project delivery and quality.

Key Challenges

- Targeting oversight resources and managing risks to investments
- Capitalizing on oversight support
- Improving project delivery, quality, and impact

Targeting Oversight Resources and Managing Risks to Investments

The Department oversees the considerable Federal investment in surface transportation by partnering with various entities, such as State DOTs and metropolitan planning organizations. The Federal Highway Administration (FHWA) funds the highest amount of surface transportation grants, and State

DOTs may assume certain project oversight responsibilities except for projects deemed high-risk or when not allowed by law. Due to the high numbers of projects, FHWA has developed an approach for making decisions on when to delegate and where to target oversight. The Agency has chosen risk-based stewardship and oversight as its approach, but faces challenges in obtaining reliable and meaningful data to assist with its risk assessments. We have found that FHWA does not always track the data necessary to readily identify the amount and type of activity that received Federal funding, making risk analyses of those activities difficult or impossible. For example, FHWA has historically not included force account activity[23]—which involves the noncompetitive use of State or local resources to execute Federal-aid highway projects—in its oversight because the Agency considers it a low-risk activity. However, our work shows the Agency could not produce sufficient data to support its low risk assessment for force account activities.

For FTA, which in fiscal year 2018 provided about $12 billion to grantees, as well as additional funding in response to natural disasters, the use of data in its oversight also presents challenges. For instance, preliminary results from our ongoing work found that after Hurricane Sandy, FTA established new procedures to determine whether its grantees complied with a Federal flood insurance requirement. However, these procedures did not require grantees to produce data to support self-certifications that they meet this requirement or FTA to verify that grantees carried appropriate flood insurance. As a result, FTA cannot conclusively determine whether its grantees have the required insurance for a portion of the billions in Federal transit investments it funds annually, and therefore whether those grantees are eligible for the full amount of funding they receive. We expect to make recommendations to address these weaknesses and better manage risks to FTA's investments.

The Federal Railroad Administration (FRA) also faces challenges in targeting oversight resources and managing risks, especially as it manages the investments of a variety of grant programs, including two of the largest—the Consolidated Rail Infrastructure and Safety Improvements Program and the annual operating and capital grants to the National Railroad Passenger Corporation (Amtrak). In 2019, Congress appropriated over $2.6 billion to FRA's grant programs. In the past, the Agency has taken steps to address weaknesses in its administration of grant funds. However, given the importance of grant management for ensuring proper stewardship of taxpayer dollars, we continue to monitor FRA's efforts. Specifically, we currently have an ongoing audit related to FRA's over $2.5 billion investment in California made under High Speed Intercity Passenger Rail (HSIPR)

[23] Federal law requires FHWA grant recipients to competitively award contracts for these grants unless another method is more cost-effective or an emergency exists. One such method is force accounts, which involves the noncompetitive use of State or local resources to execute highway projects. FHWA Division Offices are primarily responsible for overseeing the use of force account on Federal-aid projects.

program. Our audit objectives include an assessment of FRA's risk mitigation efforts and its procedures for assuring that expenditures comply with Federal requirements.

Capitalizing on Oversight Support

As it seeks to provide effective stewardship of its grants and contracts, the Department could do more to capitalize on the oversight support provided by such various means as oversight contractors. For instance, in fiscal year 2012, FRA entered into a $50 million intra-agency agreement (IAA)[24] with DOT's John A. Volpe National Transportation Systems Center (Volpe). This agreement allowed FRA to implement its Monitoring and Technical Assistance Program (MTAP)[25] with Volpe's assistance and oversight support using monitoring and technical assistance contractors (MTAC). However, we recently found that FRA and Volpe did not ensure that MTACs for the $8 billion High-Speed Intercity Passenger Rail Program consistently documented oversight reviews. Also, FRA and Volpe did not sufficiently track and verify resolution of the MTACs' recommendations and significant issues to the grantee. These weaknesses impeded FRA and Volpe's ability to realize the full benefit of the MTACs' oversight. In our 2019 report, we made 11 recommendations to improve FRA's and Volpe's acquisition and use of MTACs.

We found similar issues with FTA's requirements for recipients to use integrity monitors[26] as an additional control for federally funded Hurricane Sandy relief and recovery projects. For example, FTA did not provide adequate guidance to make sure that grantees resolved integrity monitors' recommendations or take proactive steps to ensure grantees established controls to prevent problems from recurring. Furthermore, FTA did not have a formal process for reviewing and approving integrity monitor plans to help ensure they meet program expectations and support its Hurricane Sandy oversight goals. Therefore, FTA allowed risks—such as inadequate reporting of grantees' integrity monitoring activities and possible conflicts in the role of the integrity monitor participants—to go unaddressed. The Agency has recently agreed to take actions based on our recommendations to improve its use of integrity monitors. FTA has also taken action to address our prior recommendations stemming from similar concerns

[24] An IAA is an agreement between components within a Federal agency to requisition services in exchange for reimbursement, obligate funds, and describe work to be performed.

[25] MTAP performs oversight of the HSIPR program and FRA's other capital rail projects, and provides technical assistance to project stakeholders. FRA's goals for MTAP are (1) proactively identify and mitigate risks, foster solutions to challenges and issues, and ensure projects move successfully into revenue operations; (2) develop an ongoing oversight program with knowledge sharing and partnering; and (3) elevate the knowledge and level of practices in the U.S. rail industry.

[26] FTA defines integrity monitors as independent organizations that bring together various disciplines of expertise, including legal, auditing and accounting, investigative, engineering, and environmental. Agencies use integrity monitors to ensure compliance with relevant laws and regulations and prevent, uncover, and report unethical and illegal conduct.

with its use of project management oversight contractors[27] for a Sandy relief major capital project—such as tracking and following up on issues identified by its oversight contractors and subsequent actions taken. The use of oversight support continues to pose both opportunities and challenges as the Department works to ensure effective use and safeguarding of its grants dollars.

Improving Project Delivery, Quality, and Impact

The Department needs to continue to improve its efforts aimed at helping reduce traffic congestion, enhance economic viability and safety, and improve project delivery. Through DOT's discretionary grant programs, billions are available for these efforts. In a recent report, the Government Accountability Office (GAO) noted that DOT faces challenges in awarding discretionary grants in a fair and competitive process to maximize benefits.[28] GAO also found insufficient documentation of decisions made during application and award processes for the Infrastructure for Rebuilding America (INFRA) program, which provides financial assistance to highway and freight projects. These concerns are similar to ones we reported in February 2018 for the Transportation Investment Generating Economic Recovery (TIGER) program.[29] Addressing these concerns will help ensure the Department's discretionary grants meet the programs' goals and deliver quality projects.

DOT's goals also include improving the timeliness of transportation projects. An important aspect of project acceleration is the Department's implementation of the FAST Act's provisions on streamlining the environmental review process. For example, the act requires DOT to undertake several actions on Federal environmental reviews, and improve its implementation of the National Environmental Policy Act (NEPA).[30] Additionally, an Executive Order signed by the President in 2017 established a goal of completing all environmental reviews of major infrastructure projects within 2 years.[31] Given that the current median time to complete environmental impact statements[32] for transportation projects is over 4 years, DOT faces challenges in completing timely reviews and making authorization decisions. To meet this goal, DOT needs to implement the April

[27] For federally funded major capital projects, FTA uses project management oversight contractors to help it accomplish its oversight role. These contractors make recommendations and identify actions with target dates to help address grantee and project issues and vulnerabilities.
[28] GAO, *Actions Needed to Improve Consistency and Transparency in DOT's Application Evaluations* (GAO-19-541), June 26, 2019.
[29] The Better Utilizing Investments To Leverage Development (BUILD) Program replaced the TIGER program in 2018.
[30] Pub. L. No. 91-190 (1970), as amended, establishes the framework for Federal environmental reviews and requires Federal agencies to evaluate the potential environmental effects of proposed actions on the human environment.
[31] Executive Order 13807, *Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects*, August 15, 2017.
[32] NEPA requires Federal agencies to prepare environmental impact statements for projects with actions that significantly affect the quality of the human environment.

2018 memorandum of understanding it signed with other Federal agencies and update its NEPA implementing procedures.

Related Documents and Recommendations

The following documents as well as the current status of OIG recommendations can be found on our website at http://www.oig.dot.gov.

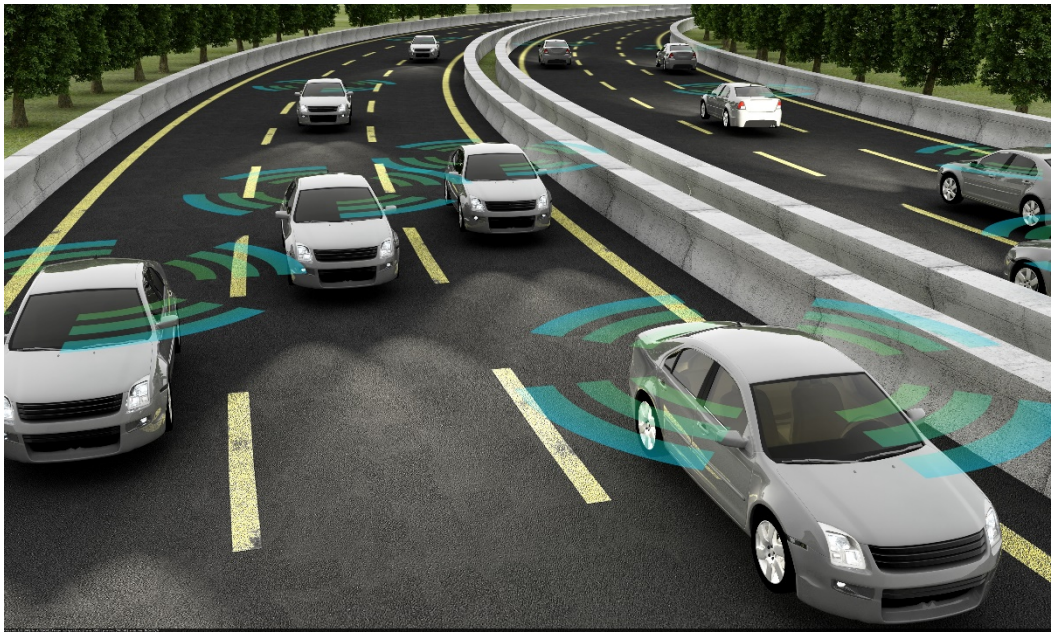
Title	Total Recommendations	Open Recommendations
FTA Has an Opportunity To Improve the Integrity Monitor Program for Hurricane Sandy Grantees (September 9, 2019)	8	8
Opportunities Exist To Improve FRA and Volpe's Acquisition and Use of Oversight Contractors (July 10, 2019)	11	11
Inadequate Data and Guidance Hinder FHWA Force Account Oversight (May 29, 2019)	4	4
FTA has an Opportunity To Further Promote Lessons Learned To Enhance the Protection of Rolling Stock at Transit Agencies (April 3, 2019)	2	0
FHWA Lacks Adequate Oversight and Guidance for Engineer's Estimates (March 13, 2019)	4	4
DOT Has Completed FAST Act Requirements on Aligning Federal Environmental Reviews (November 6, 2018)	0	0
Initial Audit of Florida International University Pedestrian Bridge Project – Assessment of DOT's TIGER Grant Review and Selection Processes (October 29, 2018)	0	0
Improvements Are Needed To Strengthen the Benefit-Cost Analysis Process for the TIGER Discretionary Grant Program (February 28, 2018)	4	0
Review of Major Western Capital Projects Points to Overall Improvements Needed in FTA's Financial Guidance and Oversight (May 9, 2017)	5	0
Vulnerabilities Exist in Implementing Initiatives Under MAP-21 Subtitle C to Accelerate Project Delivery (March 6, 2017)	5	1
FHWA Does Not Effectively Ensure States Account for Preliminary Engineering Costs and Reimburse Funds as Required (August 25, 2016)	7	7

Title	Total Recommendations	Open Recommendations
FTA Did Not Adequately Verify PATH's Compliance With Federal Procurement Requirements for the Salt Mitigation of Tunnels Project (March 28, 2016)	3	0
Oversight of Major Transportation Projects: Opportunities To Apply Lessons Learned (June 8, 2015)	0	0
Total	**53**	**35**

For more information on the issues identified in this chapter, please contact Barry DeWeese, Assistant Inspector General for Surface Transportation Audits, at (202) 366-5630 and Mary Kay Langan-Feirson, Assistant Inspector General for Acquisition Audits, at (202) 366-5225.

Chapter 9

Preparing for the Future of Transportation



The Department has several initiatives currently underway to address the future transportation environment. As the Fixing America's Surface Transportation (FAST) Act of 2015[33] concludes and a new authorization begins, the Department's challenge will be to address the impact of emerging technologies and industries. At the same time, the Department will need to respond to increasing and evolving demands on the Nation's transportation system, such as by leveraging innovative financing, supporting research and development (R&D), and reshaping its workplaces.

Key Challenges

- Preparing for emerging vehicle automation technologies
- Safely integrating Unmanned Aircraft Systems (UAS) and the commercial space industry into the National Airspace System (NAS)
- Leveraging limited Federal funds through innovative financing
- Supporting R&D and reshaping the workplace to meet future needs

[33] Pub. L. No. 114-94.

Preparing for Emerging Vehicle Automation Technologies

Emerging technologies are impacting transportation on several fronts. Most visible to the traveling public are vehicle automation technologies, such as those popularly known as driverless cars. While automated vehicles present the potential for long-term benefits, they may also pose new safety, oversight, and regulatory challenges. The Department has developed approaches and guidance[34] but may need to take more action as the technology advances, data are collected and analyzed, lessons are learned, and needs for additional leadership emerge. For example, the Department faces the significant challenge of testing and developing new tools and standards that might be necessary for overseeing and regulating these innovative and emerging technologies. In addition, NHTSA's efforts to ensure full reporting of safety defects for the automotive industry point to potential challenges as this segment of the industry grows.

As these new technologies evolve, the Department will need to manage the impact on surface infrastructure, including asset investment; pilot programs and testing; and the interfacing of roads, traditional vehicles, pedestrians, and other road users with automated vehicles. The Department has taken initial steps to collaborate with the automobile industry, academic institutions, technology firms, and State and local agencies to develop vehicle-to-infrastructure (V2I) technologies. These technologies will allow vehicles to communicate with road infrastructure, such as traffic signals, through the wireless exchange of data.[35] To date, through its connected vehicle pilot program, the Department has committed up to $100 million for projects that will deploy V2I technologies in real-world settings and will inform a broader cost-benefit assessment of connected vehicle concepts and technologies. However, as the Government Accountability Office (GAO) and others have noted, an array of challenges could affect deployment of V2I technologies, including developing standards and addressing human factors.[36]

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[34] In 2016, the Department and NHTSA issued *Federal Automated Vehicles Policy*, which establishes a framework, guidance, and best practices for manufacturers and others to assist in the safe design, development, testing, and deployment of automated vehicles. In 2017, NHTSA issued *Automated Driving Systems: A Vision for Safety 2.0*, which incorporates feedback received through public comments, stakeholder meetings, and congressional hearings. In 2018 the Department released *Automated Vehicles 3.0: Preparing for the Future of Transportation,* which describes its strategy to address barriers to safety innovation and progress and provides guidance on cross-modal collaboration.

[35] Software applications currently under development will use V2I technologies to, among other things, warn drivers about nearby road conditions, such as work zones, and that they are approaching curves at unsafe speeds.

[36] GAO, *Intelligent Transportation Systems: Vehicle-to-Infrastructure Technologies Expected to Offer Benefits, but Deployment Challenges Exist* (GAO-15-775), September 15, 2015.

Safely Integrating UAS and the Commercial Space Industry Into the NAS

The Department also faces significant safety and regulatory challenges with integrating new technologies and industries that are shaping the future of aviation. For example, the demand for and number of UAS operations continues to climb. According to FAA, as of August 2019, FAA has processed nearly 1.5 million registrations for commercial UAS operators and hobbyists. Further, reports of UAS sightings by pilots and other sources have increased significantly in the past few years—from 238 in 2014 to over 2,350 in 2018.

FAA has taken steps to further the integration of UAS in the NAS, such as issuing a rule[37] permitting small UAS (under 55 pounds) to fly commercially with a number of operational restrictions.[38] However, we reported last year that FAA faces several challenges in developing and implementing a risk-based oversight system to oversee the safe integration of UAS in the same airspace as manned aircraft. In response to our recommendations, FAA began requiring new inspections of UAS operators based on data. However, several challenges remain as FAA continues to advance the integration of UAS, including: (1) implementing UAS hobbyist provisions of the 2018 FAA Reauthorization Act; (2) creating a robust system for obtaining, tracking, and analyzing UAS safety data; and (3) resolving technological and regulatory challenges, such as remote identification.

At the same time, FAA's oversight and regulatory challenges also extend to the growing commercial space industry. In fiscal year 2018, there were 35 launches and reentries conducted under licenses issued by FAA's Office of Commercial Space Transportation, with 32 licensed or permitted operations conducted this fiscal year. With SpaceX scheduling more launches and new entrants offering launch services, this growth is expected to increase. In December 2018, Virgin Galactic's SpaceShipTwo successfully completed a suborbital test flight, bringing the industry closer to having commercial passengers in space.

In May 2018, the President issued a policy directive requiring the Department to review and revise licensing requirements for commercial space launches and re-entries. In April 2019, FAA issued a Notice of Proposed Rulemaking (NPRM) that would streamline all launch and re-entry regulations into a single, performance-based system.[39] While FAA continues to review comments from the NPRM, it must also meet the challenge of safely integrating commercial operations into

[37] 81 Fed. Reg. 42064 (June 28, 2016) (codified at 14 CFR Part 107).
[38] The rule does not permit several types of UAS operations that industry values but FAA considers high risk, such as operating a small UAS beyond line of sight or over people.
[39] *Streamlined Launch and Reentry Licensing Requirements*, Notice of Proposed Rulemaking, 84 Fed. Reg. 15296 (April 15, 2019).

the NAS without sacrificing the safety and efficiency of the current commercial aviation industry.

Leveraging Limited Federal Funds Through Innovative Financing

Preparing for the future of transportation also requires seeking innovative financing for some of the Department's greatest funding challenges, including maintaining and upgrading the Nation's aging transportation infrastructure. In particular, demands on the transportation system and constraints on public resources have prompted the use of innovative financing for infrastructure projects and expanded the use of federally backed loans. One such strategy is public-private partnerships (P3), which can expand the capacity of States to finance infrastructure projects and offer possible benefits such as accelerated delivery times, reduced costs, risk transference, and better cost effectiveness of long-term maintenance. However, as we reported earlier this year, the use of alternative sources and loans poses oversight challenges for the Department. For example, we found that FHWA was not following its P3-specific guidance, which notes that P3 projects warrant additional stewardship considerations to address unique risks, and outlines FHWA staff roles in approving P3s. FHWA agreed to implement all five of our recommendations for improving its approval and monitoring processes for P3 projects by December 31, 2019.

Similarly, the FAST Act restructured the oversight of DOT's credit programs by establishing the Build America Bureau (the Bureau) to oversee the Transportation Infrastructure Finance and Innovation Act, Railroad Rehabilitation and Improvement Financing, and private activity bonds credit programs. These programs supplement traditional funding mechanisms such as the Highway Trust Fund, by providing billions of dollars for surface transportation projects across the country. In March 2019,[40] GAO reported that the Department had made significant progress in establishing the Bureau. However, the Bureau had not established an acceptable risk level for its financing programs, resulting in project sponsors' hesitance to invest time and resources applying for loans. Addressing these challenges could lead to increased demand for these programs and thus greater investment in surface transportation infrastructure.

Supporting R&D and Reshaping the Workplace To Meet Future Needs

As research into new transportation technologies and capabilities accelerates, our work has identified challenges for the Department as it seeks to exercise proper stewardship over its support for R&D efforts. For example, we reported in 2017 that FAA lacked important controls over its use and management of other

[40] GAO, *Action Needed to Guide Implementation of Build America Bureau and Improve Application Process* (GAO-19-279), March 11, 2019.

transaction agreements (OTA),[41] which the Agency uses to engage outside parties in cooperative R&D. In particular, FAA did not encourage competition when awarding OTAs, consistently analyze OTAs for conflicts of interest, or monitor cost sharing when using this innovative mechanism. More recently, our audit on the Department's management and oversight of its highway and vehicle safety R&D agreements[42] found that DOT's Operating Administrations (OA) do not use a clear definition for R&D when determining whether a financial assistance award should be identified as R&D. This omission could make it difficult for the Department to obtain a full understanding of and report on the amount and types of R&D it funds and verify that it does not fund duplicative research. The Department also has opportunities to better plan and coordinate R&D through its Volpe Center, an internal resource for R&D, testing, evaluation, analysis, and related activities for DOT and its OAs. Such services are obtained via intra-agency agreements (IAAs), which between fiscal years 2015 and 2017 totaled $865.8 million. However, our recently completed audit found that OAs conduct limited planning for IAAs with Volpe, and departmental policies on establishing IAAs and evaluating their performance are unclear and not always followed.

Another challenging area for the Department is reshaping its workplace to meet future needs. For example, the Department procures millions of dollars in laptop computers each year for thousands of employees, who use them daily in offices and for telework. However, we found that outdated policies and weak internal controls inhibit the Department's ability to track and manage these laptops, and consequently, its ability to fully account for its laptops and prevent their misuse and theft. Furthermore, DOT and the rest of the Federal Government are moving toward more flexible and virtual work arrangements. Thus, the Department will need to regularly assess its over 9.4 million square feet[43] of office space across the country to continue making progress on the Office of Management and Budget's long-standing focus on optimizing office space usage, controlling costs, and reducing the Federal footprint. We found that most of DOT's office spaces exceeded the Department's own utilization standard, indicating they were not being used as efficiently as possible. FAA has taken action to improve its office space data and management, and the rest of DOT could possibly leverage these improvements, resulting in cost savings and more efficient work environments.

[41] OTAs are legally binding instruments used to engage industry and academia for a broad range of research and prototyping activities. Because they are not contracts, grants, or cooperative agreements, however, they are not subject to the Federal laws and regulations, such as the Federal Acquisition Regulations, that apply to Government procurement contracts and financial assistance.
[42] Mandated by the FAST Act § 24202.
[43] As of September 2018.

Related Documents and Recommendations

The following related documents as well as the current status of OIG recommendations can be found on our website at http://www.oig.dot.gov.

Title	Total Recommendations	Open Recommendations
DOT Needs To Strengthen Its Oversight of IAAs With Volpe (September 30, 2019)	9	9
Stronger Guidance and Internal Controls Would Enhance DOT's Management of Highway and Vehicle Safety R&D Agreements (May 1, 2019)	15	12
Several Factors Limit DOT's Ability To Efficiently Utilize Its Office Space (April 9, 2019)	5	5
FHWA Needs To Clarify Roles and Processes for Approving and Monitoring Public-Private Partnerships (March 6, 2019)	5	5
Opportunities Exist for FAA To Strengthen Its Review and Oversight Processes for Unmanned Aircraft System Waivers (November 7, 2018)	8	1
FAA's Management and Oversight Are Inadequate To Secure Timely and Cost-Efficient Agency-Leased Offices and Warehouses (April 11, 2018)	12	2
DOT and FAA Lack Adequate Controls Over Their Use and Management of Other Transaction Agreements (September 11, 2017)	17	13
Total	**71**	**47**

For more information on the issues identified in this chapter, please contact Barry DeWeese, Assistant Inspector General for Surface Transportation Audits, at (202) 366-5630, or Mary Kay Langan-Feirson, Assistant Inspector General for Acquisition and Procurement Audits, at (202) 366-5225.

Exhibit. List of Acronyms

ADS-B	Automatic Dependent Surveillance-Broadcast
BUILD	Better Utilizing Investments To Leverage Development grant program
CDL	Commercial driver's license
CSA	Compliance, Safety, and Accountability
CSAM	Cybersecurity Assessment and Management system
DataComm	Data Communications
DMV	Department of Motor Vehicles
DOT	Department of Transportation
ERAM	En Route Automation Modernization program
FAA	Federal Aviation Administration
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FISMA	Federal and Information Security Management Act
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GAO	Government Accountability Office
Hazmat	Hazardous materials
IAA	Intra-agency agreement
IRT	Item Response Theory
IT	Information technology
LNG	Liquefied natural gas
MAP-21	Moving Ahead for Progress in the 21st Century Act
MCAS	Maneuvering Characteristics Augmentation System

MTAC	Monitoring and technical assistance contractor
MTAP	Monitoring and Technical Assistance Program
NAS	National Airspace System
NAS	National Academy of Sciences
NEPA	National Environmental Policy Act
NextGen	Next Generation Air Transportation System
NHTSA	National Highway Traffic Safety Administration
NOAA	National Oceanic and Atmospheric Administration
NPRM	Notice of Proposed Rulemaking
NTSB	National Transportation Safety Board
OA	Operating Administration
OCIO	Office of Chief Information Officer
ODA	Organization Designation Authority
OIG	Office of Inspector General
OTA	Other Transaction Agreement
P3	Public-private partnership
PBN	Performance-Based Navigation
PHMSA	Pipeline and Hazardous Materials Safety Administration
POA&M	Plans of action and milestones
PTC	Positive Train Control
RMV	Registry of Motor Vehicles
R&D	Research and development
SENSR	Spectrum Efficient National Surveillance Radar program
SMS	Safety management system (FAA)
SMS	Safety Measurement System (FMCSA)
TIGER	Transportation Investment Generating Economic Recovery grant program

UAS	Unmanned Aircraft Systems
V2I	Vehicle-to-infrastructure

Appendix. Department Response

U.S. Department of Transportation
Office of the Secretary of Transportation

Assistant Secretary
for Budget and Programs
and Chief Financial Officer

1200 New Jersey Avenue, SE
Washington, DC 20590

10/7/19

Subject: **INFORMATION:** Management Response to the Office of Inspector General (OIG) Draft Report: DOT's Fiscal Year 2020 Top Management Challenges

From: Lana Hurdle
Acting Chief Financial Officer and
Deputy Assistant Secretary for Budget and Programs

To: Mitchell Behm
Deputy Inspector General

The OIG's Fiscal Year (FY) 2020 Top Management Challenges report refers to many of the risks the Department of Transportation (DOT or Department) has identified and is actively addressing. Safety is the top priority of the Department, and we have adopted a systemic approach to safety oversight and management. This approach uses data and performance measures to determine priorities, evaluate risk mitigation strategies, guide safety standards, and ensure the effective integration of those standards into organizational structures and business process. The Department has taken a proactive approach to ensure that innovative and emerging technologies are safely integrated in existing transportation systems. For example, DOT has established an Unmanned Aircraft Systems Integration Pilot Program, partnering with ten local governments and private entities to gather data for safely integrating drones into the National Airspace System.

A second Departmental priority is investing in the Nation's infrastructure, while also providing thorough attention, accountability, and oversight of these investments. For example, through discretionary grant-making, the Department is actively targeting Federal investments toward transportation projects that address high-priority infrastructure and safety needs. In the last two years, transportation investments at DOT increased by $16.1 billion, for a total of $162 billion. DOT is addressing our Nation's infrastructure in a few key ways to include the following: streamlining the permitting process so that infrastructure can be delivered promptly; improving selection criteria for DOT discretionary grants, so that infrastructure in both rural and urban areas benefit from taxpayer investments; providing quick emergency response for rapid recovery from disasters; and readying for Fixing America's Surface Transportation Act (FAST Act) reauthorization, based on market-friendly principles.

Supporting innovation, while also ensuring the safe integration of new technologies into our transportation system, is a third priority of the Department. Emerging technologies can offer benefits in efficiency, access to transportation, and safety. DOT is working with the public and private sectors to safely develop, test, and integrate these new technologies into our existing transportation systems. In October 2018, DOT released *Preparing for the Future of Transportation: Automated Vehicles 3.0.* This non-regulatory approach will promote innovation and safety, which DOT believes could save lives, reduce congestion, and expand mobility.

A fourth priority, which in many ways is the government's number one mission, is accountability. DOT must ensure that every dollar spent is used to the maximum benefit of the taxpayer. The Department is committed to regulatory reform that advances its core safety mission while making rules more streamlined and cost-effective. Accountability at the Department also means exercising proper management and oversight of its contracts and grants to improve program performance and prevent fraud, waste, and abuse. In addition, we want to ensure that efficient and effective internal controls, processes, and procedures are in place and appropriately implemented. For example, to help strengthen oversight of DOT assets, DOT is implementing a shared services model for delivering its acquisitions, human resources, and information technology (IT) functions. The shared services model establishes Administrative Centers of Excellence for Executive and Political Resources, Human Resources Operations, Leadership and Supervisory Development and IT Acquisitions.

We expect the Office of Inspector General to be a partner in these efforts, and the Department will work with OIG to identify fraud, waste, abuse, or mismanagement in the Department's programs, activities, or operations.

We appreciate the opportunity to respond to the OIG draft report. Please contact Madeline M. Chulumovich, Director, Office of Audit Relations and Program Improvement, at (202) 266-6512, with any questions.

U.S. DOT OIG Fraud & Safety Hotline

hotline@oig.dot.gov | (800) 424-9071

https://www.oig.dot.gov/hotline

Our Mission

OIG conducts audits and investigations on behalf of the American public to improve the performance and integrity of DOT's programs to ensure a safe, efficient, and effective national transportation system.

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