



Theme Implementation Plan for Transportation Theme

U.S. Department of Transportation

Federal Geographic Data Committee (FGDC)

10/31/2019



Transportation Theme Fiscal Year 2019 Implementation Plan Report



Overview

As part of meeting the requirements under the [Office of Management and Budget’s \(OMB\) Circular A–16 Supplemental Guidance](#) and [OMB Circular A-16 Appendix E – National Geospatial Data Asset \(NGDA\) Data Themes, Definitions, and Lead Agencies](#) for NGDA Portfolio Management and NGDA Theme Management, NGDA Themes Leads for a Theme, in coordination with associated NGDA Dataset Managers, have developed Theme Strategic Plans and corresponding implementation plans for each Theme in the NGDA Portfolio. This report provides information on implementing the goals, objectives, and actions outlined in the Theme’s Strategic Plan (link below). The report includes information on Theme Personnel (Table 1), National Geospatial Data Asset (NGDA) Datasets associated with the Theme (Table 2), and the human and financial resources needed to manage the Theme (Table 3). Table 4 provides a status update on progress made in in the current reporting period toward meeting Theme Strategic Plan goals and objectives. Table 5 provides details on the Theme Implementation Plan.

Theme Strategic Plan

https://communities.geoplatform.gov/ngda-portfolio/wp-content/uploads/2016/2016_Reports/Transportation_Theme_Strategic_Plan_2016_2019.pdf

Theme Personnel

Theme personnel play a vital role in the operation and maintenance of a Theme. They are “individuals who provide interdepartmental leadership and coordination at the NGDA Theme level. They work with component NGDA Dataset Managers to develop standards and provide guidance. The NGDA Theme Lead, or designee, chairs the NGDA Theme’s Thematic Committee and manages the annual process of providing NGDA Dataset collaboration and funding recommendations to the FGDC Steering Committee for those NGDA Datasets within their NGDA Theme. Additionally, the NGDA Theme Lead reports to the Executive NGDA Theme Champion and the FGDC Coordination Group on the NGDA Theme’s activities and investments (both current and planned).” Table 1 provides a summary of current Theme Personnel followed by Table 2 that lists the NGDA Datasets that comprise the Theme.

Theme Personnel	
Theme Lead (Co-Leads):	Derald Dudley
Theme Lead Agency(ies):	United States Department of Transportation (USDOT)
Executive Theme Champion(s):	Daniel Morgan
Executive Champion Agency(ies):	USDOT

Table 1. Personnel Involved in Theme Management.

Transportation Theme NGDA Datasets	NGDA Agency
Airports	USDOT - Federal Aviation Administration (FAA)
Runways	USDOT - FAA
Intermodal (Freight)	USDOT – Bureau of Transportation Statistics (BTS)
Roads	Federal Highway Administration (FHWA) & Department of Commerce (DOC) – Bureau of Census (Census)
Rail Lines	USDOT – Federal Railroad Administration (FRA)
Rail Nodes	USDOT FRA
Inland Electronic Navigational Charts (IENC)	Department of Defense (DOD) – United States Army Corps of Engineers (USACE)
Locks	DOD – USACE
Ports	DOD – USACE
Waterway Lines	DOD – USACE
Waterway Nodes	DOD – USACE
Intermodal (Passenger)	USDOT BTS
Bridges	USDOT FHWA
Transit (Lines)	USDOT BTS
Transit (Stations)	USDOT BTS

Table 2. NGDA Datasets within the Theme.

Human and Financial Resources Needed for Theme Management

The following table provides an estimate of resources needed for managing this Theme. It includes different activities, the roles that support them, as well as an estimated decimal Full Time Equivalent (FTE) and FTE grade. This estimate does not include the resources required for the agency to develop and maintain the NGDA Dataset(s) that make up the Theme to meet the agency’s core mission requirements.

Reporting Period for Human and Financial Resources¹: 10/2018 – 9/2019

Description of Theme Management Activities	Role <i>(Theme Lead, co-Theme Lead, NGDA Coordinator, other as specified)</i>	FTE ²	FTE Grade
NGDA Theme management (e.g., attend meetings, review NGDA documents, develop Theme Strategic Plans, etc.)	Theme Lead	.75	14
Other Theme administration activities	Co-Chair of the Transportation Subcommittee	.10	14

Table 3. Human and Financial Resources Needed for Theme Management.

¹ Reporting period should align with October 1 – September 30 and be submitted by October 31.

² A full-time employee was available a maximum of 1952 hours during the inclusive period of October 1 – September 30; assuming a Monday-Friday schedule with 8-hour workdays and not counting Federal Holidays. The FTE was determined by taking actual number of hours worked in support of Theme Management divided by 1952 hours, rounded to the nearest 0.01.

Progress against Goals and Objectives

The following table shows the progress status made toward achieving the Theme’s Strategic Plan goals and objectives since the last reporting period. Status categories include 'Not Started' for those activities that have not gotten underway in the reporting period; 'In Progress' for those activities underway which will continue into the next year; 'Complete' for the activities finished, or 'Recurring (completed for the current reporting period).

Summary of Goals and Objectives undertaken during 2019	Status
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.	In Progress
Objective 1.2: Leverage the Geospatial Platform.	In Progress
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 NGDA.	In Progress
Objective 2.2: Continued development and support of the Rail NGDA.	In Progress
Objective 2.3: Continued development and support of the Airports and Runways NGDA.	Recurring (completed for 2019)
Objective 2.4: Continued development and support of the Transit NGDA.	In Progress
Objective 2.5: Continued development and support of the Bridge NGDA.	In Progress
Objective 2.6: Continued development and support of the Intermodal Facilities NGDA.	In Progress
Objective 2.7: Continued development and support of the Navigable Waterway, Ports, Locks, and Inland Electronic Navigation Charts NGDA.	Recurring (completed for 2019)
Objective 2.8: Continued development and support of the Traffic Analysis Zones NGDA.	TAZs were retired in 2019
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.	In Progress
Objective 3.2: Lead the transportation geospatial community and advocate shared resources.	In Progress

Table 4. Theme Implementation Plan Progress Status.

Theme Implementation Plan

The following table provides details for achieving Theme Strategic Plan goals and objectives over the multi-year planning period. These include roles and responsibilities, specific actions, milestones, performance indicators and projected completion dates.

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.				
Agency and/or Stakeholders Involved: USDOT				
Anticipated Outcome: More current data available to all through WFS. Cost savings through reduced duplication of effort.				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
1.1.1 Develop, maintain, and publish Web Feature Services (WFS) for the NDGA datasets of the Transportation Theme	Develop WFS – Rolling, as NGDA datasets are updating by dataset managers and available through the National Transportation Atlas Database (NTAD) Optimize WFS – Rolling, as NGDA datasets are updating by dataset managers and available through the National Transportation Atlas Database (NTAD).	Number of NDGA datasets with WFS Number of optimized WFS Number of dataset owners originating WFS	BTS NTAD Manager	Recurring (completed for 2019)
1.1.2 Register the WFS on the Geospatial Platform/Clearinghouse	Register WFS - June 2019. After, as new datasets are updated by dataset managers	Number of registered WFS on Geospatial Platform	BTS NTAD Manager	Recurring (completed for 2019)

1.1.3 Market the WFS to the stakeholder community and encourage feedback and partnerships	Conduct Webinars - ongoing Conduct Listening Sessions - ongoing Attend Industry Events – ongoing Employ Social Media - ongoing	Number and type of outreach events held	BTS - Office of Spatial Analysis and Visualization (OSAV) Director	Recurring (completed for 2019)
Agency and/or Stakeholder	Activity through FY 2019, Q4			
BTS NTAD Manager	<p>1.1.1 Actions Taken in 2019:</p> <ul style="list-style-type: none"> • New and faster web services were created for all NTAD layers to efficiently render data in web mapping applications. This was completed by migrating data to a new data storage mechanism and republishing Web Mapping Services (WMS)/WFS of all NTAD data. For cartographic purposes, vector tile services for 13 of the largest NTAD datasets were created to facilitate drawing large datasets at small scales. Vector tile services provide large amounts of visual data quickly but do not provide feature selection capabilities. • Optimization of the WMS/WFS is ongoing. • BTS will register the optimized NTAD NGDA WFS on the Geospatial Platform/Clearinghouse. • BTS employed social media throughout the year to inform industry and the public about NTAD updates and releases. • BTS is working with Environmental Systems Research Institute (ESRI) to evaluate Geographic Information Systems (GIS) Information Technology (IT) infrastructure and database organization to help improve data retrieval, time outs, and latency. 			
BTS NTAD Manager	<p>1.1.2 Actions Taken in 2019:</p> <p>The WMS/WFS for NTAD are continuously monitored and referenced by data.gov and the geospatial platform. Referencing files will be updated in 2019 Q4 and 2020 Q1.</p>			
OSAV Office Director	<p>1.1.3 Actions Taken in 2019:</p> <p>This year, in support of Objective 1.1, BTS expanded in-person engagement with the stakeholder community. BTS geospatial staff members actively participated in the following meetings and conferences:</p> <ul style="list-style-type: none"> • American Association of Geographers Annual Meeting • Association of American State Highway and Transportation Officials GIS Annual Meeting • ESRI User Conference and Federal User Conference • MapBox Government Summit • National Academies of Science, Engineering and Medicine 			

	<ul style="list-style-type: none"> • National Association of Counties Annual Meeting • National Bus Transportation Association Conference • National Transportation Planning Applications Conference • North American Cartographic Information Society Annual Meeting • Open Street Map’s State of the Map • Rural and Intercity Bus Conference • Transportation Research Board Annual Meeting <p>BTS continued to employ social media throughout the year to inform industry and the public about NTAD updates and releases. In particular, BTS uses @TransportStats on Twitter for announcements of additional dataset releases and geospatial engagement with the stakeholder community.</p>
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Objective 1.2: Leverage the Geospatial Platform. Agency and/or Stakeholders Involved: USDOT Anticipated Outcome: Efficient, effective use of shared technology infrastructure to encourage and support better information sharing. Cost savings through shared geospatial investment planning.				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
1.2.1 Publish the WFS for the Transportation Theme NGDA datasets to the Geospatial Platform	Publish WFS - Ongoing, as NGDA datasets are updated.	Number of published WFS on Geospatial Platform	BTS NTAD Manager	Recurring (completed for 2019)
1.2.2 Develop and maintain the Transportation Community pages on the Geospatial Platform	Update Transportation Subcommittee page after each monthly meeting	Number of page updates	Chair of the Transportation Subcommittee	Recurring (completed for 2019)
1.2.3 Develop and maintain the NGDA Transportation Theme Community on the Geospatial Platform	Update the NGDA Transportation Theme Community page as needed	Review content at least once a year	Chair of the Transportation Subcommittee	Recurring (completed for 2019)
Agency and/or Stakeholder	Activity through FY 2019 Quarter 4			
BTS NTAD Manager	1.2.1 Actions Taken in 2019: BTS continuously works with USDOT Geospatial Information Officer, Deputy Geospatial Information Officer, and ESRI staff to publish geospatial data services for Transportation Theme’s NGDA datasets and to maintain reference files.			

<p>Geospatial Transportation Subcommittee Chair</p>	<p>1.2.2 Actions Taken in 2019:</p> <ul style="list-style-type: none"> • The Transportation Subcommittee Chair (TSC) updates the Geospatial Platform’s Transportation Subcommittee and the working group pages after each meeting. • The TSC maintains the Transportation Subcommittee Website. It explains the subcommittee’s purpose, details its schedule, provides meeting minutes, and features links to its working group’s websites. Each working group site provides the same content as the TSC site.
<p>Geospatial Transportation Subcommittee Chair</p>	<p>1.2.3 Actions Taken in 2019:</p> <p>The Transportation Subcommittee Chair reviews and updates the NGDA Transportation Theme website as content becomes available.</p>

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 NGDA.

Agency and/or Stakeholders Involved: FHWA & Census

Anticipated Outcome: 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/Census Bureau to DOT through the FHWA's All Roads Network Of Linear-referenced Data (ARNOLD) program.

Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
<p>2.1.1 Develop a strong partnership between DOT and the Department of Commerce/Census Bureau to ensure that data collected through FHWA's ARNOLD program can be utilized in the Topologically Integrated Geographic Encoding and Referencing (TIGER) files.</p>	<p>2.1.1.1 USRS working group forums</p> <p>2.1.1.2 Proposed USRS attribute data requirements</p> <p>2.1.1.3 Final USRS attribute data requirements</p>	<p>2.1.1.1 Number of meetings held</p> <p>2.1.1.2 Percent of proposed data requirements that have been reviewed and/or discussed</p> <p>2.1.1.3 Percent of proposed data requirements that have been reviewed, discussed, and received feasibility concurrence (from both the Dept. of Commerce/Census Bureau and DOT)</p>	<p>FGDC Transportation Subcommittee, US Road Specification Working Group</p>	<p>2.1.1.1 In Progress</p> <p>2.1.1.2 Complete</p> <p>2.1.1.3 Complete</p>

<p>2.1.2 Work with stakeholders, particularly Census Bureau, the National States Geographic Information Council (NSGIC), and the Next Generation 911 community, to develop a NGDA of address points</p>	<p>2.1.2.1 Regular meetings between DOT and Census Bureau</p> <p>2.1.2.2 Meetings with NSGIC and National Emergency Number Association (NENA) at the mid-year and annual NSGIC conferences</p>	<p>2.1.2.1 Number of meetings held</p> <p>2.1.2.2 Attendance and presentations at the NSGIC conferences</p>	<p>GIO, FGDC Transportation Subcommittee</p>	<p>2.1.2.1 In Progress</p> <p>2.1.2.2 In Progress</p>
<p>2.1.3 Continue to support the DOC/Census Bureau as manager of the Address Range-Feature Name Relationship File and the Address Ranges Relationship File NGDA</p>	<p>2.1.3.1 Regular meetings between DOT and Census Bureau</p>	<p>2.1.3.1 Number of meetings held</p>	<p>GIO, FGDC Transportation Subcommittee, FHWA HPMS/ARNOLD Program</p>	<p>2.1.3.1 In Progress</p>
<p>Agency and/or Stakeholder</p>		<p>Activity through FY 2019 Quarter 4</p>		
<p>Geospatial Transportation Subcommittee Chair</p>	<p>2.1.1 Actions Taken in 2019:</p> <ul style="list-style-type: none"> • DOT hosted a U.S. Road Specification Workshop in January 2019. • The minimum content, baseline classes and properties for the specification were determined. • DOT presented specification format options to the working group. • DOT is authoring a draft specification by the end of the 2019 calendar year. 			
<p>FHWA</p>	<p>2.1.1 Actions Taken in 2019:</p> <p>Participated in TSC, USRN Workshop, TSC Special Interest Group (at AASHTO GIS-T Symposium), and WZ Data meetings.</p>			
<p>U.S. Census Bureau</p>	<p>2.1.1 Actions Taken in 2019:</p> <ul style="list-style-type: none"> • The Census Bureau continued to update, maintain, and publish the National Geospatial Data Asset (NGDA) Road data set (TIGER Roads). • Census Bureau attended the U.S. Road Specification (USRS) Workshop in March 2019 and participated in a review of proposed attributes for base 			

	<p>specifications and requested the inclusion of street names and route numbers.</p> <ul style="list-style-type: none"> • Census Bureau presented 'The National Geospatial Data Asset for Roads: Topologically Integrated Geographic Encoding and Referencing (TIGER) at the GIS for Transportation (GIS-T) Symposium in April 2019 to highlight its potential as a resource for the USRN. • Census Bureau attended the one Transportation Subcommittee meeting that was held in FY 2019 (June 2019) and all subsequent USRS subgroup meetings.
US Census Bureau	<p>2.1.2. Actions Taken in 2019:</p> <ul style="list-style-type: none"> • Census Bureau worked with DOT to co-lead seven Address Subcommittee meetings in FY 2019: November 2018, December 2018, March 2019, April 2019, May 2019, June 2019, and August 2019. • The Census Bureau lead two Address Subcommittee subgroups that are working on recommendations for state level address data workflows and NAD content. • Census Bureau attended the NSGIC Elections GeoSummit on August 14, 2019 in Washington, DC where pilot study states reported on the status of elections management and state address databases. • Census Bureau representatives attended the NSGIC 2019 annual and mid-year conferences. The Census Bureau presented "Proven Practices in Managing Island-Wide Address Data for Puerto Rico" at the annual conference. • The Census Bureau and DOT met bi-weekly during the year to plan and prioritize NAD activities. • The Census Bureau attend NENA's 9-1-1 Goes to Washington Conference.
GIO, FGDC Transportation Subcommittee, FHWA HPMS/ARNOLD Program	<p>2.1.2.1 DOT and Census Bureau met 22 times during the reporting period to discuss and plan for the continued development of the National Address Database (NAD).</p> <p>Census Bureau and DOT held monthly Address Theme Subcommittee Meetings in 2019. DOT and Census Bureau attended GIS-T Conference in April 2019.</p> <p>2.1.2.2 DOT and Census Bureau briefed the National Geospatial Advisory Committee twice during FY2019.</p>
GIO, FGDC Transportation Subcommittee, FHWA HPMS/ARNOLD Program	<p>2.1.3.1 Held quarterly meetings between Census Bureau and DOT.</p> <p>2.1.3.2 Provided address data from participation states, counties, and Native American sources.</p>

Objective 2.2: Continued development and support of the Rail NGDA. Agency and/or Stakeholders Involved: USDOT FRA Anticipated Outcome: 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.				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
2.2.1: Conflate existing rail networks from FRA and from the DOD to produce a single, authoritative rail network NGDA Dataset managed by FRA	Completed	Published the North American Rail Network (NARN)	Federal Railroad Administration	Complete
2.2.2 Develop a Memo of Understanding (MOU) between FRA and Railinc which is a subsidiary of the American Association of Railroads (AAR). This effort will ensure that FRA always has the most up-to-date rail data from the Class 1s.	<ul style="list-style-type: none"> - Development of the MOU - Approval and signatures from all parties 	MOU will be published on FRA's website	Federal Railroad Administration	Complete

2.2.3 Work with stakeholders, particularly DOD, AAR, and the National Emergency Numbers Association, to ensure that all stakeholder needs are met	<ul style="list-style-type: none"> - Professional presentations on the status of the NARN - Outreach with stakeholders on the current improvements and enhancements - Ongoing 	<ul style="list-style-type: none"> - Professional presentations on the status of the NARN - Attending meetings and professional conferences 	Federal Railroad Administration	In Progress
Agency and/or Stakeholder	Activity through FY 2019 Quarter 4			
Federal Railroad Administration	2.2.1 Objective complete. Federal Railroad Administration published the NARN in the third quarter of 2019.			
Federal Railroad Administration	2.2.2 Objective complete. MOU signed by all parties on 03/26/19.			
Federal Railroad Administration	2.2.3: FRA continuously works with stakeholders to keep the North American Rail Network (NARN) current and relevant. FRA continues to publicize the NARN by presenting enhancements at stakeholder meetings, conferences, and summits.			

Objective 2.3: Continued development and support of the Airports and Runways NGDA.				
Agency and/or Stakeholders Involved: Federal Aviation Administration				
Anticipated Outcome: 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.				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
2.3.1 Examine all of the airport information contained in the National Air Space (NAS) and determine which parts are good	Development /Implementation of the Airports Authoritative Source	Effort is on schedule Availability date is only 9 months out therefore no interim milestones are identified	Program Management Office development for AJV-5 and Airports Office under FAA's NavLean initiative	Complete

candidates to be included in the NGDA				
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	Aeronautical Information Management Modernization Segment 2 & 3 (AIMM S2 & S3) Segment 2 is establishing the Aeronautical Common Service (ACS) with data access through SWIM	Jan 2018: In addition to the Airport Authoritative Source (AAS) the following authoritative sources also become available: <ul style="list-style-type: none"> • Obstacle Authoritative Source (OAS) • Federal NOTAM System • Special Use Airspace (SUA) • Navaid Authoritative Source (NAVAS) 	Program Management Office development for AJV-5 and FAA	In Progress
2.3.3 Establish a web interface for external users outside the Federal Aviation Administration system to obtain needed aeronautical information	External Data Access Initiative (EDAi) has established open data website https://www.faa.gov/got_data/aero_data/	Complete	AJV-5	Complete
Agency and/or Stakeholder	Activity through FY 2019			
DOT FAA	2.3.1 Actions Taken in 2019: <ul style="list-style-type: none"> • Airport Authoritative Source work was transferred to Aeronautical Information Services (AJV-A) this year. • AJV-A will implement single authoritative source work for U.S. airport information. 			

	<ul style="list-style-type: none"> • Development continues to make airport data available by exposing OGC Web Feature Services through the Aeronautical Common Services from electronic National Airspace System Resource (eNASR). • PMO completed development and testing of the Airport Authoritative Source. • At the request of AJV-A, no user acceptance testing was performed, and implementation was delayed indefinitely. The final deployment of the Airport Authoritative Source is to be determined. • Aeronautical Information Management Modernization - Segment 2 (AIMMS2) will be deployed to allow FAA internal and external data stakeholders to access airport and other aeronautical information utilizing the Aeronautical Common Service over SWIM (See Action 2.3.2 for more updates).
DOT FAA	<p>2.3.2 Actions Taken in 2019:</p> <ul style="list-style-type: none"> • AIMMS2 Release 3 (R3) / Aeronautical Common Services (ACS) completed the Vendor Development and Test milestone and has now transitioned to the Operational Test and Evaluation (OT&E) phase. • AIMMS2 R3 will be deployed in the third quarter of 2020 and delivers web services (WS) to include WFS and WMS to query integrated aeronautical information (AI) as part of the Aeronautical Common Service. • The Program Management Office (PMO) will deliver ACS Consumer Testbed (ACT) in the first quarter of 2020 to Consumers in the SWIM Research & Development (R&D) community and to the FAA Telecommunications Infrastructure (FTI) National Testbed (FNTB) environment, providing an early development and testing opportunity to Consumers ahead of the AIMMS2 R3/ACS deployment. • The AIMM E1 (Enhancement 1) program, formally known as AIMMS3, reached its investment analysis readiness decision (IARD) in the first quarter of 2018. The program is currently conducting final investment analysis with a Final Investment Decision (FID) scheduled for Q4 FY2020.

Objective 2.4: Continued development and support of the Transit NGDA. Agency and/or Stakeholders Involved: USDOT/BTS Anticipated Outcome: 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.				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
2.4.1 Develop relationships with individual transit agencies to receive regular, consistent, and reliable updates to the transit data	Outreach to Metropolitan Planning Organizations to bring additional key urban agencies on board with the goal of having complete coverage of all urban transit agencies in large and medium metropolitan areas	Number of urban transit agencies registering data for use with the National Transit Map Number of metropolitan areas with partial or full transit agency participation in the National Transit Map	BTS National Transit Map Manager	Complete
	Develop strategy for including rural transit agencies	Number of rural transit agencies registering data for use with the National Transit Map	BTS National Transit Map Manager	Complete
	Develop a sustainable, stable and efficient process for managing, optimizing and updating National Transit Map database	Frequency, consistency and timeliness of updates Speed of database access for users Time from GTFS scrape until services are ready for release	BTS National Transit Map Manager	In Progress
2.4.2 Assist and inform the stakeholder community,	<ul style="list-style-type: none"> • Conduct webinars • Conduct listening sessions • Attend industry events • Employ social media 	Number and type of outreach events held	BTS National Transit Map Manager	Recurring (completed for 2019)

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	Acquire/create and provide training and tools	Number of training modules available Number of times training accessed or offered	BTS National Transit Map Manager	In Progress
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Agency and/or Stakeholder	Activity through FY 2019 Quarter 4
Passenger Travel Dataset Manager	<p>2.4.1 Actions Taken in 2019:</p> <ul style="list-style-type: none"> • BTS continues to lead collaborative passenger travel initiatives within the U.S. Department of Transportation and among the passenger travel community. • Last year BTS established the Intercity Bus Atlas Initiative. The initiative collects, compiles, publishes, and archives scheduled intercity bus service information. The data reveal local, interregional, and international transportation patterns, and inform the Nation about the location and connectivity of its transportation facilities and services. • BTS continues to mature the National Transit Map Initiative by partnering with industry experts Spatial Front Inc. (SFI) and Trillium Transit Inc. (Trillium). BTS, along with SFI and Trillium are deepening outreach among the passenger travel community; maturing dataset management procedures; identifying, developing, and documenting best practices in spatial analysis techniques; and developing a National Catalog of transit, intercity bus, and intermodal passenger terminals. • BTS is testing the use of artificial intelligence and machine learning to identify, evaluate, and catalog transportation data sources. • BTS worked with partners to attend and present at other forums to discuss the NTM, GTFS collection or passenger travel projects. This includes presentations

	at the Transportation Research Board’s Annual Meeting, the National Intercity Bus Traffic Association, The Rural and Intercity Bus Conference, and the National Rural Transit Assistance Program.
Passenger Travel Dataset Manager	2.4.2 Actions Taken in 2019: On an ongoing basis, FTA headquarters works with FTA regional offices to promote transit agency development of GTFS or other machine-readable data and to promote transit agency participation in the NTM by voluntarily registering data with DOT.

Objective 2.5: Continued development and support of the Bridge NGDA. Agency and/or Stakeholders Involved: FHWA Anticipated Outcome: 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.				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
2.5.1 Assist State DOTs to develop methodologies that ensure that their reported bridge locations are consistent with the FHWA ARNOLD program	<ol style="list-style-type: none"> 1. Create draft new National Bridge Inventory (NBI) Specification (90%) 2. Publish new NBI Specification 3. Build new NBI 4. Transition existing data into new NBI 5. Accept new submittal data into new NBI (Estimated in the Spring 2020) 	Number of full data submittals accepted into new NBI	FHWA Coding Guide Team, FHWA - NBI System Owner	In Progress
2.5.2 Develop, with the assistance of stakeholders, a dataset of rail bridges	<ol style="list-style-type: none"> 1. Develop a list of stakeholders 2. Determine the status of the rail bridges 3. Engage the rail industry on participation 	Collect and publish requirements and identify the stakeholders	FRA	Complete
2.5.3 Develop, as a part of the Bridge NGDA or as a separate NGDA, a	<ol style="list-style-type: none"> 1. Publish National Tunnel Inspection Standard (NYIS) regulation (done) 2. Publish National Tunnel Inventory (NTI) Specification (done) 	Number of full data submittals accepted into NTI	FHWA – Office of Bridges and Structures (HIBS) –NTI System Owner	In Progress

dataset of road tunnels	<ol style="list-style-type: none"> 3. Collect preliminary NTI data (done) 4. Build NTI database / application (95%) 5. Accept first full NTI data submittal (spring 2018) 6. Propose the Addition of Tunnel Data to the NSDI 			
2.5.4 Develop, as a part of the Bridge NGDA or as a separate NGDA, a dataset of rail tunnels	<ol style="list-style-type: none"> 1. Develop a list of stakeholders 2. Determine the status of the rail tunnels 3. Engage the rail industry on participation 	Collect and publish requirements and identify the stakeholders.	FRA	In Progress
Agency and/or Stakeholder	Activity through FY 2019 Quarter 4			
Bridge Dataset Manager	<p>2.5.1 Actions Taken in 2019: Draft Specification will go out for comment with the Notice of Proposed Rule Making (NPRM) for the National Bridge Inspection Standards. Comments will be addressed and then Specification finalized. Aim to complete in 2020, but it depends on NPRM timing. Design and coding of new NBI (NextGen) was begun in 2019 based on the draft Specification.</p> <p>FRA developed a SOW to use multiple data sources to update the Rail bridge database. 2018/Q2</p>			
FRA	2.5.2: Contract is underway of conflating the NARN with water and roads to get accurate location and populating attributes. Completing the Bridge layer is planned for Q4/2020.			
Bridge Dataset Manager	2.5.3: Items 1 – 5 are complete. The addition of the National Tunnel Inventory will be considered in 2019.			
Bridge Dataset Manager	<p>2.5.3 Actions Taken in 2019:</p> <ul style="list-style-type: none"> • Accepted second full submittal of tunnel data in 2019. • Published 2018 data online (FHWA website) 			
FRA	<p>2.5.4: Hold meetings with FRA Safety staff on the current collection of tunnels and develop a base data dictionary.</p> <p>2.5.4.1: Engage the AAR GIS Rail Committee on a data standard. Outreach with other Stakeholder on future developments of the rail tunnels. 2019/Q4</p> <p>2.5.4.2: Engaged with USGS of potential data sources and processes for collecting rail tunnels. 2019/Q1</p>			

Objective 2.6: Continued development and support of the Intermodal Facilities NGDA. Agency and/or Stakeholders Involved: USDOT/BTS Anticipated Outcome: 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.				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
2.6.1 Pursue partnerships with stakeholders to assist in creating and updating the different layers in the database.	Outreach and successfully acquire data from Federal agencies, public sector agencies, industry, and industry associations with intermodal facility data – FY19/FY20	Each quarter release a different Intermodal Facilities layer, with the number of intermodal facilities including relevant attribute information during FY19/FY20	BTS NTAD Manager	Recurring (completed for 2019)
2.6.2 Develop a mechanism to ensure regular updates to the intermodal facilities.	Develop Intermodal Facilities Action Strategy – FY19	Development of Intermodal Facilities Action Strategy	BTS NTAD Manager	Completed
Agency and/or Stakeholder	Activity through FY 2019, Q4			
BTS NTAD Manager	2.6.1 Actions Taken in 2019: <ul style="list-style-type: none"> Determined the updated Intermodal Freight Facility database should be a collection of layers, instead of one layer/database, for all modes and commodities. BTS anticipates there being 7–8 layers in total in this database with a layer produced once a quarter if possible. 			

	<ul style="list-style-type: none"> • BTS worked with Volpe to create the first layer for the updated Intermodal Freight Facility database, which was Trailer On Flat Car (TOFC)/Container On Flat Car (COFC) rail intermodal freight facilities. Volpe was able to use a collection of methods in completing this layer, such as port/terminal information from websites and satellite imagery. • BTS worked internally to create the second layer of the Intermodal Freight Facility database, Air to Truck Intermodal Freight Facilities. Airport facilities for these intermodal connections comprised the top 60 airports by total freight moved in 2017 per BTS statistics. Airport information/maps and satellite imagery were used with methods to pinpoint these locations/freight hangars. • BTS worked with Volpe to create the third layer for the updated Intermodal Freight Facility database, which was roll-on/roll-off (ro-ro) port intermodal freight facilities. Volpe was able to use a collection of methods in completing this layer, such as port/terminal information from websites and satellite imagery.
BTS NTAD Manager	<p>2.6.2 Actions Taken in 2019: With Volpe, and also internally at BTS, for the layers already created for the updated database as part of the Action Strategy, the methods, practices, and sources used were extensively documented. This enables BTS to reference completed work and guide future work and updates. Volpe has also developed, in some parts of the methods, automation data techniques that will facilitate rapid updates when source data is the same. BTS anticipates revisiting and potentially updating each database layer every 2–3 years after initial completion.</p>

<p>Objective 2.7: Continued development and support of the Navigable Waterway, Ports, Locks, and Inland Electronic Navigation Charts NGDA. Agency and/or Stakeholders Involved: USACE Anticipated Outcome: 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.</p>				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
2.7.1 Develop a strong partnership between DOT and the United States Army	Complete Navigable Waterway lines, nodes, locks, and port facility datasets 2.7.1 a) Dec 2016 2.7.1.b) Mar 2017	Correct duplicate nodes, increase navigable waterway length to meet official	Waterborne Commerce Statistics Center	Completed

<p>Corps of Engineers (USACE) to ensure that the Navigable Waterway, Ports, Locks, and Inland Electronic Navigation Charts remain NGDA under the Transportation Theme</p>	<p>2.7.1.c) Jun 2017 2.7.1 d) Sep 2017</p>	<p>navigable waterway length, added new nodes and shape points Updates completed NLT March 31 2017 June 30 2017 Sep 30 2017</p>		
<p>2.7.2 Encourage the USACE to continue to develop, maintain, and publish Waterway Network, Ports, Locks, and Inland Electronic Navigation Charts</p>	<p>2.7.2 update Navigable Waterway lines, nodes, locks, and port facility datasets Publish on NDC Website: 2.7.2 a) Dec 2016 2.7.2.b) Mar 2017 2.7.2.c) Jun 2017 2.7.2 d) Sep 2017</p>	<p>Will continue the corrections for agencies) 2.7.2 a) add/terminate services for Ports Facility dataset, update weekly report on website, publish quarterly dataset (shape file) on website March 2017, June 2017, Sep 2017 2.7.2 b) Gather users (public, routing team, and research groups) request, verify data thru sources, prepare quarterly updates for waterway network, nodes,</p>	<p>Waterborne Commerce Statistics Center</p>	<p>Completed</p>

		and locks. Publish on website March 2018, Jun 2018, Sept 2018.		
2.7.3 Develop a mechanism to ensure regular updates to the Waterway Network, Ports, Locks, and Inland Electronic Navigation Charts	Ongoing	Ongoing editing and updating datasets	Waterborne Commerce Statistics Center	Completed
Agency and/or Stakeholder	Activity through FY 2019 Quarter 4			
United States Army Corps of Engineer	2.7.1 Actions Taken in 2019: <ul style="list-style-type: none"> • USACE continually seeks to enhance the NWN (National Waterway Network) dataset and other databases (Master Links, Ports and Waterways Facility and routing systems). • Reshaped Channels, Harbors, and Bays. New shape points available in the latest NWN for FY 2019. • Ports and Waterway Facility: <ul style="list-style-type: none"> ○ Added 31 records (24 records for Docks, 4 records for Anchorages, 2 records for Open Water, and 1 Marina) • No change with Locks dataset in 2019. 			
United States Army Corps of Engineer	2.7.2 Actions Taken in 2019: <ul style="list-style-type: none"> • Prepare quarterly updates for waterway lines and nodes. • Publish shape files on USACE Digital Library. https://usace.contentdm.oclc.org/digital/collection/p16021coll2/id/1472%20/ • Prepare quarterly updates for Ports and Facility data. • Publish shape files on U.S. Army Corps of Engineers Geospatial Platform website. https://geospatial-usace.opendata.arcgis.com 			
United States Army Corps of Engineer	2.7.3 Actions Taken in 2019: <ul style="list-style-type: none"> • Quarterly updates will continue for next quarter. 			

Objective 2.8: Traffic Analysis Zones NGDA Retired Agency and/or Stakeholders Involved: FHWA/Census Anticipated Outcome: 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.				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
Agency and/or Stakeholder	Activity through FY 2017 Quarter 2			
Census Bureau/ FHWA	Retire the TAZ – the program has been discontinued for 2020			

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. Agency and/or Stakeholders Involved: USDOT/OST Anticipated Outcome: 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.				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
3.1.1 Consult and collaborate with both existing and emerging geospatial communities to advance common standards and approaches	1. Join the Open Geospatial Consortium 2. Make standards development a task of the FGDC Transportation Subcommittee	OGC membership Regular reports from the Transportation Subcommittee	1. OST/OCIO 2. Transportation Subcommittee	Complete
3.1.2 Lead the development and implementation of standards for	1. Publish OGC compliant Web Feature Services 2. Publish NGDA standards	Functional WFS for every NGDA Published standards	1. OST-R/BTS 2. OST/OCIO	Complete

the Transportation Theme NGDA	where applicable			
Agency and/or Stakeholder	Activity through FY 2019 Quarter 4			
FGDC Transportation Subcommittee	Quarterly meetings were held			
OST/BTS	Joined the Open Geospatial Consortium as a Technical Member			
OSAV Office Director	<p>3.1.1 and 3.1.2 Actions Taken in 2019:</p> <ul style="list-style-type: none"> • The Transportation Subcommittee continues to lead a U.S. Road Specification working group and a National Work Zone Specification working group. • The USDOT continues to co-chair the National Address Database Specification. • The Subcommittee Chair is a member of the Federal Trails specification working group. • The USDOT is aware of the Geospatial Data Act (GDA) and its implications on standards development. In 2020, the Department will author a new Theme Strategic Plan that will address the directives defined in the GDA. Specifically, the updated strategic plan will define the mythology and schedule that the Department will follow to ensure its standards development efforts align with all Federal law. 			

<p>Objective 3.2: Lead the transportation geospatial community and advocate shared resources. Agency and/or Stakeholders Involved: USDOT/OST Anticipated Outcome: 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.</p>				
Actions <i>(Describe discrete activities)</i>	Milestones <i>(A significant change in development with associated date)</i>	Performance Indicators <i>(A metric to assess progress of the action)</i>	Action Responsibility <i>(Agency, individuals, and/or groups leading the action)</i>	Projected Completion Date <i>(FY / Quarter)</i>
3.2.1 Produce comprehensive, effective, and useful transportation geospatial data that will demonstrate DOT's commitment to the NSDI and its stakeholders	Annual release of the National Transportation Atlas Databases	Usage/download metrics	OST-R/BTS	Recurring (completed for 2019)

<p>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</p>	<ol style="list-style-type: none"> 1. Participation in the NSGIC midyear and annual meetings 2. Participation in the AASHTO GIS for Transportation Symposium 	<p>Presentations given</p>	<p>OST/OCIO</p>	<p>Recurring (Complete for 2019)</p>
<p>Agency and/or Stakeholder</p>	<p>Activity through FY 2019</p>			
<p>NSGIC</p>	<p>Midyear and annual meetings. Ongoing</p>			
<p>AASHTO</p>	<p>Annual symposium. Ongoing</p>			
<p>Geospatial Transportation Subcommittee Chair</p>	<p>3.1.1 Actions Taken in 2019:</p> <ul style="list-style-type: none"> • The Geospatial Transportation Subcommittee (GTC) enhances the Transportation Theme of the National Spatial Data Infrastructure by facilitating partnerships, coordinating efforts, and heightening awareness among the geospatial-transportation community. The committee promotes best practices and develops transportation standards to improve data quality, accessibility, exchange, and interoperability. Ultimately, the TSC cultivates a greater understanding of the American transportation system by providing accurate and timely information to American decision makers. Each quarterly GTS meeting is dedicated to heightening awareness among the geospatial-transportation community. Meetings are an opportunity for members and partners to highlight their activities, review the progress of GTS working groups, and discuss GTS initiatives. • The Subcommittee also facilitates partnerships, coordinates efforts, and heightens awareness among the geospatial-transportation community by hosting the Federal Land Roads Working Group, the Intercity Bus Working Group, the U.S. Road Specification Working Group, and the Work Zone Data Working Group. • The Subcommittee is also involved in outside working groups, such as the Federal Trails Working Group, the Transportation Research Board, and the American Association of State Highway Transportation Officials. 			

	<ul style="list-style-type: none"> The Subcommittee leads the effort to define a National Road Specification and a National Work Zone Specification. It is also involved in the National Address Database Specification and the Federal Trails specification.
OSAV Office Director	<p>3.2.1 Actions Taken in 2019:</p> <p>This year BTS continued its release of the National Transportation Atlas Database. BTS now uses a dynamic NTAD publication cycle, making updated data available throughout the year as they become available from their respective government agencies. Each quarter BTS release a news digest with the data published over the preceding 12 weeks. To increase awareness of the data and information resources available through the Transportation Theme of the NSDI, BTS produced a thematic map with each news digest, highlighting how one of the updated geospatial datasets can be used in an analysis.</p> <p>A new and updated open data catalog for NTAD has been deployed for public use. The new catalog has been streamlined for easier navigation, allowing for faster and more efficient searches. This year new and faster web services were created for all NTAD layers to help efficiently render data in web mapping applications. Also, vector tile services for 15 of the largest NTAD datasets, including several NGDAs, were created for cartographic purposes to show large datasets at a national and regional scale. These vector tile services render large amounts of data very quickly but do not provide feature selection capabilities.</p>
Chief Geospatial Information Officer	<p>3.2.2 Actions Taken in 2019:</p> <ul style="list-style-type: none"> Moved multiple DOT program operated services into the DOT shared service. Continued to optimize the shared service infrastructure.

Table 5. Theme Implementation Plan.