

UNITED STATES DEPARTMENT OF TRANSPORTATION

# Transportation Theme of the National Spatial Data Infrastructure

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Strategic Plan  
2016 - 2019

8/17/2015

## Executive Summary

The Transportation Theme of the National Spatial Data Infrastructure (NSDI) is comprised of geospatial datasets that are critical to our Nation's geospatial practitioners and decision makers. The U.S. Department of Transportation (DOT) manages the development of the Transportation Theme, and the individual geospatial datasets are managed by partners both within and outside of the Department. This Strategic Plan, meant to complement the NSDI Strategic Plan published in December 2013, was developed with extensive input from these partners and represents their shared vision:

*The Transportation Theme of the NSDI leverages investments in people, technology, data, and procedures to create and provide the geospatial knowledge required to understand, analyze, protect, and promote our national transportation system.*

The goals and objectives in the plan define areas of critical importance to the continued development of the Transportation Theme and provide a roadmap for DOT and the dataset owners to follow over the next 2 years:

### **Goal 1: Facilitate the Sharing of Transportation Geospatial Data**

- **Objective 1.1.** Provide Web Feature Services for the National Geospatial Data Asset (NGDA) datasets of the Transportation Theme.
- **Objective 1.2.** Leverage the Geospatial Platform.

### **Goal 2: Ensure the Effective Development of the Transportation NGDA Datasets**

- **Objective 2.1.** Continued development and support of the All Roads Dataset NGDA and its related Address Range-Feature Name Relationship File and the Address Ranges Relationship File NGDAs.
- **Objective 2.2.** Continued development and support of the Rail NGDA.
- **Objective 2.3.** Continued development and support of the Airports and Runways NGDAs.
- **Objective 2.4.** Continued development and support of the Transit NGDA.
- **Objective 2.5.** Continued development and support of the Bridge NGDA.
- **Objective 2.6.** Continued development and support of the Intermodal Facilities NGDA.
- **Objective 2.7.** Continued development and support of the Navigable Waterway, Ports, Locks, and Inland Electronic Navigation Charts NGDAs.
- **Objective 2.8.** Continued development and support of the Traffic Analysis Zones NGDA.

### **Goal 3: Convene Leadership of the Transportation Geospatial Community**

- **Objective 3.1.** Lead and participate in the development and coordination of national and international standards applicable to the transportation geospatial community.
- **Objective 3.2.** Lead the transportation geospatial community and advocate shared resources.

This plan also documents the challenges and opportunities associated with these goals and describes the steps that DOT and its partners will take to fulfill the goals.

## Background

Executive Order 12906, “Coordinating Geographic Data Acquisition and Access,” describes the National Spatial Data Infrastructure (NSDI) as “the technology, policies, standards, and human resources necessary to acquire, process, store, distribute, and improve utilization of geospatial data.”

The NSDI is composed of 16 National Geospatial Data Asset (NGDA) Themes, one of which is Transportation. Each NGDA Theme consists of a related group of NGDA Datasets selected from a larger, constantly changing universe of geospatial datasets because they meet the inclusion criteria for the NGDA Theme. An NGDA Dataset is defined as a geospatial dataset that has been designated as such by the Federal Geographic Data Committee (FGDC) Steering Committee and meets at least one of the following criteria: supports mission goals of multiple federal agencies; statutorily mandated; supports Presidential priorities as expressed by Executive Order or by the Office of Management and Budget.

The Transportation Theme is described as “means and aids for conveying persons and/or goods. The transportation system includes both physical and non-physical components related to all modes of travel that allow the movement of goods and people between locations.” The United States Department of Transportation (DOT) is the lead federal agency for the Transportation Theme. Currently, the Transportation Theme consists of the following NGDA Data sets:

<b>Transportation NGDA</b>	<b>Manager</b>
Address Range-Feature Name Relationship File	Department of Commerce/Bureau of the Census
Address Ranges Relationship File	Department of Commerce/Bureau of the Census
All Roads Dataset	Department of Commerce/Bureau of the Census
Traffic Analysis Zones	Department of Commerce/Bureau of the Census
Inland Electronic Navigation Charts	Department of Defense/U.S. Army Corps of Engineers
National Transportation Dataset – National Map	Department of Interior/U.S. Geological Survey
Airports	Department of Transportation/Federal Aviation Administration
Runways	Department of Transportation/Federal Aviation Administration
Transit (lines and stations)	Department of Transportation/Federal Transit Administration
Rail	Department of Transportation/Federal Railroad Administration
Bridge	Department of Transportation/Federal Highway Administration
Intermodal	Department of Transportation/Bureau of Transportation Statistics
Ports	Department of Defense/U.S. Army Corps of Engineers
Locks	Department of Defense/U.S. Army Corps of Engineers

It is important to note that not all of NGDA Datasets are managed by DOT. Management of the Transportation Theme is, therefore, clearly an interagency effort. In addition, DOT is also in the process of revising the list of Transportation NGDA datasets by removing “National Transportation Dataset – National Map” from the list of Transportation NGDA datasets and adding a “Navigable Waterway” NGDA dataset.

## **Vision**

The NSDI Strategic Plan, which was published in December of 2013 and is the basis for this strategic plan, defined the following vision statement for the NSDI:

*The NSDI leverages investments in people, technology, data, and procedures to create and provide the geospatial knowledge required to understand, protect, and promote our national and global interests.*

As stated in the NSDI Strategic Plan, the NSDI extends far beyond data. The NSDI encompasses the policies, organizational responsibilities, data, information, technologies, standards, services, and financial and human resources necessary to achieve this vision. The NSDI has become a critical vehicle for facilitating seamless data development, information sharing, and collaborative decision-making across multiple sectors of the economy.

With the above as the overall vision, DOT has developed this vision statement for the Transportation Theme:

*The Transportation Theme of the NSDI leverages investments in people, technology, data, and procedures to create and provide the geospatial knowledge required to understand, analyze, protect, and promote our national transportation system.*

### **The Desired Future State of the Transportation Theme of the NSDI**

- Provide government, businesses, and citizens with a way to visualize and explore transportation data to inform decision making.
- Create a network of resources and services for the seamless integration of location-based information into broader information assets to serve the needs of government, the business community, and citizens.
- Serve as an enabling resource for discovery, access, integration, and application of geospatial information for a growing body of users.
- Leverage shared and open standards-based services and applications.
- Promote place-based business intelligence and smart, shared applications.
- Be comprised of a core set of geospatial layers that interface with other nonspatial data.
- Use real-time data feeds and sensor webs for improved monitoring, control, situational awareness, and decisionmaking.
- Facilitate access to and use of multi-temporal information linked to place.
- Integrate and use advanced technologies and their associated standards and best practices.
- Facilitate use of community-driven open standards with multiple implementations.

### **Guiding Principles for the Transportation Theme**

Federal agencies that produce, collect, maintain, or use transportation spatial data either directly or indirectly will (1) recognize and manage their transportation spatial data as capital assets, (2) facilitate non-Federal participation in the development of the NSDI, and (3) work together through the FGDC to

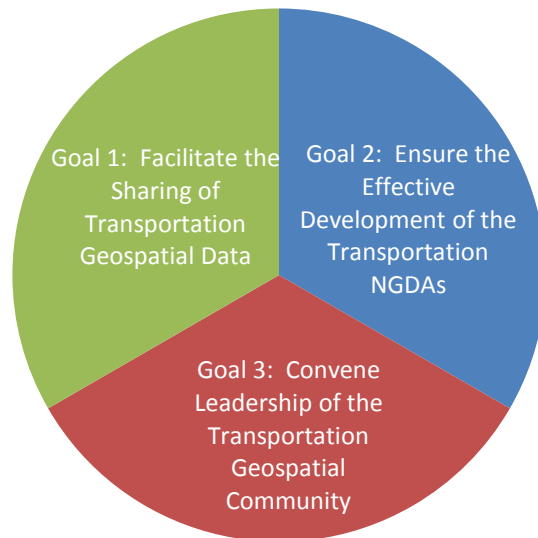
provide effective and efficient use and management of geospatial data in the digital environment for the benefit of the Nation.

### **Guiding Principles for the Federal Geospatial Community**

- Ensure that spatial data from multiple sources (Federal, State, Tribal, regional, and local governments; academia; and the private sector) are available and easily integrated to enhance understanding of our physical, natural, and cultural world.
- Facilitate the development of authoritative National Geospatial Data Assets that are complete, accurate, current, standards-compliant, and at the scale needed for shared uses by Federal, State, Tribal, regional, and local governments, academia, the private sector, and the public.
- Protect the privacy and security of citizens' personal data and ensure the accuracy of statistical information about people, both in raw form and in derived information products.
- Enable access for all citizens to spatial data, information, and derivative and interpretive products, in accordance with Office of Management and Budget Circulars A-130 and A-16 and the Open Data Policy (OMB Memorandum M-13-13).
- Protect proprietary interests related to licensed information and data.
- Enable interoperability of information systems through the use of open and machine-readable formats to enable access to resources from multiple agencies and partners.
- Ensure that investment and policy decisions consider the expected return on investment and effective use of resources.

## Goals and Objectives

### Transportation Theme of the NSDI Strategic Plan 2016 - 2019



The Transportation Theme of the NSDI Strategic Plan consists of three strategic goals that were developed from the NSDI Strategic Plan and from consultations with the managers/owners of the individual Transportation Theme NGDA datasets. The strategic goals include objectives and actions that describe how the goals will be accomplished. The following section describes the strategic goals, objectives and actions in the Strategic Plan; and also describes the outcomes that will result from their implementation.

#### **Goal 1: Facilitate the Sharing of Transportation Geospatial Data**

DOT is committed to developing and distributing the NGDA datasets that comprise the Transportation Theme. Widely and openly sharing these resources is critical to leveraging tight budgets and reducing, if not eliminating, duplication of effort. DOT has traditionally offered the NGDA datasets via download and DVD but will move towards Web Feature Services (WFS). WFS represent a change in the way geographic information is created, modified and exchanged on the Internet. Rather than sharing geographic information at the file level using downloads, the WFS offers direct fine-grained access to geographic information at the feature level. WFS allow customers to only retrieve or modify the data they are seeking, rather than retrieving a file that contains the data they are seeking and possibly much more.

The Geospatial Platform initiative is a critical component for the continued development of the Transportation Theme. The Platform is a Web-based first generation service environment that provides

access to a suite of well-managed, highly available, and trusted geospatial data, services, applications, and tools for use by Federal agencies and their State, Tribal, regional, and local partners.

Actively engaging the stakeholder community is another critical component of data sharing. Staying abreast of and addressing the requirements of the stakeholders is yet another way to reduce duplication of effort and leverage budgets through partnerships.

**Objective 1.1.** Provide Web Feature Services for the NGDA datasets of the Transportation Theme.

**Anticipated Outcomes.** More current data available to all through WFS. Cost savings through reduced duplication of effort.

- **Action 1.1.1.** Develop, maintain, and publish WFS for the NDGA datasets of the Transportation Theme.
- **Action 1.1.2.** Register the WFS on the Geospatial Platform/Clearinghouse.
- **Action 1.1.3.** Market the WFS to the stakeholder community and encourage feedback and partnerships.

**Objective 1.2.** Leverage the Geospatial Platform.

**Anticipated Outcomes.** Efficient, effective use of shared technology infrastructure to encourage and support better information sharing. Cost savings through shared geospatial investment planning.

- **Action 1.2.1.** Publish the WFS for the Transportation Theme NGDA datasets to the Geospatial Platform.
- **Action 1.2.2.** Develop and maintain the Transportation Community pages on the Geospatial Platform.
- **Action 1.2.3.** Develop and maintain the DOT pages on the Geospatial Platform.

## **Goal 2: Ensure the Effective Development of the Transportation NGDA Datasets**

DOT is committed to developing, maintaining, and distributing authoritative transportation geospatial data. Part of the effective development of this data is leveraging existing resources. DOT did just this through the strategic planning effort for Transportation for the Nation (TFTN), which outlined a strategy for the development of a complete road centerline database through the expansion of an existing program in the Federal Highway Administration (FHWA). This plan will expand upon the TFTN effort to include the other Transportation Theme NGDA datasets.

A major focus of DOT over the period of this plan is a continued reduction of duplication of effort. Internally, the geospatial programs across DOT will standardize on the NGDA datasets and work together to ensure that the NGDA datasets meet all mission requirements. Externally, DOT will work with our partners in other agencies and throughout the transportation geospatial community to encourage widespread use of the NGDA datasets. This will include working with all of these partners to incorporate their needs in the continued development of the NGDA datasets.

**Objective 2.1.** Continued development and support of the All Roads Dataset NGDA and its related Address Range-Feature Name Relationship File and the Address Ranges Relationship File NGDAs.

**Anticipated Outcomes.** A single all roads network, with associated address ranges/points, that is used throughout the DOT and across the federal government and meets the requirements of its stakeholders; reduced duplication of effort; greater stakeholder involvement. Transition of the All Roads NGDA management from the Department of Commerce/Bureau of the Census (DOC/BOC) to DOT through the FHWA's All Roads Network Of Linear-referenced Data (ARNOLD) program.

- **Action 2.1.1.** Develop a strong partnership between DOT and the Department of Commerce/Bureau of the Census to ensure that data collected through FHWA's ARNOLD program can be utilized in the TIGER files.
- **Action 2.1.2.** Work with stakeholders, particularly DOC/BOC, the National States Geographic Information Council, and the Next Generation 911 community, to develop a NGDA of address points.
- **Action 2.1.3.** Continue to support the DOC/BOC as manager of the Address Range-Feature Name Relationship File and the Address Ranges Relationship File NGDAs.
- **Action 2.1.4.** Transition the management of the All Roads NGDA from DOC/BOC to DOT.

**Objective 2.2.** Continued development and support of the Rail NGDA.

**Anticipated Outcomes.** A single rail network that is used throughout the DOT and across the federal government and meets the requirements of its stakeholders; reduced duplication of effort; greater stakeholder involvement.

- **Action 2.2.1.** Conflate existing rail networks from DOT/Federal Railroad Administration (FRA) and from the Department of Defense (DOD) to produce a single, authoritative rail network NGDA Dataset managed by FRA.
- **Action 2.2.2.** Develop a Memo of Understanding (MOU) between FRA and the American Association of Railroads (AAR) that will ensure that FRA always has the most up-to-date rail data.
- **Action 2.2.3.** Work with stakeholders, particularly DOD, AAR, and the National Emergency Numbers Association, to ensure that all stakeholder needs are met.

**Objective 2.3.** Continued development and support of the Airports and Runways NGDAs.

**Anticipated Outcomes.** A single set of airport and runway data that is used throughout the DOT and across the federal government and meets the requirements of its stakeholders; reduced duplication of effort; greater stakeholder involvement.

- **Action 2.3.1** Examine all of the airport information contained in the National Air Space (NAS) and determine which parts are good candidates to be included in the NGDA.



- **Action 2.3.2** Enact changes to improve Federal Aviation Administration data collection and data utilization workflows and enhance singular distribution mechanisms that allow users to access and update authoritative aeronautical information.
- **Action 2.3.3** Establish a web interface for external users outside the Federal Aviation Administration system to obtain needed aeronautical information.

**Objective 2.4.** Continued development and support of the Transit NGDA.

**Anticipated Outcomes.** A single transit dataset that is used throughout the DOT and across the federal government and meets the requirements of its stakeholders; reduced duplication of effort; greater stakeholder involvement.

- **Action 2.4.1.** Develop relationships with individual transit agencies to receive regular, consistent, and reliable updates to the transit data.
- **Action 2.4.2** Assist and inform the stakeholder community, including American Public Transportation Association, Community Transportation Association of America, AASHTO, ITS America and ten other federal partners who are providing transportation services, on the USDOT collection of transit geospatial data.

**Objective 2.5.** Continued development and support of the Bridge NGDA.

**Anticipated Outcomes.** A single bridge dataset that is used throughout the DOT and across the federal government and meets the requirements of its stakeholders; reduced duplication of effort; greater stakeholder involvement.

- **Action 2.5.1.** Assist State DOTs to develop methodologies that ensure that their reported bridge locations are consistent with the FHWA ARNOLD program.
- **Action 2.5.2.** Develop, with the assistance of stakeholders, a dataset of rail bridges.
- **Action 2.5.3.** Develop, as a part of the Bridge NGDA or as a separate NGDA, a dataset of road and rail tunnels.

**Objective 2.6.** Continued development and support of the Intermodal Facilities NGDA.

**Anticipated Outcomes.** A single Intermodal Facilities dataset that is used throughout the DOT and across the federal government and meets the requirements of its stakeholders; reduced duplication of effort; greater stakeholder involvement.

- **Action 2.6.1.** Pursue partnerships with stakeholders to assist in updating the data.
- **Action 2.6.2.** Develop a mechanism to ensure regular updates to the intermodal facilities.

**Objective 2.7.** Continued development and support of the Navigable Waterway, Ports, Locks, and Inland Electronic Navigation Charts NGDAs.

**Anticipated Outcomes.** A single set of waterway data that is used throughout the DOT and across the federal government and meets the requirements of its stakeholders; reduced duplication of effort; greater stakeholder involvement.

- **Action 2.7.1.** Develop a strong partnership between DOT and the United States Army Corps of Engineers (USACE) to ensure that the Navigable Waterway, Ports, Locks, and Inland Electronic Navigation Charts remain NGDAs under the Transportation Theme.
- **Action 2.7.2** Encourage the USACE to continue to develop, maintain, and publish Waterway Network, Ports, Locks, and Inland Electronic Navigation Charts.
- **Action 2.7.3** Develop a mechanism to ensure regular updates to the Waterway Network, Ports, Locks, and Inland Electronic Navigation Charts.

**Objective 2.8.** Continued development and support of the Traffic Analysis Zones NGDA.

**Anticipated Outcomes.** A single Traffic Analysis Zones dataset that is used throughout the DOT and across the federal government and meets the requirements of its stakeholders; reduced duplication of effort; greater stakeholder involvement.

- **Action 2.8.1.** Develop a strong partnership between DOT and the Department of Commerce/Bureau of the Census to ensure that the Census Traffic Analysis Zone geography developed by MPOs and State DOTs are part of the Census Bureau's TIGER files to support the Census Transportation Planning Products.
- **Action 2.8.2.** Engage and assist MPOs and State DOTs in the creation and maintenance of Census Transportation Analysis Zones.

### **Goal 3: Convene Leadership of the Transportation Geospatial Community**

The DOT is in a unique position to provide a leadership and facilitation role in the transportation geospatial community. This role includes providing institutional leadership for the development and coordination of transportation geospatial standards and policies, integrating geospatial technology into information technology (IT) management processes, contributing to the development of a legal and policy framework that supports the objectives of the NSDI, and fostering collaboration across sectors. The DOT and the rest of the Federal geospatial community can play an important role in communicating the value of geospatial information and tools to enable informed analysis and decisionmaking.

**Objective 3.1.** Lead and participate in the development and coordination of national and international standards applicable to the transportation geospatial community.

**Anticipated Outcomes.** Greater adoption and utilization of standards resulting in enhanced interoperability of geospatial data, services, and systems. Decreased barriers to exchanging geospatial content effectively and efficiently by reducing technical impediments to sharing geospatial data and services.

- **Action 3.1.1.** Consult and collaborate with both existing and emerging geospatial communities to advance common standards and approaches.
- **Action 3.1.2.** Lead the development and implementation of standards for the Transportation Theme NGDAs.

**Objective 3.2.** Lead the transportation geospatial community and advocate shared resources.

**Anticipated Outcomes.** Greater awareness of the data and information resources available through the Transportation Theme of the NSDI, increased usage of shared services, reduced duplication of effort.

- **Action 3.2.1.** Produce comprehensive, effective, and useful transportation geospatial data that will demonstrate DOT’s commitment to the NSDI and its stakeholders.
- **Action 3.2.2.** Engage with the stakeholder community, including NSGIC, AASHTO, AAR, and our partner federal agencies, to keep them informed of DOT geospatial activities and to solicit their feedback on the transportation data and services.

### Roles and Responsibilities

<b>Role</b>	<b>Responsibilities</b>
Executive Champion	Provide high-level sponsorship and support for the Transportation Theme and associated NGDA Datasets; facilitate communication among the FGDC, other Executive Theme Champions, and agencies to promote effective and efficient development and management of themes and their associated resources to benefit implementation.
Senior Agency Official for Geospatial Information	Oversee, coordinate, and facilitate the agency’s implementation of the geospatial-related requirements, policies, and activities. While these activities may be undertaken by various components of an agency, OMB will look to the senior agency official for information regarding the agency’s coordination of these activities.
Geospatial Information Officer (GIO)	Provides strategic, programmatic, and technical leadership for geospatial activities across the Department and facilitate DOT’s role in the development and implementation of geospatial platforms. The GIO works collaboratively with component agencies, or modes, as well as other Federal, state, local, and tribal governments in addition to academic institutions and private industry, as required.
Theme Lead	Coordinate and oversee the strategic planning and implementation of the Transportation Theme and associated NGDA Datasets and the development of annual Transportation Theme Report.
NGDA Dataset Manager	Act as primary data steward(s), directly develop(s) national geospatial data assets (i.e. datasets) that fall under an NGDA Theme (in whole or part) in conjunction with other Dataset Managers and Data Stewards; work with Theme Lead to produce annual NGDA Dataset Reports.

## **Challenges and Opportunities**

The DOT faces several challenges in carrying out this strategic plan:

- DOT doesn't currently have the proper IT infrastructure to host the Web Feature Services outlined in Goal 1.
- Many of the Transportation Theme NGDA datasets are not owned/managed by DOT, making it difficult to ensure the effective development of these datasets as called for in Goal 2.
- Several of the Transportation Theme NGDA datasets are built from component datasets from the authoritative sources. For example, the All Roads Dataset is comprised of statewide datasets supplied by each State DOT. It is difficult to control the development of the component datasets. It is also difficult to mandate specific standards for the component datasets.
- Several of the Transportation Theme NGDA datasets are quite dated. The Dataset Managers for these themes do not have adequate funding to bring the datasets up-to-date.

With the challenges, the DOT has opportunities:

- DOT is investigating the use of cloud services to host Web Feature Services.
- DOT will continue to build strong partnerships with the non-DOT NDGA dataset owners/managers.
- DOT will explore opportunities for cost sharing with partner agencies to update older NGDA datasets.
- DOT will leverage the emerging Geospatial for National Information Exchange Model (Geo4NIEM) to ensure a data exchange standard for the NGDA datasets.

## **Implementation of the Transportation Theme Strategic Plan**

Following the adoption of the Transportation Theme Strategic Plan, the Geospatial Information Officer, Theme Lead and Dataset Managers will develop a project plan outlining how the goals and objectives will be achieved. The project plan will include:

- Tasks and milestones
- Timelines
- Responsible parties
- Performance indicators/measures
- Identification of resources available to achieve the objectives

The Executive Champion and Senior Agency Official for Geospatial Information will provide guidance throughout the development and implementation of the project plan.