

UNITED STATES DEPARTMENT OF TRANSPORTATION
GIS STRATEGIC PLAN

U.S. DOT GIS Strategic Plan 2026-2030

Letter of Introduction

The U.S. Department of Transportation (DOT) is pleased to release its third Geographic Information Systems (GIS) Strategic Plan. This plan updates and replaces the 2022–2025 U.S. DOT GIS Strategic Plan. It aligns with the 2025–2035 National Spatial Data Infrastructure (NSDI) Strategic Plan as well as DOT’s Strategic Plan. This plan also serves as DOT’s “strategy for advancing geographic information and related geospatial data and activities appropriate to the mission of the covered agency” as required by Section 2808 of the Geospatial Data Act of 2018 (43 U.S.C. ch. 46).

This plan examines the current state of GIS at the Department and defines the strategies we will implement to grow and improve our geospatial program. A multiagency group with support from both executive leadership and individual employees developed the Plan. We are committed to ensuring that the GIS Strategic Plan serves as a foundation for continued innovation and collaboration in our geospatial program. We welcome your comments and encourage you to send feedback to OCIO@dot.gov.



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Chief Digital & Information Officer

U.S. DOT GIS Strategic Plan 2026-2030

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1. Executive Summary

Congress enacted the Geospatial Data Act of 2018 (GDA) on October 5, 2018. It is a reflection of the important role that geospatial data and technology play in building a great nation. At DOT, Geographic Information Systems (GIS) are critical to enhancing transportation safety, operational excellence, evidence-based decision making, and crafting innovative solutions to meet transportation challenges.

This GIS Strategic Plan builds on and replaces the 2022–2025 GIS Strategic Plan. This plan sets out our goals for 2026–2030 and aligns with the 2025–2035 National Spatial Data Infrastructure (NSDI) Strategic Plan, the DOT Strategic Plan¹, the 2025–2029 DOT IT Strategic Plan, and the Open Data Plan.

DOT is involved in all aspects of the geospatial ecosystem. DOT uses GIS to support field staff, assess risk, allocate resources, respond to events, strengthen policy analysis, plan safety initiatives, and raise public awareness on transportation issues. Our vision for GIS at DOT is:

The United States Department of Transportation (DOT) is a leader in geospatial innovation, providing open data and advanced analytics for evidence-driven policymaking. By optimizing resources, leveraging geospatial insights, and incorporating new technologies, DOT uses Geographic Information Systems (GIS) to address complex challenges in support of strategic and mission goals.

Our 2026–2030 strategic goals for the advancement of DOT's geospatial program are:

1. Establish and maintain structures, policies, and processes to govern how geospatial data is collected, managed, and shared in alignment with NSDI core values.
2. Modernize geospatial datasets used in DOT activities by implementing data management best practices, optimizing supporting infrastructure, and ensuring that DOT's National Geospatial Data Assets (NGDA) are findable, accessible, interoperable, and reusable.
3. Establish DOT as a leader and essential partner in transportation innovation using geospatial technologies.
4. Develop and maintain a highly skilled and adaptable geospatial workforce that is proficient in exploring, analyzing, and effectively addressing location-related challenges within the transportation sector.

The Geospatial Management Office (GMO) will guide the implementation of strategic objectives. Each applicable OA will provide updates on its progress toward meeting these objectives and will actively build collaborative relationships within their organization, across the Federal geospatial community, and with external stakeholders.

2. Introduction

The U.S. DOT GIS Strategic Plan empowers the U.S. Department of Transportation (DOT) to enhance safety, uphold operational excellence and efficiency, promote national leadership, invest in personnel, and foster innovation through the use of geospatial data, analytical techniques, and advanced technologies.

For decades Geographic Information Systems (GIS) and Geographic Information Science (GISc) have played a vital role in advancing DOT's goals by facilitating the development and distribution of critical transportation data and serving as a valuable location intelligence resource. The Department curates and disseminates authoritative spatial data layers via platforms such as the FAA Enterprise Data Platform (EDP), the National Transportation Atlas Database (NTAD), and GIS Shared Services (GSS). In addition, the Department's use of GIS extends beyond traditional IT systems by also integrating spatial analysis, data visualization, and decision support capabilities into a comprehensive location intelligence framework. Together this has provided a solid backbone to address a wide variety of transportation-related activities and initiatives.

In today's rapidly evolving technological landscape, Geographic Information Systems have emerged as powerful tools that transcend merely understanding the physical world. Location-based analysis allows us to predict future scenarios, analyze complex patterns, and make informed decisions with greater precision and accuracy. By continuing to improve on existing spatial information and leveraging advanced and novel techniques such as artificial intelligence, machine learning, and spatial data science, DOT can uncover insights and trends that improve strategic planning and operational efficiency. Below are some examples of how DOT uses GIS for improved operations.

¹ The DOT Strategic Plan cited throughout this document is the 2026-2030 DOT Strategic Plan, which is in draft form as of this writing.

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Example 1: Response to the Key Bridge Collapse

In March 2024, a container ship struck the Francis Scott Key Bridge in Baltimore, disrupting interstate access and shipping lanes. GIS facilitated emergency response and communication among DOT's Operating Agencies. MARAD helped OST map affected terminals at the Port of Baltimore, informing industry stakeholders and the public about supply chain impacts and port congestion. FHWA assessed traffic using live data feeds immediately after the incident. The Bureau of Transportation Statistics (BTS) quickly assembled a team to compile and publish geospatial data and statistics for DOT leadership, the White House, and the public. BTS created a webpage titled "Information about the Port of Baltimore," featuring a port profile, freight statistics, import/export data, maps, and alternative routes to provide immediate insights into the situation.



Figure 1. Port of Baltimore, Bureau of Transportation Statistics

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Example 2: DOT Infrastructure Impacts After an Event

Over a 22-day period in 2024, OST staff led GIS personnel and subject matter experts to create maps that tracked transportation infrastructure closures across the affected areas in Florida and North Carolina during Hurricane Milton. This was a collaborative effort with experts from across DOT Operating Administrations, to give senior leadership better situational awareness for decision making.



Figure 2. GIS for disaster response. This map portrays the status of transportation infrastructure during the aftermath of Hurricane Milton.

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Example 3: Improving Intra-Agency Data Interoperability

The Volpe Center used GIS extensively to develop the “Importance of Highways to U.S. Agriculture” report for the U.S. Department of Agriculture (USDA). This project leveraged advanced spatial analysis and other geospatial techniques, including linear referencing and dynamic segmentation. GIS tools were central to the team’s efforts to bring conditions, performance, and commodity flow data together to better understand highway corridors that are of critical importance to U.S. agriculture. The project required integrating disparate datasets from DOT and USDA to be able to tackle cross-cutting analytic questions, generate compelling graphics, and support data-driven insights for the report.

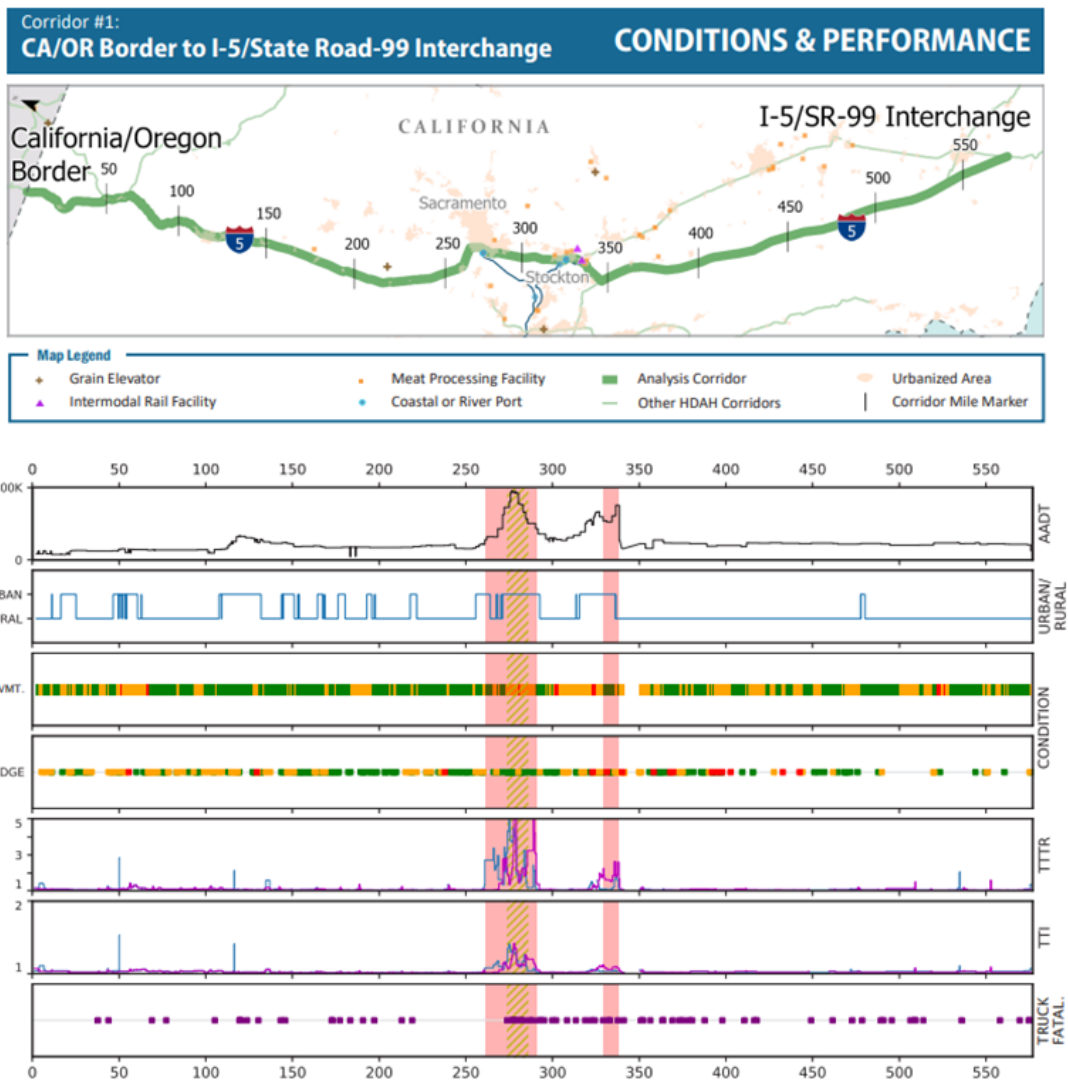


Figure 3. The Volpe Center dashboard showing the I-5 corridor in northern California along with transportation, demographic, and agricultural layers.

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Example 4: Extreme Weather Alerts for Staff Safety

The Federal Highway Administration developed an app that alerts project managers, field staff, and Federal land management agencies of incoming storms. This allows workers, especially field staff, to get to a safe location before a storm hits. The app features NOAA layers that are updated live based on storm forecasts.

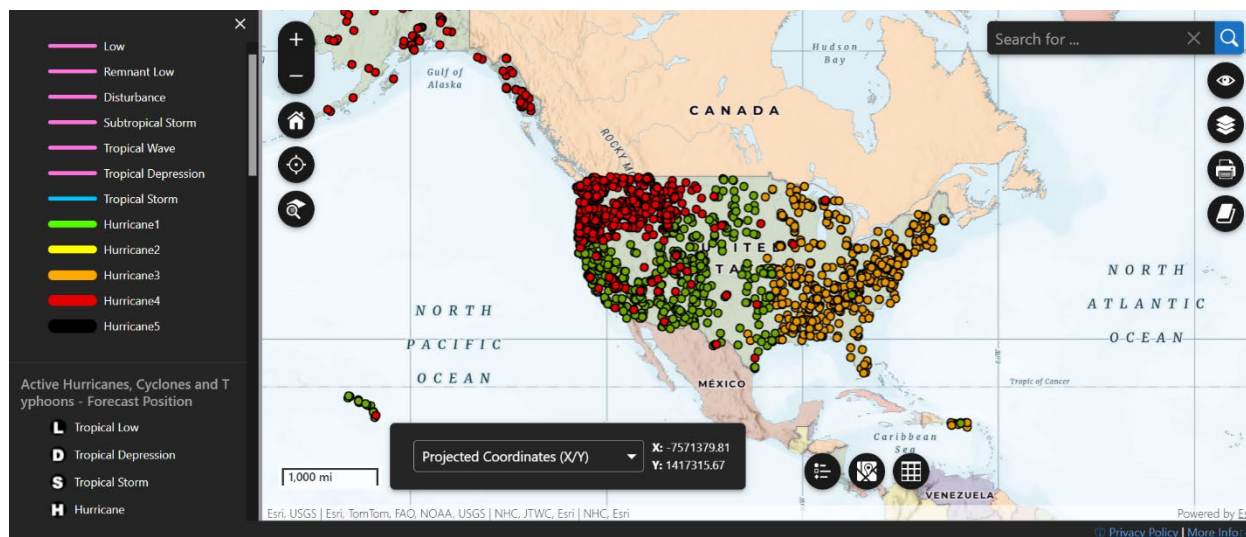


Figure 4. FHWA developed application alerting field staff of incoming storms.

Example 5: Improved Rail Inspector Efficiency

The Office of Railroad Safety within the Federal Railway Administration has nine Safety Management Teams (SMTs). Each of the nine SMTs is assigned to either a Class I railroad or a group of railroads and provides safety oversight of their respective railroad system(s). The SMT Viewer is an interactive mapping tool that allows users to quickly and intuitively visualize and filter FRA's North American Rail Network (NARN) based on SMTs, density, districts, subdivisions, railroad owner, and trackage rights. Before SMT Viewer, FRA inspectors did not have a holistic view of rail and safety data without referring to multiple sources, including online data and static maps. The SMT Viewer makes FRA inspectors' jobs easier by allowing them to view all relevant data to their SMT in one place that can be accessed online.

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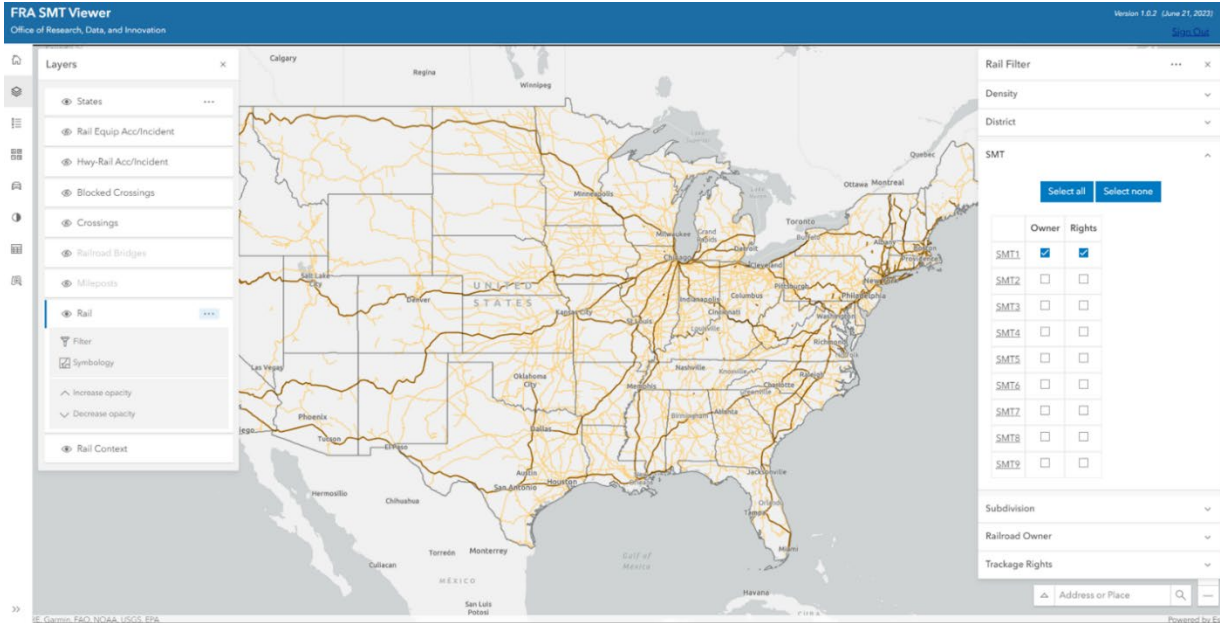


Figure 5. FRA application for inspectors to quickly gain a holistic view of rail and safety data.

Example 6: Digital Transformation of Air Safety Event Data

The FAA’s Air Traffic Organization (ATO) Office of Safety and Technical Training (AJI) Falcon system provides the capability to replay radar sessions of significant National Airspace System (NAS) events. Collaborating with the FAA’s Chief Data Officer, FAA is completely re-writing Falcon as a web-based platform that leverages ArcGIS. These new enhancements will greatly improve the effectiveness of safety event reviews at every FAA air traffic facility, service area, and headquarters.

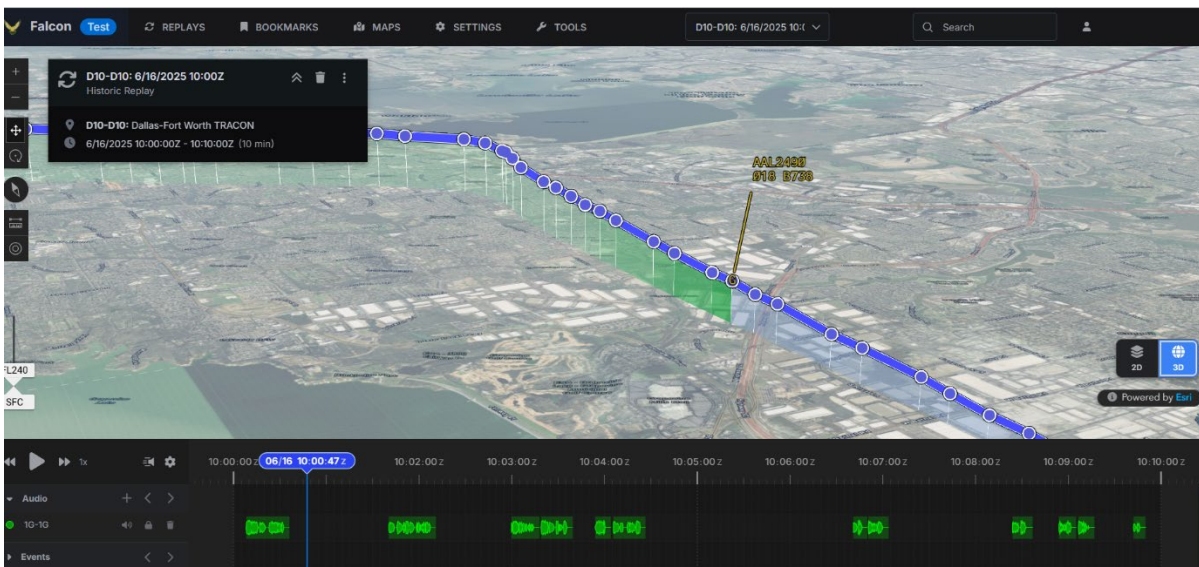


Figure 6. Screenshot from the newly redesigned Falcon system showing a flight path in 3-D overlaid with ATC voice transcripts.

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This GIS Strategic Plan builds on and replaces the 2022–2025 GIS Strategic Plan. This plan sets out our goals for 2026–2030 and aligns with the 2025–2035 National Spatial Data Infrastructure (NSDI) Strategic Plan, the DOT Strategic Plan, the 2025–2029 DOT IT Strategic Plan, and the Open Data Plan. Our previous strategic goals were to implement requirements from the Geospatial Data Act (GDA) of 2018, advance the Transportation Theme by maturing DOT geospatial data management practices, grow DOT’s GIS shared services, enable and promote collaborative governance, and cultivate a strong geospatial workforce. While those pillars still guide DOT’s geospatial initiatives, our goals have evolved to adapt to changes in the technical landscape, such as:

- **NSRS Modernization:** The National Oceanic and Atmospheric Administration (NOAA)'s National Geodetic Survey (NGS) will replace old datums (NAD83 and NAVD88) with new coordinate frames and a geopotential datum in 2026. Essentially, this creates a more accurate model of the shape of the earth. This update aligns U.S. mapping with international standards and accounts for tectonic plate movement. DOT OAs are assessing impacts and updating geospatial datasets, tools, and workflows to use the new National Spatial Reference System (NSRS) frames. Geospatial datasets requiring high degrees of positional accuracy, such as many of FAA’s datasets, will be affected.
- **New U.S. geospatial strategy (NSDI 2025–2035):** In late 2024, the Federal Geographic Data Committee approved an updated National Spatial Data Infrastructure (NSDI) strategic plan for 2025–2035. This plan sets national priorities for geospatial governance, data integration and technology utilization, and workforce development across agencies. DOT is aligning its GIS strategy with this Federal framework, helping ensure the Department’s geospatial efforts support the nationwide strategy.
- **AI/ML and digital twins in transportation:** Federal research and the Advanced Research Projects Agency Infrastructure (ARPA-I) surveys highlight rapid adoption of AI and machine learning in transportation. In addition, DOT notes the utility of AI tools across traffic operations, asset management, and logistics. The emerging use of digital twins and predictive analytics (AI models) has the potential to simulate and improve transportation networks. These AI-driven geospatial capabilities can enhance route planning, safety modeling, infrastructure maintenance, and more across DOT’s purview.
- **Cloud computing:** The expanding prevalence of cloud computing, which provides easy access to high-performance systems without the limitations and challenges of on-premises infrastructure, has enabled the processing and analysis of large volumes of data quickly and cost-efficiently.
- **Generative AI:** Integrating generative AI tools into workflows significantly enhances the speed and efficiency with which staff can perform some tasks or seek novel solutions to problems. These tools support workforce development by automating routine data processing, generating analytical summaries, and assisting product creation, enabling staff to focus on higher-level analysis and decision making. This boosts productivity and enables a skilled workforce capable of leveraging advanced technologies to meet evolving sector demands. Executive Order 14179 (2025), “Removing Barriers to American Leadership in Artificial Intelligence,” also supports tighter integration of these tools.

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- **Advancements in automated vehicles and drone technologies:** Automated vehicles have the potential to reshape transportation and provide DOT with new capabilities to meet key objectives. DOT personnel support this emerging technology in a number of ways, including the development of a mature Automated Routing and Navigation (ARN) geospatial ecosystem by establishing an Automated Routing and Navigation Theme within the National Spatial Data Infrastructure (NSDI).
- **Proliferation of sensors and earth observation data:** The widespread use of sensors and the growing availability of Earth observation data offer powerful tools for real-time monitoring and smarter decision making. Data from ground-based and vehicle-integrated sensors, combined with satellite imagery, which has become cheaper and more current, can help identify maintenance needs, track environmental impacts, and optimize transportation networks.

Each of these developments, from datum shifts to AI tools to new technology and data, helps shape how DOT collects, manages, and uses geospatial information. Incorporating them into our strategy will improve consistency, accuracy, and innovation in transportation infrastructure mapping and analysis, ensuring the U.S. DOT can continue to be a leader and partner in transportation innovation.

3. Vision

Our vision for GIS at DOT is:

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4. Current State

Our Geospatial Program

As of February 2025, the U.S. Department of Transportation had approximately 56,800 employees nationwide. DOT is organized into 10 Operating Administrations (OAs). Representatives from nine OAs were interviewed for this plan:

- 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)
- Office of the Secretary of Transportation (OST), including the Office of the Assistant Secretary of Research and Technology (OST-R), the Office of Policy Coordination and Development (OST-P), and the Office of Civil Rights (S-32)

A representative from the Volpe Center, an OST component that provides support to DOT and other Federal agencies, was also interviewed. The Great Lakes St. Lawrence Seaway Development Corporation (GLS) and the Office of the Inspector General (OIG) were not interviewed. The interviewees were a mixture of leadership and hands-on GIS users.

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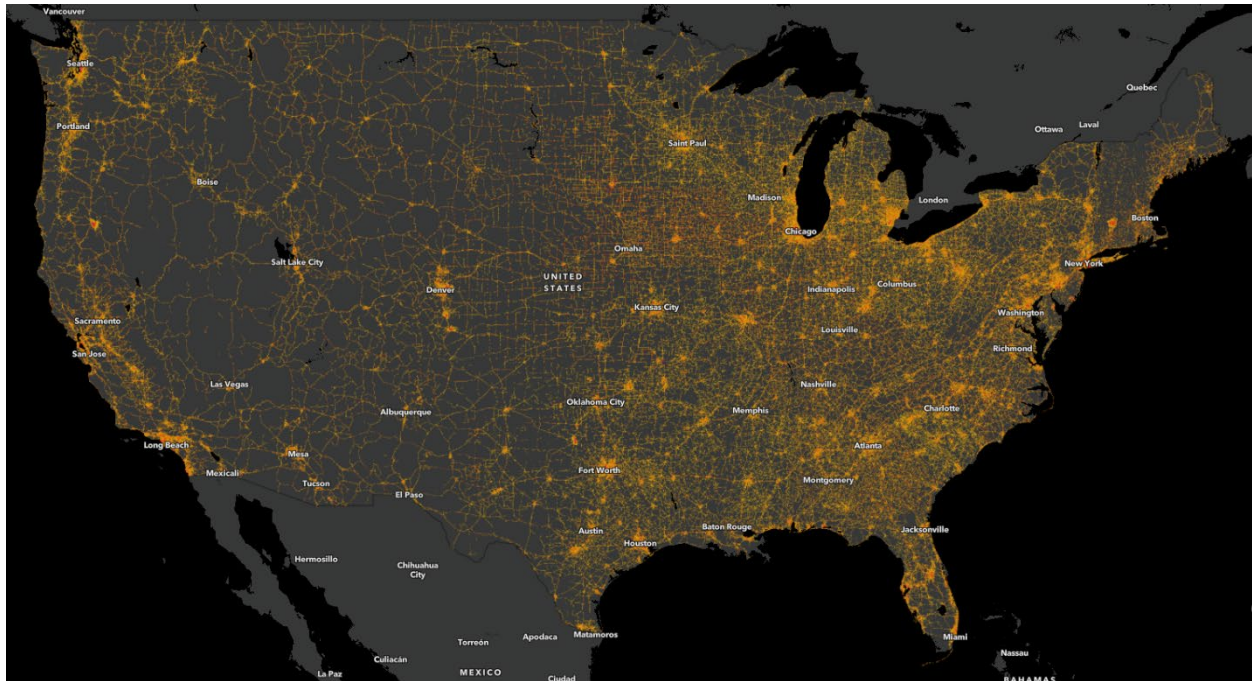


Figure 7. National Transportation Noise Map, Bureau of Transportation Statistics.

Since the 2022 GIS Strategic Plan was published, DOT has expanded its geospatial capabilities. The Geospatial Management Office (GMO) now employs five full-time Federal employees (FTEs), including the GIO, Deputy GIO, and the Geospatial Shared Services (GSS) Manager. Access to online GIS collaboration tools has been expanded to many more users and departments. The GMO is tasked with:

- Implementing the Geospatial Data Act (GDA) and other requirements.
- Maintaining DOT's Geospatial Shared Services (GSS).
- Leading the GIS Task Force, a group of geospatial SMEs from the OAs that provides maps and analysis for the Secretary's office and the Office of Intelligence, Security, and Emergency Response during national emergencies.
- Coordinating with OA GIOs to monitor geospatial programs and systems in the OAs and (in collaboration with the Office of Strategic Portfolio Management in OCDIO) tracking geospatial IT expenditures.
- Co-leading the GIS User Group, which has over 200 members.
- Managing the National Address Database (NAD) program.
- Maintaining the Enterprise Agreement with ESRI for GIS desktop and server software, in collaboration with the FAA.
- Leading department efforts to find the best tool for the job by identifying alternative GIS software applications and tools.
- Administering the approval processes for new applications to minimize entry barriers and support OA access to innovative solutions.

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The Secretary issued an order in 2023 formalizing the GIS Task Force, ensuring that staff from the OAs participate as needed.

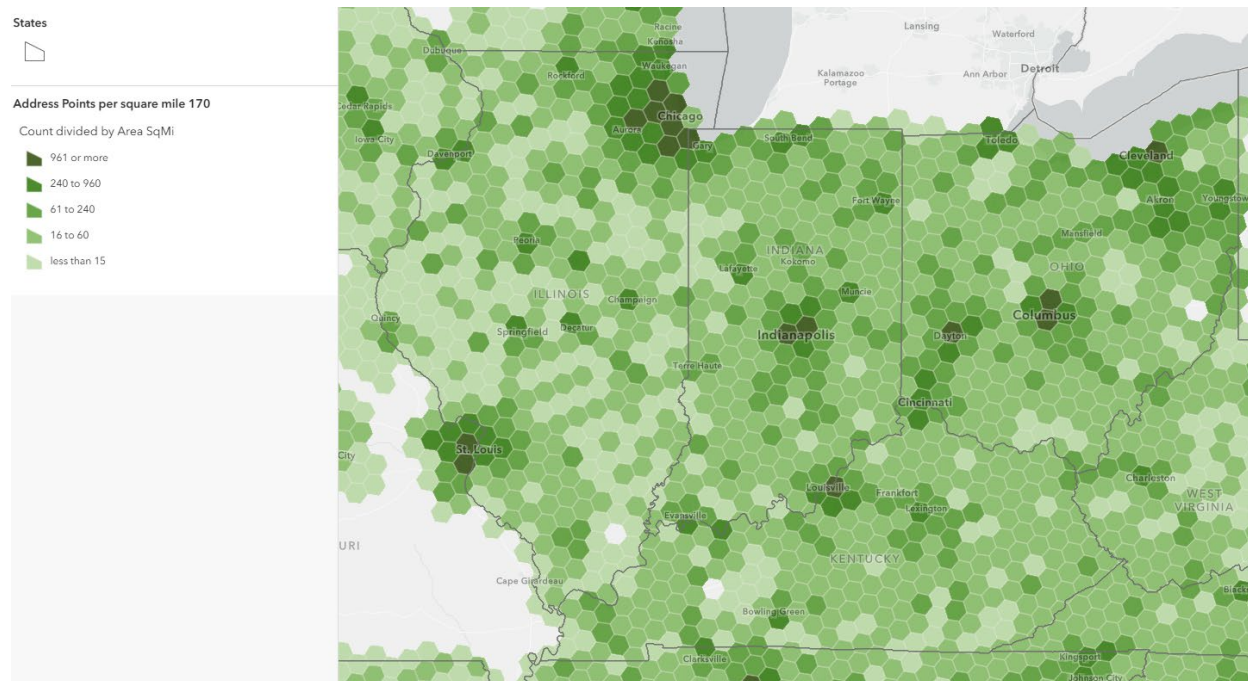


Figure 8. Address point density derived from the National Address Database, Office of the Secretary of Transportation.

DOT is designated by the Federal Geographic Data Committee (FGDC) as the lead agency for the National Geospatial Data Act (NGDA) Transportation Theme, and the co-lead for the Address Theme. The Bureau of Transportation Statistics (BTS) is statutorily tasked with leading the NGDA Transportation Theme. The Transportation Theme includes geospatial representation of both physical and non-physical components related to all modes of travel that allow the movement of goods and people between locations. The Transportation Theme portfolio currently includes 15 transportation-related geospatial datasets provided by DOT, Census, or the U.S. Army Corps of Engineers. DOT hosts the Transportation Theme datasets on DOT GSS and registers them on GeoPlatform. DOT and the Census co-lead the NGDA Address Theme, which consists of a single dataset, the National Address Database. The National Address Database is sourced entirely from authoritative local data partners and is included on the GeoPlatform. The data itself is available for download and viewing on several online platforms. Themes are dynamic, and discussions are ongoing about what future additions or removals are necessary to keep the themes relevant for achieving national geospatial goals.

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Staffing

The table below lists the number of current Federal GIS FTEs at DOT, and the change between 2020 and 2025.

Table 1. Number of GIS FTEs 2016–2025

OA	2016 GIS FTEs	2020 GIS FTEs	2025 GIS FTEs	Percent growth from 2020
FAA	137	97	132	36%
All other OAs	20	29	31	7%
Total	157	126	163	29%

The number of GIS FTEs has increased at DOT as more OAs embrace geospatial analysis and visualization in their day-to-day operations. By necessity, GIS FTEs will follow agencywide employment trends, with numbers increasing and decreasing in accordance with budget and hiring policies. The success of DOT at integrating spatial analysis and spatial visualization into its work has created unintended consequences. Many interviewees said they do not have the staff to keep up with the increasing demand for data collection, data management, and spatial analysis. Replacing FTEs with contractors has been a limited solution because issues over data ownership, tool ownership, and knowledge transfer persist long after contractors exit a project. They also expressed concerns over a lack of funds for formal training and conferences to ensure the staff they do have are capable of handling the latest technology.

Table 2. Number of GIS FTEs by Operating Administration, June 2025

OA	GIS FTEs
FAA	132
FHWA	6
FMCSA	0
FRA	3
FTA	1
MARAD	1
NHTSA	0
OST (GMO)	5
OST-R (includes Volpe Center)	13
PHMSA	3

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In the last several years, DOT has increased the number of GIS staff both as full-time employees and support contracts to meet the growing demands for geospatial staff. The demand for geospatial services continues to grow as GIS is incorporated into more areas of transportation analysis and management. Aside from dedicated GIS positions, many staff use GIS part-time in their work. Roles like travel demand modeling, demographic analysis, and emergency management make use of GIS. However, recent staff losses throughout the Federal government have led to sharp reductions in GIS staff in some OAs and current staffing levels are still in flux. Some Operating Administrations have reported that current demand for geospatial support has exceeded what they can supply. One administration is already discontinuing some cartographic products in response to staff cuts. Potential termination of GIS support contracts threatens to reduce capacity even further.

Software

DOT uses Esri GIS desktop software for most data analysis and processing, with an estimated 1,000 GIS users agency-wide. DOT renewed its Enterprise Agreement (EA) with Esri in September 2023 and has option years through 2028. Non-FAA DOT has approximately 500 Esri desktop GIS users, including licenses for contractors and part-time GIS software users. With a few exceptions for full-time GIS professionals, these users share 90 concurrent use licenses (60 licenses for ArcGIS Pro and 30 licenses for ArcGIS Desktop). FAA has nearly 500 Esri desktop GIS users (also including contractors and occasional users) which includes 339 named users and a number of floating licenses.

Usage of non-Esri desktop solutions varies depending on the preferences of the Department or Operating Administration. The open source desktop application QGIS is the most common non-Esri desktop solution. GRASS and Google Earth are also used, with Tableau and Microsoft BI being used for data visualization and analysis. For script-based geospatial analysis, Python and R are used frequently. Applications that are tailored to a specific task such as TransCad, Trimble, and Microstation are also used. Non-Esri data management applications that handle data storage, querying, and transformation include FME, OneSpatial, Microsoft SQL Server, and open source solutions like PostGres and PostGIS.

Online GIS applications have become a major component of DOT's geospatial operation. ArcGIS Online (AGO) is an Esri product intended for viewing and analyzing geospatial data online in the form of web maps and applications. DOT currently maintains over 3,000 AGO accounts for a variety of users, including those who perform simple data viewing, GIS analytics, application development, and field data collection. Between 2024 and early 2025, DOT saw a 41% increase in AGO users. This is largely driven by FAA, while non-FAA administrations have seen a slight decrease commensurate with staff reductions. Periodically, administrators examine users' activity with ArcGIS desktop software and online accounts and remove inactive users from the connection to the license server (or uninstall the software in FAA's case).

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Table 3. ArcGIS Online User Accounts by Operating Administration, 2025

Operating Administrations	User Accounts
FAA	2,212
FHWA	67
FRA	445
FTA	28
FMCSA	6
GLS	1
MARAD	21
NHTSA	19
OIG	2
OST	74
PHMSA	72
The Volpe Center	120
External or Uncategorized	43

DOT also hosts several ArcGIS Enterprise Portals, a product similar to AGO but hosted on DOT servers and intended for internal GIS data storage and project collaboration. DOT has a limited number of AGO credits, and ArcGIS Enterprise Portals do not consume those credits.

A number of non-Esri web GIS applications are in use throughout the agency, including MapBox and Geocortex. Most of this online web development utilizes JavaScript libraries created for mapping such as Leaflet, MapLibre, and OpenLayers.

The GIS User Group (GUG) meets every quarter and features updates from the Geospatial Management Office (GMO), presentations, and discussions. This group serves 250 people across the agency and includes a Teams channel for people to post announcements and ask questions between meetings. FAA hosts user group meetings as well as its own GIS Community of Practice. Several operating agencies also hold office hours, which are scheduled forums that provide GIS users an opportunity to ask technical questions.

Top 200 O-D Zonal Flows by Air



Figure 9. Travel Flows by Air, part of the FHWA NextGen NHTS National Origin-Destination Data Dashboard.

Stakeholder Feedback

DOT is both a data steward and a data consumer. Data curation, evaluation, and analysis are part of the daily work of most GIS users. DOT uses this data and analysis to support field staff, assess risk, allocate resources, respond to events, strengthen policy analysis, perform research and development, plan safety initiatives, and raise public awareness on transportation issues.

To maximize the effectiveness of geospatial analysis, DOT must enhance its capabilities in several key areas: data governance, data management, digital infrastructure, and workforce. To address these areas, the agency will need to:

1. Continue working with DOT's Data Governance and AI communities to strategize ways to strengthen data quality and metadata by developing clear guidelines to improve the overall accuracy and consistency of data and applications.
2. Collaborate across Operating Administrations and data teams to advance data management practices, ensuring data is not only reliable but also findable, accessible, interoperable, and reusable to the widest set of authorized customers.
3. Modernize our digital infrastructure to be more efficient, secure, resilient, and scalable, ensuring it can support and adapt to both current operational requirements and future innovations.

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4. Prepare DOT for improved positional accuracy by facilitating adoption of the National Spatial Reference System (NSRS 2022).
5. Expand our geospatial expertise and adoption of AI and other emerging geospatial technologies through targeted training and collaborative efforts across Operating Administrations, jurisdictions, and industries.

Most interviewees were familiar with and praised the DOT GIS User Group (GUG) for highlighting projects across Operating Administrations. To build on its success, interviewees suggested strengthening internal support networks by creating topic-specific working groups such as data modeling, real-time data processing, AI, and drone integration in GIS and custom web development. Many also advocated for broadening learning opportunities by inviting presenters from various sectors and level of government.

The FAA seeks to transition from 2D to 3D data visualization and analysis, relying on technologies like LiDAR to help support digital twins and enhanced visual models for planning and management purposes.

Users continue to value the flexibility provided by the Enterprise Agreement (EA) with Esri, though at times they have found it insufficient. Slow processing speed and limited storage space in desktop and cloud computing options, and slow performance in online applications were recurring complaints. This has led several Operating Administrations to establish or request separate ArcGIS Enterprise Portals to supplement the Enterprise Portal. Since the previous strategic plan, DOT GIS users remain confident that senior leadership recognizes the analytical and visualization capabilities of GIS. However, they expressed a desire to see the technology more actively leveraged in shaping policy, informing decision making, and contributing to evidence-based recommendations in the future.

Challenges and Opportunities

Since the last GIS Strategic Plan, many of the concerns remained constant. DOT has seen broad adoption of geospatial technology in recent years and an enthusiasm for new technical developments. However, Operating Administrations face common barriers to leveraging GIS to its full potential in support of mission goals. Present funding levels leave modes without access to resources that would enhance job performance such as upgraded hardware, data procurement opportunities, training, and most critically, staff. These constraints limit the Department's ability to fully leverage geospatial tools in evidence-based decision making.

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Challenge 1: Infrastructure and adequate performance for processing, analytical, and mobile needs

DOT utilizes big data. The National Address Database, sensor data, satellite imagery, live GPS ship location data (AIS), and machine-readable data for AI, are only a few examples of resource-intensive products that DOT uses to achieve its mission. As the Department's data processing and storage needs continue to grow, the performance limitations of "engineering build" laptops are becoming increasingly apparent. These devices often lack the computing power necessary to handle large datasets or run advanced geospatial analysis, resulting in delays and crashes. The servers and virtual machines provided by IT and the GSS face similar challenges. Some Operating Administrations report funding their own decentralized GIS infrastructure in order to maintain a more efficient processing environment than can be provided by GMO. Staff frequently spend time and resources finding workarounds to complete their GIS work, which reduces productivity and detracts from higher-value activities. A "GIS build" laptop is available, but procurement has been limited because of the high cost. This challenge is expected to intensify over time, as the demand for more robust, real-time data and analysis becomes essential to achieving mission objectives.

In addition to the need for more powerful computers, there is also a pressing requirement for a wider range of mobile devices tailored to geospatial data workflows, particularly for field staff. Many Operating Administrations send personnel into the field to collect data, yet they are often required to return to the office solely to re-submit paper reports in digital formats. This process not only delays reporting and reduces efficiency, but also introduces greater risk of human error, including misplaced or incomplete documentation. Though the Department's current EA with Esri provides access to digital tools that could streamline this workflow and eliminate the usage of paper-based reporting, many field employees lack mobile devices capable of supporting these solutions. Equipping field staff with appropriate mobile technology would help eliminate redundancies, reduce reporting errors, and enable faster, more accurate decision making based on real-time data. Technical support is also needed to create data collection workflows and ensure system components are in compliance with cybersecurity requirements.

Challenge 2: Data Access and Quality

The effective use of GIS to support evidence-based recommendations is fundamentally dependent on access to high quality, relevant data. While DOT frequently serves as a repository for curated datasets submitted by other jurisdictions and industry partners, it rarely acts as a data producer. There is a growing consensus across Operating Administrations that additional data, ranging from General Transit Feed Specification (GTFS) files to satellite imagery, LiDAR, and other advanced datasets, is needed to enable more comprehensive and robust analyses. Under current funding levels, the procurement of such datasets remains a significant challenge. GIS practitioners across DOT often lack the financial and technical resources to access or generate modern, high-resolution data. As a result, the Department is unable to fully capitalize on recent advancements in geospatial data and technologies. This limitation hinders innovation in data analysis, slows progress toward real-time decision support, and ultimately reduces the quality and timeliness of the policy insights that DOT can provide. Addressing these gaps through

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increased investment in data procurement and infrastructure is essential to enabling a more innovative, responsive, and efficient agency.

Challenge 3: Personnel and Workforce Development

As previously indicated, many Operating Administrations are experiencing a surge in demand for geospatial support, highlighting the critical and expanding role of this expertise. While this growth presents staffing challenges, particularly with recent fluctuations, it also underscores the immense value and growing reliance on geospatial capabilities. To address these evolving needs, a strategic focus on strengthening our internal capacity is vital. While contractors can offer some flexibility, the specialized nature of the work, the time invested in training, and the importance of maintaining institutional knowledge and seamless project continuity make in-house expertise indispensable. By proactively addressing staffing levels and fostering robust knowledge transfer, the agency can ensure the continued excellence in maintaining key datasets and applications, ultimately empowering Operating Administrations to adapt and thrive amid dynamic demands.

Operating Administrations are keen to enhance their teams' capabilities, recognizing the rapid advancements in geospatial science and technology. They have highlighted the need for more resources dedicated to professional development, including funding for training and participation in industry conferences. While budget constraints have limited access to some external opportunities, the GMO published a Workforce Development Plan which includes self-guided GIS training available through providers like Esri and Cornerstone OnDemand (CSOD). These resources, though not equivalent to in-person training or conferences, are valuable for keeping pace with emerging technologies such as artificial intelligence, evolving software platforms, and the latest best practices in data management.

5. GIS Strategic Goals

The Geospatial Data Act states that a covered agency must prepare, maintain, publish, and implement a strategy for advancing geographic information and related geospatial data and activities appropriate to the mission of the covered agency in support of the strategic plan for the National Spatial Data Infrastructure (43 U.S.C. § 2808).

Table 4 shows how DOT GIS strategic goals support the NSDI strategic goals while capturing themes that emerged during the interview and research phases of this project. Tie-ins to DOT strategic goals are included in the GIS strategic goal descriptions. DOT will implement these goals to advance geographic information and related geospatial data and activities appropriate to our mission.

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Table 4. Comparison of NSDI and DOT Strategic Goals

NSDI Strategic Goal	DOT GIS Strategic Goal
<p><u>Governance: Implement National Governance</u></p> <p>Increase multisector nationwide participation and accountability in NSDI governance and implementation and establish and execute national oversight and management mechanisms for the NSDI.</p>	<p>Goal 1: Establish and maintain structures, policies, and processes to govern how geospatial data is collected, managed, and shared in alignment with NSDI core values.</p> <p>Goal 3: Establish DOT as a leader and essential partner in transportation innovation using geospatial technologies.</p>
<p><u>Data and Technology: Modernize the Infrastructure and Leverage Advanced Technology</u></p> <p>Leverage technological innovations (for example, AI; the broader use of space-based positioning, navigation, and timing [PNT]; and alternative PNT technologies both in space and on the ground) to reduce the level of effort required to acquire, develop, manage, maintain, access, distribute, and use geospatial data through the NSDI.</p>	<p>Goal 2: Modernize geospatial datasets used in DOT activities by implementing data management best practices, optimizing supporting infrastructure, and ensuring that DOT’s National Geospatial Data Assets (NGDA) are findable, accessible, interoperable, and reusable.</p> <p>Goal 3: Establish DOT as a leader and essential partner in transportation innovation using geospatial technologies.</p> <p>Goal 4: Develop and maintain a highly skilled and adaptable geospatial workforce that is proficient in exploring, analyzing, and effectively addressing location-related challenges within the transportation sector.</p>
<p><u>People: Building a Skilled Geospatial Workforce for a Sustainable Future</u></p> <p>Build a skilled and engaged geospatial workforce that is equipped to advance and leverage the full potential of the NSDI to address complex challenges, drive innovation, and promote societal advancement.</p>	<p>Goal 2: Modernize geospatial datasets used in DOT activities by implementing data management best practices, optimizing supporting infrastructure, and ensuring that DOT’s National Geospatial Data Assets (NGDA) are findable, accessible, interoperable, and reusable.</p> <p>Goal 3: Establish DOT as a leader and essential partner in transportation innovation using geospatial technologies.</p> <p>Goal 4: Develop and maintain a highly skilled and adaptable geospatial workforce that is proficient in exploring, analyzing, and effectively addressing location-related challenges within the transportation sector.</p>

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Goal 1: Establish and maintain structures, policies, and processes to govern how geospatial data is collected, managed, and shared in alignment with NSDI core values.

Objectives

- Work internally and with stakeholders to uphold geospatial data governance guidelines and Federal data standards.
- Support data integration across different digital platforms.
- Collaborate with data governance subject matter experts to promote data management best practices.
- Identify and evaluate data standards in accordance with national guidance.
- Build partnerships across Operating Administrations (OAs), Federal agencies, state, local, and tribal governments, non-governmental organizations, and the private sector to exchange knowledge and collaborate on effective solutions to geospatial information management challenges.

Actions

- Collaborate with data governance, records management, privacy, legal, information technology, and cybersecurity teams to promote compliance with Federal Law, Executive Orders, and Departmental policies, including, but not limited to, the Geospatial Data Act of 2018, Executive Order 14243, OMB Memorandum M-25-05, OMB Circular A-130, and the Open Government Data Act of 2018.
- Promote an effective, efficient, and sustainable collaboration ecosystem to advance the NSDI.
- Consult with OA Geospatial Information Officers (GIOs) to identify datasets important to achieving DOT mission and strategic goals.
- Promote best practices in standardizing metadata definitions and formats with an eye towards conforming to Federal metadata standards.
- Create or leverage existing processes, tools, or technology to enable the furtherance of NSDI goals.

Table 5. Comparison of GIS Goal 1 to NSDI and DOT strategic goals

NSDI Strategic Plan	DOT Strategic Plan	IT Strategic Plan	Open Data Plan
Goal 1 - Implement National Governance	Efficiency	Eliminate Technical Debt	Goal 3: Improve Government Efficiency and Accountability

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Goal 2: Modernize geospatial datasets used in DOT activities by implementing data management best practices, optimizing supporting infrastructure, and ensuring that DOT’s National Geospatial Data Assets (NGDA) are findable, accessible, interoperable, and reusable.

Objectives

- Support data governance and maturity efforts via engagement with Federal Geographic Data Committee (FGDC) and key stakeholders.
- Improve hardware and software infrastructure to ensure that GIS systems meet customer needs to store, process, transfer, and deliver increasingly large and complex data sets.
- Assess impacts of the National Spatial Reference System (NSRS) change and implement the new datum across all DOT-owned geospatial datasets as required.
- Optimally resource geospatial programs in the agency.
- Grow our centralized geospatial hub to ensure authoritative data is available to the widest possible audience.
- Promote the creation and maintenance of geospatial datasets that are complete, current, trustworthy, and AI-ready for evidence-based decision making.

Actions

- Lead the Federal Geographic Data Committee (FGDC) Transportation and Address Themes.
- Ensure that GIS users have resources appropriate to the requirements of their work.
- Optimize workflows by helping GIS and Data managers improve database infrastructure.
- Identify authoritative geospatial data and make it findable for our customers and stakeholders.
- Establish processes that make authoritative data more easily searchable and identifiable.
- Work with GIS users to identify opportunities to document, implement, and share geospatial data management best practices.
- Promote the use of existing resources like the Esri Enterprise Agreement (EA) and the GMO-hosted shared services.
- Make geospatial data ready for artificial intelligence and other machine-readable applications.
- Identify opportunities to assess current uses, needs, and challenges to leveraging mobile GIS technology in the field and improve access to mobile GIS tools and workflows.

Table 6. Comparison of GIS Goal 2 to NSDI and DOT strategic goals

NSDI Strategic Plan	DOT Strategic Plan	IT Strategic Plan	Open Data Plan
Goal 2 - Modernize the Infrastructure and Leverage Advanced Technology	Safety, Efficiency	Eliminate Technical Debt, Build Obsessive Products	Goal 1: Enhance Public Access and Discoverability

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Goal 3: Establish DOT as a leader and essential partner in transportation innovation using geospatial technologies.

Objectives

- Evaluate geospatial technologies at a foundational level in order to modernize tools and workflows for performance, efficiency, and reliability.
- Advance geospatial analysis in support of transportation safety, risk mitigation, and infrastructure management.
- Evaluate state-of-the-art geospatial technology to understand potential benefits and challenges relative to DOT’s strategic and mission goals.
- Advance our own use of emerging geospatial technology by implementing new tools and processes that provide secure and innovative solutions, including an IT infrastructure capable of supporting large geospatial datasets and advanced geospatial processing.
- Promote the use, understanding, and value of geospatial data and technologies to transportation stakeholders outside of the geospatial sector by encouraging the exchange of ideas and strengthening awareness of the role geospatial technology plays in a strong national transportation infrastructure.

Actions

- Establish or leverage existing collaborative interagency groups in response to emerging technology trends.
- Gain a comprehensive understanding of use cases of next-generation digital geospatial tools and their applicability to DOT workflows.
- Ensure geospatial data needs are included in artificial intelligence planning.

Table 7. Comparison of GIS Goal 3 to NSDI and DOT strategic goals

NSDI Strategic Plan	DOT Strategic Plan	IT Strategic Plan	Open Data Plan
Goal 1 - Implement National Governance, Goal 2 - Modernize the Infrastructure and Leverage Advanced Technology, Goal 3 - Building a Skilled and Inclusive Geospatial Workforce for a Sustainable Future	Innovation, Infrastructure	Build Obsessive Products	Goal 2: Drive Innovation and Economic Value

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Goal 4: Develop and maintain a highly skilled and adaptable geospatial workforce that is proficient in exploring, analyzing, and effectively addressing location-related challenges within the transportation sector.

Objectives

- Leverage budgetary and technical resources to ensure the effective use of funds and staff.
- Build capacity by providing access to learning opportunities such as training and conferences that relate to emerging geospatial data and technology.
- Foster the exchange of ideas and knowledge transfer by supporting user groups, communities of practice, and networking opportunities.
- Attract, recruit, and retain highly skilled geospatial professionals who possess expertise in geospatial technologies and related disciplines.

Actions

- Support a workforce capable of leveraging geospatial data and tools to support data-driven decision making, enhance operational efficiency, and drive innovation.
- Foster creativity and innovation by creating opportunities to incubate new ideas, cultivate knowledge retention, and improve customer response times.
- Enable DOT to stay relevant in a rapidly evolving sector by recruiting and retaining skilled employees.
- Staff and train the GIS Task Force to respond to transportation-related events.

Table 8. Comparison of GIS Goal 4 to NSDI and DOT strategic goals

NSDI Strategic Plan	DOT Strategic Plan	IT Strategic Plan	Open Data Plan
Goal 2 - Modernize the Infrastructure and Leverage Advanced Technology, Goal 3 - Building a Skilled and Inclusive Geospatial Workforce for a Sustainable Future	Efficiency, Innovation	Become Customer-Centric, Grow Talent	Goal 3: Improve Government Efficiency and Accountability

6. Reporting

Reports are required by the GDA, and DOT’s OIG issues recommendations based on their biennial audits of GDA compliance. The OIG began the 2024 audit in June 2024 and completed it in October 2024. The 2024 OIG audit determined that the GMO was fulfilling its Lead Covered Agency and General Covered Agency reporting requirements. The audit recommended completing the geospatial assets inventory, which was rectified in December 2025. The table below shows how DOT fulfills its ongoing reporting requirements.

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Table 9. GIS reporting

Requirement	Deadline or Reporting Period	Status
Covered Agency Report (GDA, 43 U.S.C. § 2808)	Annually in January or as determined by the FGDC	Report filed on time in January 2025 and annually since 2021.
Lead Covered Agency Report (GDA, Section 2805(b)(3)(E)(ii)(I)) for the Transportation Theme	Annually in January or as determined by the FGDC	Report filed on time in January 2025 and annually since 2021.
Lead Covered Agency Report (GDA, Section 2805(b)(3)(E)(ii)(I)) for the Address Theme	Annually in January or as determined by the FGDC	Report filed on time in January 2025 and annually since 2023.
GIS Strategic Plan (GDA, Section 2808(a)(1))	Updates begin after NSDI Strategic Plan is updated	NSDI plan adopted in November 2024.
Geospatial Budget and Data Inventory (GDA, Section 2808(b)(2))	Budget is coordinated with DOT's CFO	Data inventory is maintained by the GMO and is updated as needed.
OIG Audit recommendations	Biennially	Auditors closed one recommendation in December 2024; one recommendation remains open.

7. Conclusion

During the years covered by the last GIS Strategic Plan (2022–2024), DOT rapidly expanded its adoption of GIS technology, moving beyond desktop applications to embrace web and mobile platforms. The agency is incorporating artificial intelligence and other cutting-edge innovations to make GIS even more efficient and responsive to the needs of every customer. Our updated geospatial strategy will guide DOT as it increases the reach of geospatial-powered analysis, visualizations, applications, and services. The agency will improve data governance, augment geospatial operations with new technology, and build a strong, efficient, future-ready workforce to support DOT's mission.

8. Appendix

Acronym List

BTS	Bureau of Transportation Statistics
DOT	Department of Transportation
EA	Enterprise Agreement
EIM	Enterprise Information Management Platform (FAA)
Esri	Environmental Systems Research Institute
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 equivalent
GDA	Geospatial Data Act
GIO	Chief Geospatial Information Officer
GIS	Geographic Information Systems
GLS	Great Lakes Saint Lawrence Seaway Development Corporation
GMO	Geospatial Management Office
GSS	GIS Shared Services
GUG	GIS User Group
MARAD	Maritime Administration
NGAC	National Geospatial Advisory Committee
NGDA	National Geospatial Data Asset
NHTSA	National Highway Traffic Safety Administration
NSDI	National Spatial Data Infrastructure
NTAD	National Transportation Atlas Database
OA	Operating Administration
OCDIO	Office of the Chief Digital & Information Officer
OIG	Office of the Inspector General
OMB	Office of Management and Budget
OST	Office of the Secretary of Transportation
OST-R	Office of the Assistant Secretary of Research and Technology
PHMSA	Pipeline and Hazardous Materials Safety Administration
SMEs	Subject Matter Experts

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About this Document

DOT's third GIS Strategic Plan was researched and written between September 2024 and July 2025. The authors were Mara Kaminowitz, Deputy GIO at OST, Jay Gregory, FAA IT Specialist (ArcGIS & Geospatial Tools), and Sharita Underwood, Senior GIS Analyst at OST. Additional assistance was provided by Amy Nelson, GIO at OST, Laura Kahn, Data Governance Lead at OST, and Drew Goldsmith, FAA Office of Airport Safety and Standards.

Information used to create the Strategic Plan came from the following sources:

1. Interviews and input from with each of the OAs mentioned in the Introduction, as well as key staff such as the Chief Data and AI Officer, GIO, and Deputy CDIO
2. The 2025–2035 NSDI Strategic Plan
3. The Geospatial Data Act, signed into law in October 2018
4. The DOT Strategic Plan
5. 2025–2029 DOT IT Strategic Plan
6. The DOT Open Data Plan

This Strategic Plan is effective from the date of publication until 12/31/2030.