



U.S. DEPARTMENT OF TRANSPORTATION
OFFICE OF INSPECTOR GENERAL

**DOT Is Making Progress Toward Fulfilling
the Requirements of the Geospatial Data
Act of 2018**

OST

Report No. IT2021001

October 2, 2020





DOT Is Making Progress Toward Fulfilling the Requirements of the Geospatial Data Act of 2018

Required by the Geospatial Data Act of 2018

Bureau of Transportation Statistics, Office of the Secretary of Transportation | IT2021001 |
October 02, 2020

What We Looked At

Geospatial data contain information on locations on Earth, such as location identifiers and boundary characteristics. Transportation related geospatial data include instrument-flight-rule navigation charts and maps of pipeline inspection boundaries. In October 2018, Congress passed the Geospatial Data Act (GDA) on the management of the National Spatial Data Infrastructure (NSDI). NSDI includes 17 geospatial data themes, including a transportation theme. The act requires inspectors general of covered agencies to report to Congress on their agencies' geospatial data. Our audit objective was to assess DOT's progress in fulfilling the act's requirements. Specifically, we reviewed the Department's status in implementing its responsibilities (1) as a lead covered agency under section 756 and (2) as a covered agency under sections 759(a) and 759(b).

What We Found

DOT has implemented two of five responsibilities under section 756—communicating with theme users about data needs and designating a point of contact for the GeoPlatform. It has partially completed a third. DOT has not yet developed standards for the National Geospatial Data Asset (NGDA) in the transportation theme, and does not have complete information about financial resources needed for transportation theme maintenance.

DOT is making progress implementing 11 responsibilities as a covered Agency under section 759(a), with 4 complete and 4 partially complete. For example, DOT is updating its Geospatial Information System Strategic Plan—its strategy for promoting use of geographic information. While it is addressing the act's reporting requirements under section 759(b), DOT has not collected information needed for an annual report. DOT also does not have a complete inventory of geospatial data assets but is updating its data inventory guidelines, which will explain how Operating Administrations should inventory and verify the accuracy of their geospatial data.

Our Recommendations

DOT concurred with all 13 recommendations to help it comply with the act's requirements and provided documentation to close 1 recommendation.

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Memorandum

Date: October 2, 2020

Subject: INFORMATION: DOT Is Making Progress Toward Fulfilling the Requirements of the Geospatial Data Act of 2018 | Report No. IT2021001

From: Kevin Dorsey 
Assistant Inspector General for Information Technology Audits

To: Chief Information Officer
Director, Bureau of Transportation Statistics

Geospatial data contain information on locations on Earth, including geographic location identifiers and characteristics of natural and constructed features and boundaries. Examples of transportation related geospatial data include instrument-flight-rule navigation charts and maps of pipeline inspection boundaries. These data can be critical to monitoring and responding to safety issues. The Department of Transportation (DOT) used geospatial data in its investigation of Takata airbag failures in 2016, and in its response to Hurricane Harvey in August 2017.

DOT's Chief Data Officer in the Office of the Chief Information Officer (OCIO), in cooperation with the Bureau of Transportation Statistics (BTS), is responsible for the Department's geospatial data related activities. Currently, OCIO offers DOT's Operating Administrations (OA)¹ a shared service for geospatial applications and data, but OAs can also host data and applications in their own systems.

In October 2018, Congress enacted the Geospatial Data Act (GDA), which puts into law the committees, processes, and tools for developing, driving, and managing the National Spatial Data Infrastructure (NSDI). For example, section 756 of the GDA requires the Federal Geographic Data Committee (FGDC) to

¹ DOT consists of nine OAs—the Federal Aviation Administration (FAA), Federal Highway Administration (FHWA), Federal Motor Carrier Safety Administration (FMCSA), Federal Railroad Administration (FRA), Federal Transit Administration (FTA), Maritime Administration (MARAD), National Highway Traffic Safety Administration (NHTSA), Pipeline and Hazardous Materials Safety Administration (PHMSA), and the Saint Lawrence Seaway Development Corporation (SLSDC)—plus the Office of Inspector General (OIG) and the Office of the Secretary of Transportation (OST).

identify one or more covered agencies² to serve as the primary or lead covered agency³ for a specific data theme. Section 759 of the GDA details the responsibilities and annual reporting requirements for each covered agency. For example, covered agencies must report to FGDC on their efforts to prepare and implement a strategy for advancing geographic information. Currently, NSDI includes 17 themes, including a transportation theme. FGDC designated DOT as the lead covered agency for the transportation theme, responsible for addressing the GDA's requirements under section 756, and also is a covered agency under sections 759(a) and 759(b).

The act requires inspectors general of covered agencies, including DOT, to report to Congress at least every 2 years on their agencies' collection, production, use, preservation, and other matters, of geospatial data. Accordingly, our audit objective was to assess DOT's progress in fulfilling the act's requirements. Specifically, we reviewed the Department's status in implementing its responsibilities (1) as a lead covered agency under section 756 and (2) as a covered agency under sections 759(a) and 759(b).

We conducted this audit in accordance with generally accepted Government auditing standards. Exhibit A provides details on our scope and methodology. Exhibit B provides a list of a organizations we visited or contacted during our audit.

We appreciate the courtesies and cooperation of Department of Transportation representatives during this audit. If you have any questions concerning this report, please call me at (202) 366-1518, or Nathan Custer, Program Director, at (202) 366-5540.

cc: The Secretary
DOT Audit Liaison, M-1

² The GDA applies to covered Federal agencies as defined in Title 5, U.S Code (U.S.C), § 101, that collect, produce, acquire, maintain, distribute, use or preserve geospatial data on paper or in electronic form to fulfill their missions as executive departments. The GDA is also applicable to National Aeronautics and Space Administration and General Services Administration but excludes the Department of Defense and intelligence agencies.

³ A lead covered agency is responsible for ensuring the coordinated management of data and supporting resources related to services and products associated with a National Geospatial Data Asset theme. For more details, see the Background section of this report.

Results in Brief

DOT has fully implemented two of its responsibilities as a lead covered Agency.

As a lead covered agency under section 756 of the GDA, DOT has five responsibilities, related to the maintenance and dissemination of its transportation data theme.⁴ It has fulfilled two of these responsibilities—communicating with theme users about data needs and designating a point of contact who develops, maintains and coordinates data using the GeoPlatform—and has partially completed a third, developing a plan for the nationwide population of the transportation theme. The Department will be able to make progress on the remaining two once guidance updates are completed. Specifically, it must wait for Office of Management and Budget (OMB) guidance before it can establish goals that support the strategic plan. Second, the Department has not developed National Geospatial Data Asset (NGDA) standards within its plan for the transportation theme, as it must first update that plan to include how DOT will assess existing standards and align any new ones with relevant community and international practices. Finally, DOT officials note that the departmental plan does not include information about the financial resources it needs for annual maintenance of the transportation theme. As a result, the Department lacks a clear financial outlook, which inhibits its ability to allocate appropriate resources for the NGDA transportation theme.

DOT is making progress on complying with its responsibilities as a covered Agency.

DOT also has responsibilities as a covered agency under sections 759(a) and (b) of the GDA. These include implementing a strategy for advancing geographic information, and promoting the integration of geospatial data from all sources. DOT has made progress in implementing 8 of 11⁵ responsibilities with 4 complete and 4 partially complete. For example, the Department now collects, maintains, and preserves geospatial data so that they can be readily shared with other Federal agencies and non-Federal users. It also promotes the integration of geospatial data from State, tribal and local governments through the National Transportation Atlas Database (NTAD). It is currently updating the Geospatial Information System (GIS) Strategic Plan—its strategy for promoting usage of

⁴ BTS, located within OST, is designated on DOT's behalf to coordinate the national collection and stewardship of transportation spatial data themes (electronic records). The transportation system includes both physical and non-physical components representing all modes of travel that allow the movement of goods and people between locations.

⁵ While GDA has 13 responsibilities for covered agencies, one is not applicable to DOT and a second was excluded from the audit.

geographic information and related geospatial data and activities. DOT officials informed us that they plan to complete the update by late 2020—in accordance with FGDC’s deadline for this material. The GDA also requires covered agencies to place all geospatial data and related activities on agency records schedules approved by the National Archives and Records Administrations (NARA). Department officials told us that several OAs have not determined whether their geospatial data and activities are Federal records. However, we found that the Department does not meet three responsibilities, including protection of the privacy and confidentiality of geospatial data. Finally, while DOT is working to address the act’s reporting requirements, it has not collected the information it needs for its annual report such as implementation of its strategy. Additionally, DOT does not have a full inventory of its own and the OAs’ geospatial data assets. DOT officials stated that the Department is updating its data inventory guidelines⁶ which will explain how OAs should inventory and verify the accuracy of their geospatial data.

We made recommendations to help the Department continue to comply with the act’s requirements.

Background

The Federal Government has long recognized the need to coordinate the collection and management of geospatial data. In 1990, OMB revised its Circular A-16⁷—which provide guidance on coordination of Federal surveying, mapping, and related spatial data activities—to establish FGDC and to promote coordinated use and dissemination of geospatial data nationwide. FGDC is a 32-member interagency group composed of Cabinet members and representatives from OMB, the Department of Defense, and other agencies. Committee members are responsible for NSDI’s implementation and maintenance.

NSDI includes the technology, policies, criteria, standards and employees to promote geospatial data sharing through multiple sources—Federal, State, local, and tribal governments, academia, and the private sector. Its components are

⁶ These are internal DOT policies directed solely to DOT employees and contractors and are not intended to affect the behavior of regulated entities; they are not “guidance documents” within the meaning of Title 49 of the Code of Federal Regulations (CFR), section 5.25.

⁷ OMB last revised Circular No. A-16, *Coordination of Geographic Information and Related Spatial Data Activities*, in 2002.

data themes,⁸ metadata,⁹ standards,¹⁰ partnerships, as well as the GeoPlatform,¹¹ which provides capabilities for sharing geographic data, maps, and services that use geospatial data. Use of the GeoPlatform reduces the risk that Federal agencies will collect duplicative geospatial data. NSDI reflects several public values—privacy and security, data accuracy, access for citizens, protection of proprietary interests, and interoperability of Federal information systems.

Through Circular A-16, OMB has issued supplemental guidance to facilitate the management of Federal geospatial assets. Section 753 of the GDA required OMB to update Circular A-16 with a list of FGDC members and their roles by October 2019—1 year after the act’s effective date. However, as of the date of this report, OMB had not yet updated its guidance, which is also expected to contain significant substantive revisions. OMB Circular A-16 provides a foundation for managing the National Geospatial Data Asset (NGDA) portfolio, which is made up of NGDA themes¹² (data theme) and their associated asset datasets.

Title 49, U.S.C chapter 63¹³ mandates certain DOT responsibilities to BTS, including the publication of transportation related geospatial data and products on the GeoPlatform (see exhibit D for list of sample assets). Seven OAs¹⁴ provide mission related geospatial data related to BTS. On behalf of the Department, BTS issues reports that compile information such as airport runway data collected by FAA and rail line data collected by FRA.

BTS uses the National Transportation Atlas Database (NTAD) to transfer metadata to the GeoPlatform via Data.gov and to make data available to external users. NTAD is a collection of geospatial datasets on transportation facilities, networks, and associated infrastructure, including spatial information on modal networks and intermodal terminals. See the figure for an illustration of how the Department collects and uses its geospatial data.

⁸ A data theme is an electronic record and coordinates for a topic or subject, such as transportation.

⁹ Metadata are information about data and/or geospatial services, such as content, source, accuracy, responsible party, contact phone number, method of collection, and other information.

¹⁰ Standards are common and repeated rules, conditions, guidelines or characteristics for data, and related processes, technology and organization.

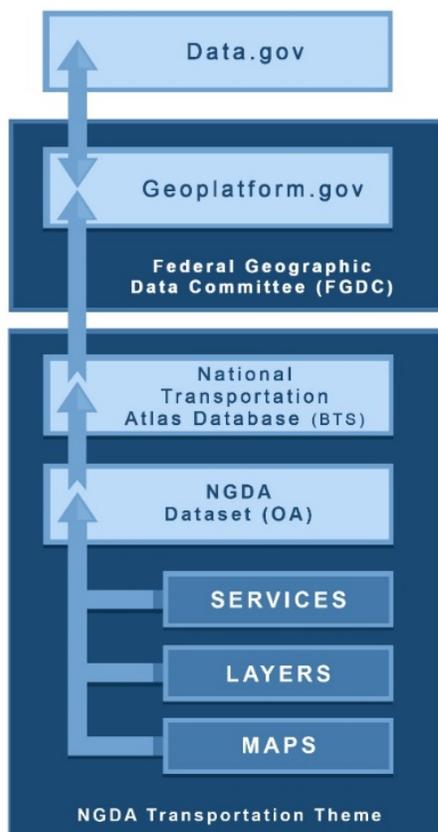
¹¹ GeoPlatform assets consist of core business objects, such as services, layers, and maps, that represent geospatial resources that are accessible online for users of geospatial data.

¹² Themes are representations of conceptual topics describing digital spatial information for the Nation, and contain associated datasets, with attribute records and coordinates, that are documented, verifiable, and officially designated to meet recognized standards.

¹³ 49 U.S.C. chapter 63.

¹⁴ DOT has determined that the GDA does not apply to the SLSDC or OIG because neither collects geospatial data. PHMSA does not provide geospatial data containing proprietary or sensitive security information to the GeoPlatform in accordance with 49 U.S.C § 60132 (d) and GDA § 758 (b) (1) (C).

Figure. Flow of DOT's Collection and Use of Geospatial Data



Source: OIG analysis

DOT Has Fully Implemented Two of Its Responsibilities as a Lead Covered Agency

As a lead covered agency under section 756, DOT has five responsibilities that cover areas such as coordinating data management, supporting resources (both technology and personnel) and other services and products related to the transportation theme. DOT has implemented two of these responsibilities by establishing methods for communicating with users on their data needs; and designating a point of contact who develops, maintains and coordinates data using the GeoPlatform. In addition, work is underway to develop a nationwide plan for the transportation theme. However, one responsibility—to establish goals that support the strategic plan for NSDI—is dependent on OMB's forthcoming revision of Circular A-16. As a result, DOT has not been able to proceed on this responsibility. Furthermore, the Department has not developed NGDA standards related to the transportation theme, as required (see table 1).

Table 1. DOT’s Progress on Its Responsibilities as a Lead Covered Agency

Responsibility	Description	Progress Status
1. NGDA theme standards ^a	Lead and facilitate the development and implementation of geospatial data standards for its National Geospatial Data Asset data theme with an emphasis on a data content standard for the data theme. Before developing new standards, the agency must review standards already in use and adopt them if possible.	Does not meet
2. Theme Plan	Lead the development and implementation of a plan for the nationwide population of the transportation theme.	Partially meets
3. Establish goals	Establish goals that support the strategic plan for the National Spatial Data Infrastructure prepared under section 755(c).	On hold ^b
4. NGDA Theme user needs	As necessary, collect and analyze information from users of geospatial data within the data theme regarding the needs of the users for geospatial data and incorporate the needs of users in strategies relating to its data theme.	Meets
5. Theme administration	As part of administering data theme, lead covered agency will have a point of contact, submit a performance report, publish maps and coordinates with GeoPlatform	Meets

^a See OMB Circular A-119.

^b We have not evaluated this area because DOT cannot establish goals until FGDC updates the NSDI Strategic Plan.

Source: Geospatial Data Act of 2018 and OIG analysis

The GDA calls for theme plans to include standards for collecting geospatial data. According to section 756(b) and OMB Circular A-119,¹⁵ these standards must be based on relevant community and international practices that data collectors and users have voluntarily agreed to use. While DOT developed a Transportation Theme Strategic Plan for 2016 through 2019, the plan predated the act and, as a result, does not include geospatial data collection standards. Consequently, the Department has not met this requirement.

Department officials acknowledged that DOT’s plan does not meet the OMB guidelines but added that they are updating the 2020 Transportation Theme Plan to include provisions for assessing existing data standards, identifying anticipated or needed data standards, and aligning new standards with relevant community and international practices.

The Department’s plan also does not include details on the financial resources that will be needed to maintain the theme. According to BTS officials, BTS has

¹⁵ OMB, Circular A-119, *Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities*, January 22, 2016.

identified the staff resources DOT needs and, as the GDA requires, will estimate the total cost—across DOT and the Departments of the Army and Commerce¹⁶—during the next Theme strategic plan cycle. However, BTS and the Office of the Chief Information Officer (OCIO) track only DOT’s cost for licensing software. As a result, DOT lacks a clear financial outlook, thus inhibiting the Department’s ability to allocate appropriate resources for the transportation data theme.

DOT Is Making Progress on Complying With Its Responsibilities as a Covered Agency

DOT has responsibilities as a covered agency under sections 759(a) and 759(b) of the GDA, such as implementing a strategy for advancing geographic information, promoting the integration of geospatial data from all sources, submitting annual reports on its strategy and including inventory of its geospatial data assets in its budget submission. DOT has complied or partially complied with 8 of 11¹⁷ responsibilities required under section 759(a). The Department is also addressing its reporting responsibilities under section 759(b).

The Department Is Striving To Fulfill Its Geospatial Data Responsibilities

DOT has complied or partially complied with 8 of 11 responsibilities as a covered agency under section 759(a). For example, DOT has implemented a strategy for promoting the integration of geospatial data from all sources, but has only partially fulfilled the requirement to include the data in Agency record schedules. See table 2 for details.

Table 2. Status of DOT’s Compliance with Its Covered Agency Responsibilities

Responsibility	Description	Status
1. Strategy	Prepare, maintain, publish, and implement a strategy for promoting the use of geographic information and related geospatial data and activities appropriate to the agency’s mission.	Partially meets

¹⁶ The Department of the Army, specifically the Corp of Engineers, and Department of Commerce serve as co-leads for the NGDA Transportation theme.

¹⁷ One has been excluded from our review, and DOT does not participate in another. See table 2 for explanations.

Responsibility	Description	Status
2. Geospatial data	Collect, maintain, disseminate, and preserve geospatial data so that they can be readily shared with other Federal agencies and non-Federal users.	Meets
3. Promotion of integration	Promote the integration of geospatial data from all sources.	Meets
4. Inclusion of geospatial data in agency record schedules	Ensure that data information products and other records created in geospatial data are included on agency record schedules that have been approved by the National Archives and Records Administration.	Partially meets
5. Allocation of resources	Allocate resources to fulfill responsibilities of collection, production, and stewardship, and support Committee activities.	Partially meets
6. Use of geospatial data standards	Use the standards, including those for metadata for geospatial data, for documenting geospatial data with relevant metadata and making metadata available through the GeoPlatform.	On hold ^a
7. Coordination	Coordinate and work with other Federal agencies, State, tribal, and local Governments, institutions of higher education, and private sector to efficiently and cost-effectively collect, integrate, maintain, disseminate, and preserve geospatial data, building upon existing non- Federal geospatial data to the extent possible.	Meets
8. Use of geospatial information	Use geospatial information to (A) make Federal geospatial information and services useful to the public; (B) enhance operations; (C) support decision making, and (D) enhance reporting to the public and to Congress.	Partially meets
9. Personal privacy and confidentiality	Protect personal privacy and maintain confidentiality in accordance with Federal policy and law.	Does not meet
10. Declassified data ^b	Participate in determining whether declassified data can contribute to and become a part of the National Spatial Data Infrastructure.	Not applicable
11. Review of existing geospatial data	Search all sources, including the GeoPlatform, to determine whether existing Federal, State, local, and private geospatial data meet the needs of the covered agency before expending funds for geospatial data collection.	Does not meet
12. Collection of high-quality data	To the extent possible, ensure that persons that receive Federal funds to collect geospatial data obtain high-quality data.	Does not meet
13. Appointment of contact	Appoint a contact to coordinate with lead covered agencies for collection, acquisition, maintenance, and dissemination of the National Geospatial Data Asset data themes.	Meets

^a Excluded from our review based on a letter dated March 23, 2020, from the Council of the Inspectors General on Integrity and Efficiency (CIGIE) to Congress concerning the challenges that exist for the first GDA audit, such as evaluating geospatial data standards.

^b DOT does not perform declassification of geospatial data at this time.

Source: Geospatial Data Act of 2018 and OIG analysis

DOT officials acknowledge that despite progress in a number of areas, the Department has more work to do to fully comply with its responsibilities under the GDA in the following areas.

Developing a strategy for geospatial data. The act calls for each covered agency to develop a strategy for increasing its use of geospatial data within its activities. In October 2017, the Department released its GIS¹⁸ Strategic Plan for 2017 through 2020, which outlines the current state of the Department's geospatial information and provides an outline of the strategies the Department will implement. DOT currently has at least 15 full-time employees (FTE) plus FAA employees whose primary responsibilities encompass their GIS-related work. In 2008, DOT appointed its first Geospatial Information Officer (GIO). The position became a full-time OCIO position in 2014.

DOT officials informed us that the Department is planning to update its GIS Strategic Plan by December 2020. However, the Department has not yet implemented a strategy for geospatial data-related activities. DOT officials stated that, as part of the plan update required by section 759(a), the Chief Data Officer and other staff are reviewing the implementation status of the 2017 strategic plan which includes the following goals:

1. Mature an enterprise geospatial information system;
2. Centralize and strengthen GIS governance; and
3. Leverage emerging geospatial technology.

The strategy also includes the actions needed to achieve these goals. For instance, the 2017 plan states that to support a mature geospatial information system, the OAs will designate their own GIOs, create new FTEs for geospatial data activities, and train existing staff in geospatial data.

As of August 2020, seven OAs—FAA, FHWA, FMCSA, FRA, MARAD, NHTSA and PHMSA, along with OST—have designated GIOs, but FTA has not.

¹⁸ Both DOT and FHWA launched their GIS programs in the mid-1980s.

Storing geospatial data records at NARA. The GDA requires each covered agency to place all geospatial data and related Federal records¹⁹ on one of its NARA-approved record schedules.²⁰ A records schedule tells NARA staff how to maintain an agency's operational records, including those that are no longer current. Federal agencies are also required to preserve evidence of geospatial data-related activities such as documents describing policy development, decision making, or operations. NARA determines whether a record will be stored permanently or temporarily. Permanent records are transferred to NARA.

We found that BTS does not have a process for identifying which data should be preserved as records, and as a result, does not place its geospatial data on NARA-approved record schedules. BTS is currently working with OST's Records Management Officer to develop a record schedule management plan for the transportation theme with a target completion date of December 1, 2020.

FHWA, FMCSA and FRA provided evidence of their NARA-approved Record Schedules. However, FAA, FTA, MARAD, NHTSA, OST, and PHMSA have not completed their record keeping processes, including comprehensive file plans, record schedules, and others requirements, for their geospatial data. Department officials stated that these six OAs consider their records to be permanent until the schedule decisions are complete.

Monitoring OA resources for geospatial data. DOT does not monitor all of the OAs' resources for geospatial data collection, production, and stewardship. We found that FRA, MARAD, NHTSA, and PHMSA did not fully report their resource allocations, although departmental policy requires reporting this information. DOT officials acknowledged that the Department should monitor these four OAs to ensure that it tracks all aspects of the OAs' geospatial investments. The DOT officials added that the Department would like clarification from OMB on the definition of effective resource allocation.

Promoting geospatial data usage. The act requires covered agencies to use geospatial information in ways that are useful to the public, and that can improve their operations, support their decision making, and enhance their reporting to the public and Congress. In response to questions, Department officials directed us to the GIS Strategic Plan which includes examples of how some OAs are

¹⁹ As defined in 44 U.S.C. § 3301, a record includes all recorded information, regardless of form or characteristics, made or received by a Federal agency under Federal law or in connection with the transaction of public business and preserved by the agency as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities of the Federal Government or because of informational value of data in them.

²⁰ NARA is responsible for the records control schedule repository which contains schedules approved by the Archivist of the United States.

making geospatial information more useful to the public. However, the Department does not provide guidance to the OAs on using geospatial data.

DOT officials later stated that DOT Order 1351.34, *Data Management Policy* (2017)—which covers all types of data—provides guidance on making geospatial data useful to the public. This order calls for the Department to establish roles and responsibilities for program offices and personnel, and sets policies for enhancing practices for planning, disseminating, and evaluating data and information. The officials added that, as a part of the Department's GIS Strategic Plan update, they will ask the OAs how they determine the quality of their geospatial data and use the responses as the basis for future policies and procedures.

However, DOT lacks guidance on using geospatial data to enhance operations. While these data do not apply to all departmental daily operations, many DOT activities can be improved by a geospatial approach, perhaps due to the nature of air and surface transportation. Examples include FAA's charting of flight restrictions and PHMSA's pipeline mapping applications. As of August 2020, FAA, FRA, MARAD and PHMSA had identified ways of using geospatial data to enhance their daily operations.

Department officials acknowledged that a process of ongoing monitoring or review would help ensure that OAs use geospatial data in the four ways²¹ codified in the GDA. The Department is updating its GIS Strategic Plan to include ongoing monitoring of geospatial data activities.

Protecting the privacy and confidentiality of geospatial data. Neither the Department nor the OAs have addressed the protection of privacy and confidentiality of information in geospatial data and associated metadata. DOT does not perform assessments to determine whether its geospatial data contain information that it does not have authority to make public. The act is intended to ensure that geospatial data are reviewed prior to disclosure in compliance with the Privacy Act of 1974,²² and that personally identifiable information (PII) is not disclosed.

DOT Order 1351.18, *Privacy Risk Management Policy*,²³ sets the policy for mitigating risk to privacy in the Department's information systems based on the

²¹ The act requires covered agencies to make Federal geospatial information and services more useful to the public; and use geospatial information to enhance operations, support decision making, and enhance reporting to the public and Congress.

²² Pub. L. No. 93-579 (1974); 5 U.S.C. § 552(a).

²³ DOT Order 1351.18 (2014).

fair information practice principles.²⁴ However, the Department’s oversight to ensure that OAs apply this policy to their geospatial data assets is inconsistent. We found 11 out of 12 geospatial information systems did not have completed privacy threshold analyses (PTA).²⁵

DOT’s Chief Privacy Officer stated that while a Department-wide process does not exist, each OA has its own internal process to ensure compliance with the Privacy Risk Management Policy. However, departmental officials acknowledged that the OAs may not apply the policy correctly. The OAs did not provide evidence that they have ensured that their geospatial data do not contain PII or other confidential information.

Reducing duplication in OA geospatial data collections. In April 2014, DOT issued *Geospatial Policy on Reducing Duplication* in response to a 2012 recommendation from the Government Accountability Office (GAO).²⁶ This policy requires the OAs to determine whether existing Federal, State, local, or private geospatial data meet their needs before expending funds to gather more data. The policy also calls for OAs to maintain information on searches, including search dates, criteria, results, and names of clearinghouses. DOT’s Geospatial Coordination Council and its chair—the Senior Agency Official for Geospatial Information (SAOGI), who is DOT’s GIO—are responsible for implementing, monitoring, and administering this policy. However, the OAs did not provide any documentation on their searches, and the SAOGI did not provide evidence of DOT’s evaluations to verify compliance with the policy.

Documenting and reviewing geospatial data collections for quality. OAs are responsible for ensuring that those that receive Federal funds for geospatial data collection provide high-quality²⁷ data. In 2002, in accordance with the Information Quality Act²⁸ (IQA), the Department implemented Agency-wide guidelines to establish and apply standards for high-quality Government information prior to public dissemination. In October 2019, the Secretary of Transportation issued a policy statement, incorporating OMB’s guidance,²⁹ that reinforces, clarifies, and interprets the responsibilities outlined in the IQA. However, DOT did not inform us how it has implemented this policy in terms of

²⁴ These principles serve as the basis for analyzing privacy risks and determining appropriate mitigation strategies.

²⁵ A PTA, also referred to as an initial privacy assessment, is used to identify PII. Departmental cybersecurity policy requires that information systems have completed PTAs before operations. FHWA applies the policy to one of its geospatial information systems.

²⁶ GAO, *Geospatial Information: OMB and Agencies Need to Make Coordination a Priority to Reduce Duplication* (GAO-13-94), November 26, 2012.

²⁷ DOT established a standard for “high-quality data” in *Policy Statement on Information Quality*.

²⁸ Treasury and General Government Appropriations Act, 2001, Pub. L. No. 106-554, § 515(a) (2000) (codified at 44 U.S.C. § 3516, note).

²⁹ OMB Memorandum 19-15, *Improving Implementation of the Information Quality Act*, April 24, 2019.

geospatial data. For example, it did not provide evidence of data-quality reviews by subject matter experts or consultations with data users, including those in other Federal agencies and the private sector.

OMB also requires each agency to review data quality³⁰ before dissemination. DOT officials stated that the Department ensures that program offices conduct pre-dissemination quality reviews of geospatial data and metadata, but they did not provide any supporting evidence.

DOT Is Working To Address Its Reporting Responsibilities as a Covered Agency

Under section 759(b) of the GDA, the Department is required to submit an annual report to FGDC and Congress. This report should cover DOT's preparation and implementation of its strategy for geospatial data activities, appropriate to the Department's mission, and its achievements in complying with the requirements of section 759(a). To complete these reporting requirements, DOT plans to submit its GIS Strategic Plan by December 2020, but must update it prior to submission.

DOT does not monitor geospatial activities in order to identify and report on its achievements as a covered Agency. For example, DOT officials informed us that the Department has not reviewed the implementation of its Geospatial Strategic Plan. GAO's *Standards for Internal Control in the Federal Government*³¹ provides guidance on how agencies can design, implement, and operate internal controls to achieve their objectives related to operations, reporting, and compliance.

DOT officials acknowledged that it would be appropriate to establish an ongoing monitoring process that documents the Department's implementation of GDA requirements such as the implementation of its strategy for geospatial data activities.

As required by section 759(b), DOT maintains an inventory of its geospatial data assets.³² However, it does not have a procedure to determine whether the OAs maintain their own inventories. Furthermore, DOT officials could not demonstrate that the Department monitors the accuracy and completeness of the data in the departmental inventory. We analyzed 19 of the 48 datasets in the departmental inventory at Data.gov. We analyzed these 19 datasets because DOT is their

³⁰ The Department relies on the OMB definition, which states that "quality" data are useful, objective (in the sense of being accurate, reliable, and unbiased), and secure.

³¹ GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G, September 10, 2014.

³² Under OMB Circular A-130, agencies must ensure that physical devices, software applications, hardware platforms, and systems within the organization are inventoried.

primary dataset owner and found that Data.gov did not include 8 of them. We also learned from DOT officials that the Department's data inventory system does not include the latest information technology investment information for two datasets.

Lastly, we found FAA, FHWA, FMCSA and NHTSA do not maintain their GIS authorization status for four systems. According to DOT's Cybersecurity Policy³³—which includes procedures and standards for information system security, including GIS—OAs need to ensure that all information technology resources are reviewed to ensure compliance with established departmental policies. FHWA has one retired GIS in its inventory and FAA's inventory includes a GIS whose authority to operate has expired. DOT officials stated that the Department is updating its data inventory guidelines, which will explain how OAs should inventory and verify the accuracy of their geospatial data. OAs' lack of reviews of all their information technology makes it difficult for them to ensure that information technology systems remain in compliance with departmental policy.

Conclusion

With its passage of the Geospatial Data Act of 2018, Congress recognized the importance of geospatial data. The act calls for covered agencies to strategize for the collection and dissemination of quality data for use in their operations and by the private sector. Furthermore, lead agencies, including DOT, are responsible under the act for making geospatial data as accessible and useful as possible. DOT has implemented GDA requirements where possible, and is making progress towards meeting its remaining requirements.

Recommendations

To help the Department's continue to fulfill the requirements of the Geospatial Data Act, we recommend that the Director, Bureau of Transportation Statistics:

1. Update the NGDA Theme plan with the processes to identify, assess, and develop NGDA standards based on the act.
2. Develop and implement a process to track the financial resources necessary to manage the NGDA transportation data theme.

³³ DOT Order 1351.37 (2011)

We also recommend that the Chief Information Officer:

3. Develop, publish, and implement DOT's strategy for geospatial data-related activities as defined in its Geospatial Information System Strategic Plan.
4. Work with the Chief Data Officer to verify that all OAs designate an appropriate individual as a geospatial information officer.
5. Work with OA records officers to verify that FAA, FTA, MARAD, NHTSA, OST, and PHMSA allocate appropriate resources to complete file plans and record schedules development activities through submission to the DOT Records Management Office.
6. Track and monitor FRA's, MARAD's, NHTSA's and PHMSA's allocated resources to meet the responsibilities of effective geospatial data collection, production, and stewardship.
7. Develop, disseminate, and implement a uniform process for all OAs to perform a quality review of geospatial data to verify compliance with DOT's information quality guidelines. This process should include a method of ensuring recipients of DOT funds for geospatial data collection meet appropriate quality standards, as well as an assessment of stakeholder and peer reviews in order to validate the quality of all disseminated information.
8. Update, disseminate, and implement DOT's internal data inventory policy to address how the OAs should verify that geospatial data and metadata does not inappropriately disclose personally identified information to external parties and include guidelines on tracking and maintaining geospatial data asset inventory and validating that inventories are complete.
9. Develop a process to verify that the OAs are aware of and apply the DOT Privacy Risk Management Policy, requiring privacy risk management activities to be completed for geospatial information systems prior to next system reauthorization.
10. Develop and implement a procedure that documents and tracks all responsibilities outlined in the Geospatial Policy on Reducing Duplication are implemented to include DOT and OAs' implementation of geospatial clearinghouse searches to validate no duplication of funds.
11. Develop and maintain a process to verify that all geospatial metadata meet quality standards that strengthen the internal control process to improve the quality of metadata reported on DOT's enterprise data inventory.

12. Establish, document, and implement a process for ongoing monitoring of its strategy for advancing geospatial information and related geospatial data and activities appropriate to its mission in accordance with requirements of the Federal Internal Control Standards.
13. Working with the OAs, require that all geospatial information systems maintain authorization status in accordance with departmental cybersecurity policies.

Agency Comments and OIG Response

We provided DOT with our draft report on September 3, 2020, and received its formal response on September 28, 2020, which is included as an appendix to this report. DOT concurred with recommendations 1 through 3 and 5 through 13 as written, and provided appropriate actions and completion dates.

Regarding recommendation 4, on September 25, 2020, OCIO provided documentation that FTA has appointed its GIO, which confirms that OCIO has worked with the Chief Data Officer and addresses the intent of this recommendation.

Actions Required

We consider recommendation 4 resolved but open pending closure within 30 days of issuance of our final audit report. We consider the other 12 recommendations resolved but open pending completion of the planned actions.

Exhibit A. Scope and Methodology

We conducted this performance audit between March 2020, and September 2020, in accordance with generally accepted Government auditing standards as prescribed by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Generally accepted Government auditing standards also require us to disclose impairments of independence or any appearance thereof.

The GDA requires inspectors general of each covered agency—as defined in 5 U.S.C. § 101—to report to Congress at least once every 2 years on their agencies' collection, production, acquisition, maintenance, distribution, use, and preservation of geospatial data. This audit is the first in a series of audits mandated by Congress to oversee compliance with the act. In this initial audit, we

- obtained an understanding of the laws, legislation, and other regulatory criteria and guidance related to the act;
- obtained an understanding of the DOT's governance structure, processes, and internal controls;
- conducted interviews with DOT's Chief Data Officer who is responsible for implementation of the Department's geospatial-data related activities, the BTS official responsible for implementing DOT's responsibilities as a lead covered agency; and DOT's Chief Privacy Officer, who is responsible for assessing geospatial data for private information or confidentiality;
- obtained and analyzed DOT and its OAs' documentation of the collection, production, acquisition, maintenance, distribution, use, and preservation of geospatial data;
- obtained and analyzed DOT's documentation of its efforts to implement its responsibilities as a lead covered agency;
- assessed whether the Department can coordinate management of the data, supporting resources (including technology and personnel) and related services and products for the National Geospatial Data Asset theme;
- assessed whether the Department can properly report its geospatial data-related activities and achievements as a covered agency related to geospatial data and activities; and

- assessed whether the Department can properly report its inventory of geospatial data in its annual budget submission to the President.

We did not review the use of geospatial data and metadata standards since it is currently difficult to determine which standards the audit should use to evaluate compliance.³⁴ We conducted our work remotely due to the COVID-19 mandatory telework and at DOT Headquarters in Washington, DC.

³⁴ CIGIE's letter to Congress, dated March 23, 2020, regarding the review of covered agencies' compliance with the act's standards and covered agencies' responsibilities.

Exhibit B. Organizations Visited or Contacted

Bureau of Transportation Statistics
Federal Aviation Administration
Federal Highway Administration
Federal Motor Carrier Safety Administration
Federal Railroad Administration
Federal Transit Administration
Maritime Administration
National Highway Traffic Safety Administration
Office of the Chief Information Officer
Office of Inspector General
Office of the Secretary of Transportation
Pipeline and Hazardous Materials Safety Administration

Exhibit C. List of Acronyms

BTS	Bureau of Transportation Statistics
CIGIE	Council of the Inspectors General on Integrity and Efficiency
DOT	Department of Transportation
FAA	Federal Aviation Administration
FGDC	Federal Geographic Data Committee
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FTE	full time employee
GAO	Government Accountability Office
GDA	Geospatial Data Act
GIO	geospatial information officer
GIS	geospatial information system
MARAD	Maritime Administration
NARA	National Archives and Records Administration
NGDA	National Geospatial Data Asset
NHTSA	National Highway Traffic Safety Administration
NSDI	National Spatial Data Infrastructure
NTAD	National Transportation Atlas Database
OA	Operating Administration
OCIO	Office of Chief Information Officer
OIG	Office of Inspector General
OMB	Office of Management and Budget
OST	Office of the Secretary
PII	personally identifiable information
PHMSA	Pipeline and Hazardous Materials Safety Administration
SAOGI	Senior Agency Official for Geospatial Information

Exhibit D. Sample of DOT's Inventory of Geospatial Assets

Operating Administration	Type of Asset	Name of Asset ^a
OST/BTS	Information System	Geospatial Database Management System
OST/BTS	Software	Azure Production Sever
OST/BTS	Dataset	Freight Intermodal Facility (National)(NGDA) Intermodal (Freight)
OST/BTS	Software	Adobe Creative Cloud
FAA	Information System	Emergency Operations Network
FAA	Software	Aviation Environmental Design Tool
FAA	Dataset	Airports (National) (NGDA) Airports
FAA	Dataset	Runways (National) (NGDA) Runways
FHWA	Information System	National Tunnel Inventory
FHWA	Information System	National Bridge Inventory
FHWA	Dataset	National Bridge Inventory (NGDA) Bridges
FHWA	Dataset	Travel-Monitoring-Analysis-System-national
FMCSA	Information System	MCNIS
FMCSA	Information System	National Hazardous Materials Route Registry
FRA	Information System	Railroad Network System
FRA	Dataset	Rail Nodes (National)(NGDA) Rail Nodes
FRA	Dataset	North-American-Rail-Nodes-National- NGDA-North American-rail-node
FRA	Software	ArcGIS Server
FTA	Software	ArcGIS Pro
FTA	Software	ArcGIS Online
FTA	Software	TransCAD
MARAD	Dataset	America's Marine Highway Routes
MARAD	Dataset	Strategic Ports
NHTSA	Information System	Fatal Analysis Reporting System
PHMSA	Information System	National Pipeline Mapping System

^a Inventories of geospatial assets (hardware, software licenses, information systems, dataset) reported by OAs and OST: FAA 38; FHWA 695; FMCSA 14; FRA 93; FTA 44; OST/BTS 206; MARAD 39; NHTSA 46; PHMSA 1037. Source: OIG analysis.

Exhibit E. Major Contributors to This Report

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Appendix. Agency Comments

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



Memorandum

September 28, 2020

Subject: INFORMATION: Management Response to the Office of Inspector General (OIG) Draft Report - DOT Is Making Progress Toward Fulfilling the Requirements of the Geospatial Data Act of 2018

From: Daniel Morgan, Chief Data Officer

DANIEL SCOTT MORGAN
Digitally signed by DANIEL SCOTT MORGAN
Date: 2020.09.28 15:57:56 -04'00'

To: Kevin Dorsey, Assistant Inspector General for Information Technology Audits

The Department of Transportation (Department or DOT) is a leader in the Federal geospatial community. When the Geospatial Data Act (GDA) was signed into law in October 2018, DOT immediately began its implementation. We joined three cross-agency working groups focused on addressing the Act's requirements. The Department's Chief Data Officer (CDO) and Chief Geospatial Information Officer (GIO) coordinated with Operating Administration subject matter experts (SMEs), the Bureau of Transportation Statistics (BTS), Chief Information Security Officer, Privacy Officer, and Records Management liaisons to implement actions to comply with the GDA. Also, the Department's Deputy GIO leads the Covered Agency Federal GDA working group, comprised of representatives from 17 agencies.

While no Federal agency can comply with all GDA requirements at this time, DOT is making steady progress on implementing the requirements of the Act. Throughout the audit, DOT officials noted, and the OIG draft report acknowledged, areas of GDA compliance where full implementation relies on guidance to be issued by the Office of Management and Budget and/or the Federal Geographic Data Committee (FGDC).

BTS is leading DOT efforts to update the 2020 Transportation Theme Plan to include provisions for assessing existing data standards, identifying anticipated or needed data standards, and aligning new standards with relevant community and international practices. DOT plans to complete its updated Transportation Theme Plan by December 31, 2020.

On a daily basis, DOT Operating Administrations are using geospatial data to enhance agency operations to include the following efforts:

- The Pipeline and Hazardous Materials Safety Administration and Federal Railroad Administration mapping applications designed for DOT inspectors;
- The National Highway Traffic Safety Administration’s Takata airbag failure investigation;
- The Department’s formation of a geospatial cadre comprised of modal SMEs supporting the Transportation Operations Center during disasters; and
- The Federal Aviation Administration’s Instrument Flight Rule Enroute navigation charts, which are essential to the safe operation of the National Airspace System.

DOT has completed the information gathering phase for its 2020 Geographic Information Systems Strategic Plan update and is on track to have the plan completed by December 31, 2020, as required by the FGDC. During interviews with the DOT Operating Administrations, OST and the Federal Aviation Administration staff reviewed the implementation of DOT’s 2017 GIS Strategic Plan, and we will implement a structured process of regular reviews once the 2020-2023 plan is published. We continually monitor geospatial activities to identify and report on our achievements as a covered agency. This monitoring occurs through regular meetings with modal GIOs, the Geospatial User Group, and the BTS. In addition, OST works with the Operating Administrations to ensure that all information systems, including geospatial information systems, are authorized and managed for risk in accordance with Departmental policies.

After reviewing OIG’s draft report, DOT concurs with recommendations 1 – 3 and 5 –13 as written. We plan to complete actions to implement recommendations 1 – 3 and 5 – 13 by September 30, 2021. Regarding recommendation 4, for the OCIO to work with the “Chief Data Officer to verify that all Operating Administrations designate an appropriate individual as a geospatial information officer,” on September 25, 2020, we provided documentation to OIG that the Federal Transit Administration appointed its GIO. Since OIG found that all other Operating Administrations had previously designated GIOs, we have implemented this recommendation and requested that OIG close it within 30 days after issuing the final audit report.

DOT appreciates the opportunity to respond to the OIG’s draft report. Please contact Daniel Morgan, Chief Data Officer, at (202) 366-4308, with any questions or if you would like additional details.

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