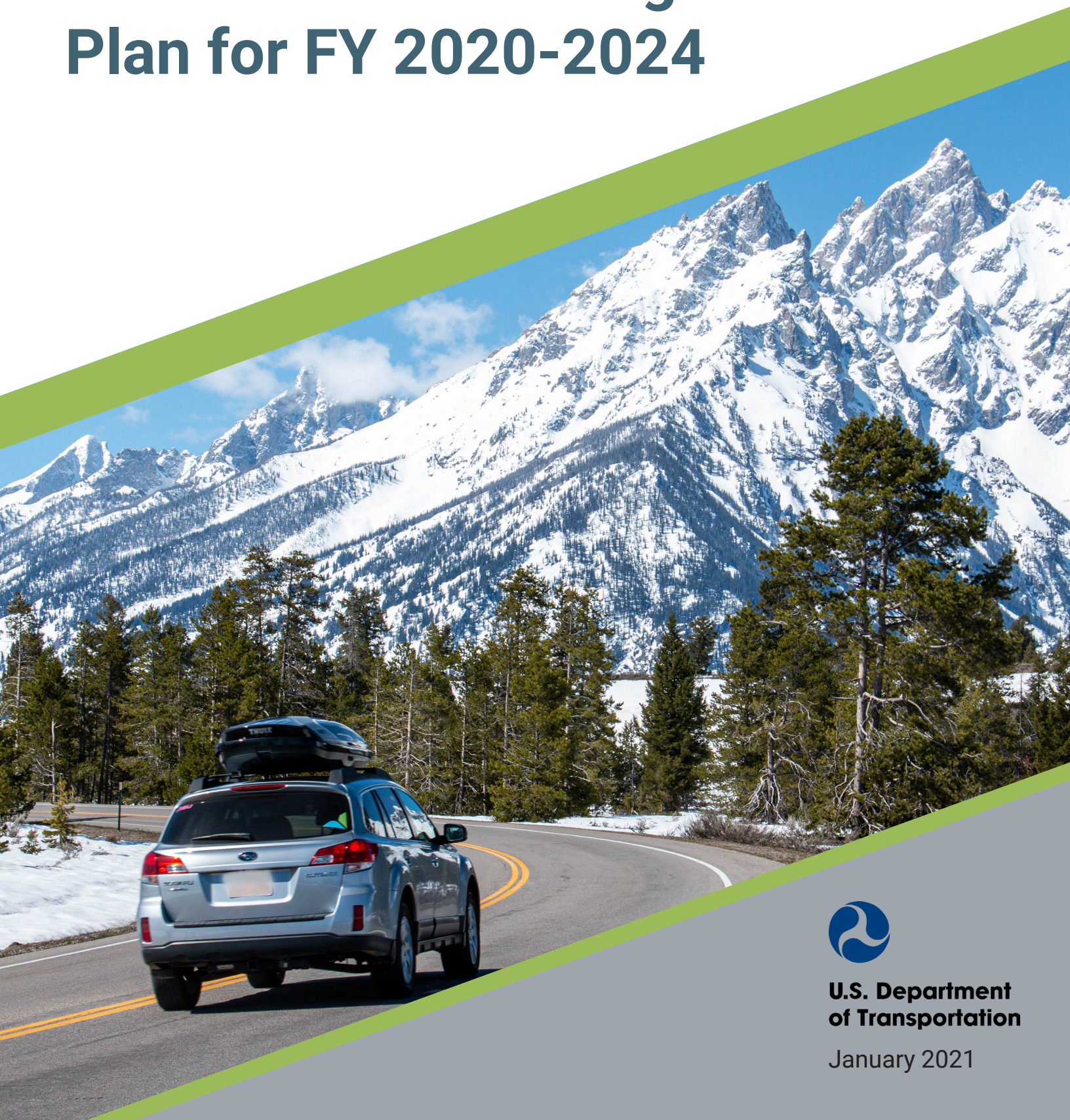
U.S. Department of Transportation

National Travel & Tourism Infrastructure Strategic Plan for FY 2020-2024



U.S. Department of Transportation

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Cover Image: Grand Teton National Park (Source: National Park Service)

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Foreword

The national intermodal transportation network is the backbone of the travel and tourism industry, facilitating the large-scale movement of business and leisure travelers day in and day out. In 2019, the travel industry contributed $2.6 trillion to the economy, supported 15.8 million American jobs, and delivered a $69 billion trade surplus.[1] Travel was the second highest export for the U.S., a top 10 employer in every State, and a critical driver of economic development for communities nationwide.[2]

While this strategic plan was being written, the entire world began to experience the coronavirus disease 2019 (COVID-19) public health emergency. The effects, beginning with the tragic human toll, will take some time to understand. As of December 1, 2020, business and leisure travel has diminished significantly; the decline in travel spending in 2020 is currently estimated at more than $500 billion in cumulative economic loss, [3] which translates into a loss of millions of jobs and thousands of businesses. A December survey found 50 percent of people are not ready to travel at this time, and 55 percent "would feel guilty" for traveling.[4] Although the travel and tourism industry may not recover for several years, views and behaviors have already changed significantly since the beginning of the pandemic. At the lowest point in April, air travel had decreased by 96 percent from 2019 levels. Since that time, however, air travel has increased nearly every week. [5] As the vaccine reaches more of the population and states relax their stay-at-home orders, people will once again be traveling more and beginning to go to restaurants, hotels, and vacation rentals in increasing numbers.

Even though – or perhaps *because* – the next several months and years will bring uncertainty, it is essential to have a clear picture of the investments needed to sustain the national intermodal transportation network, so that it will be able to support and even exceed pre-COVID-19 activity levels, including a revitalized travel and tourism industry.

[1] https://www.ustravel.org/sites/default/files/media_root/document/TravelDepression_FactSheet.pdf.

[2] Ibid.

[3] https://www.ustravel.org/toolkit/covid-19-travel-industry-research.

[4] https://www.destinationanalysts.com/blog-update-on-american-travel-in-the-period-of-coronavirus-week-of-december-14th/.

[5] https://www.ustravel.org/toolkit/covid-19-travel-industry-research.

DOT Mission, Organization, and Strategic Planning Framework

Mission

The mission of the U.S. Department of Transportation (DOT) is to ensure our Nation has the safest, most efficient and modern transportation system in the world, which improves the quality of life for all American people and communities, from rural to urban, and increases the productivity and competitiveness of American workers and businesses.

Organization

Established in 1967 by Congress, DOT consolidated 31 transportation agencies and functions under the first Secretary of Transportation, Alan S. Boyd. During the past half-century, DOT employees have brought innovation and integrity to their work improving the safety and performance of our multimodal transportation system. Today, almost 55,000 DOT employees work across the country in the Office of the Secretary of Transportation (OST), the Office of Inspector General, and nine Operating Administrations (OAs), each with its own management and organizational structure.

DOT's Operating Administrations are:

- 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)
- Saint Lawrence Seaway Development Corporation (SLSDC)

Introduction

Legislative Direction and Purpose

Sources: Fixing America's Surface Transportation (FAST) Act (Public Law No. 114-94)

> *NATIONAL TRAVEL AND TOURISM INFRASTRUCTURE STRATEGIC PLAN.—Not later than 3 years after the date of enactment of this Act, the Secretary, in consultation with the Committee, State departments of transportation, and other appropriate public and private transportation stakeholders, shall develop and post on the public Internet website of the Department a national travel and tourism infrastructure strategic plan that includes—*
>
> *(1) an assessment of the condition and performance of the national transportation network;*
> *(2) an identification of the issues on the national transportation network that create significant congestion problems and barriers to long-haul passenger travel and tourism;*
> *(3) forecasts of long-haul passenger travel and tourism volumes for the 20-year period beginning in the year during which the plan is issued;*
> *(4) an identification of the major transportation facilities and corridors for current and forecasted long-haul travel and tourism volumes, the identification of which shall be revised, as appropriate, in subsequent plans;*
> *(5) an assessment of statutory, regulatory, technological, institutional, financial, and other barriers to improved longhaul passenger travel performance (including opportunities for overcoming the barriers);*
> *(6) best practices for improving the performance of the national transportation network; and*
> *(7) strategies to improve intermodal connectivity for longhaul passenger travel and tourism.*

Senate Report 116-109, Departments of Transportation and Housing and Urban Development, and Related Agencies Appropriations Bill, 2020

> *National Advisory Committee on Travel and Tourism Infrastructure.— Section 1431 of the FAST Act established a National Advisory Committee on Travel and Tourism Infrastructure to advise the Secretary on current and emerging priorities, issues, projects, and funding needs related to the use of the intermodal transportation network of the United States to facilitate travel and tourism. Based 13 on the advice and recommendations of the Committee, the Secretary was required to develop and make publically available a national travel and tourism infrastructure strategic plan by December 4, 2018. That plan has yet to materialize. In fact, the Committee's last meeting that finalized recommendations to the Secretary was March 27, 2019, and it appears significant work remains to complete this Congressional mandate. The Committee recognizes the importance of tourism to the U.S. economy and the critical need for a comprehensive infrastructure plan that reduces traveler mobility gaps and facilitates an efficient multimodal system. As such, the Committee directs the Department to finalize the strategic plan no later than December 4, 2019 in order to better inform Congress on policy solutions for the next surface reauthorization bill.*

> The Joint Explanatory Statement, Further Consolidated Appropriations Act, 2020 (Public Law 116-94)
>
> *Travel and Tourism.—The agreement sustains support for the national advisory committee on travel and tourism infrastructure and directs the Secretary to provide the strategic plan required in the Senate report within 90 days of enactment of this Act.*

The House Committee on Appropriations on Transportation, Housing and Urban Development, and Related Agencies directed the U.S. Department of Transportation to provide the National Travel and Tourism Infrastructure Strategic Plan within 90 days after enactment.

Accordingly, this plan:

1. Assesses the current status and national trends in travel and tourism;
2. Identifies major transportation facilities, barriers, and best practices that impact national travel and tourism; and
3. Creates a DOT strategic vision that makes the American travel and tourism industry more competitive globally.

Background

The travel and tourism industry supports one out of ten American jobs and accounts for 2.9 percent of the annual U.S. Gross Domestic Product (GDP). In total, the industry accounts for over 15 million jobs and contributes $2.6 trillion in economic activity annually across every state and U.S. territory.[6] The national intermodal transportation network is the backbone of the travel and tourism industry, facilitating the large-scale movement of business and leisure travelers.

For the purpose of this report, long distance travel and tourism trips are defined as any overnight leisure or business trip greater than 50 miles using any mode or combination of modes. It should be noted, however, that this report compiles travel and tourism data from an assortment of sources where this long distance travel definition can vary, particularly on the miles traveled and the number of nights required. The report notes where this definition varies.

In 2019, the United States experienced approximately 2.4 billion domestic, long distance trips and 79.2 million international arrivals.[7] Of the domestic trips, an estimated four-in-five were leisure trips. Figure 1 shows the top 30 travel and tourism destinations nationally across all modes of transportation. Orlando, Los Angeles, New York City, Miami-Fort Lauderdale, and Washington, DC top the list, each with more than 30 million travel and tourism trips annually.

[6] U.S. Travel Association and U.S. Department of Commerce estimate.

[7] https://www.ustravel.org/system/files/media_root/document/Research_Fact-Sheet_US-Travel-and-Tourism-Overview.pdf.

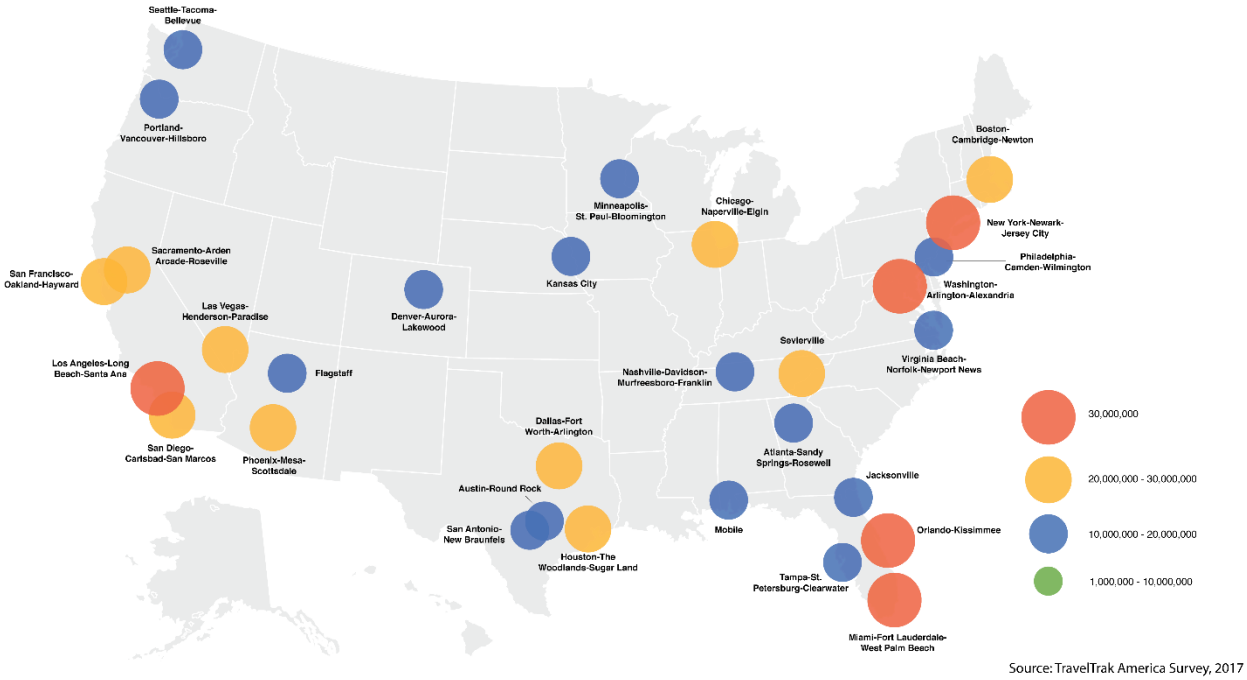

Figure 1: Top 30 U.S. Travel Destinations across all Transportation Modes
Source: U.S. Travel Association[8]

U.S. DOT Strategic Goals

The U.S. DOT's strategic goals, which apply to this plan, are:[9]

- **Safety**: Reduce Transportation-Related Fatalities and Serious Injuries Across the Transportation System.
- **Infrastructure**: Invest in Infrastructure to Ensure Mobility and Accessibility and to Stimulate Economic Growth, Productivity, and Competitiveness for American Workers and Businesses.
- **Innovation**: Lead in the Development and Deployment of Innovative Practices and Technologies that Improve the Safety and Performance of the Nation's Transportation System.
- **Accountability**: Serve the Nation with Reduced Regulatory Burden and Greater Efficiency, Effectiveness, and Accountability.

Stakeholder Input

In developing this Strategic Plan, DOT solicited stakeholder input by coordinating with the NACTTI. The FAST Act designated the NACTTI to provide information, advice, and recommendations to the Secretary on matters relating to the role of intermodal transportation in facilitating mobility related to travel and tourism activities. The NACTTI was comprised of 15 members appointed by the Secretary of Transportation to serve a 2-year term. Committee members changed over time and came from both the private and public sectors, with representation from industry product and service providers,

[8] U.S. Travel Association; TravelTrak America Survey; 2017.
[9] U.S. Department of Transportation; Strategic Plan for FY 2018-2022; 2018; https://www.transportation.gov/dot-strategic-plan.

associations, marketing organizations; the travel and tourism-related workforce; State tourism offices; State departments of transportation; regional and metropolitan planning organizations; local governments; organizations with expertise in intermodal connectivity; and entities having expertise in public-private partnerships. The NACTTI operated in accordance with the provisions of the Federal Advisory Committee Act (FACA). The NACTTI meetings were open to the public with meeting announcements and minutes posted on the Federal Register. The NACTTI members are listed in Appendix A.

I Condition and Performance of the National Transportation Network

Performance measurement provides a snapshot of the condition and performance of the transportation system. In 2017, FHWA and FTA completed rulemakings establishing national transportation performance management (TPM) measures for safety, infrastructure condition, congestion, and system reliability. State DOTs, metropolitan planning organizations (MPOs), and transit providers establish performance targets and periodically report their progress to DOT. This section summarizes the condition and performance of the national transportation network, in accordance with DOT's strategic goals.

Safety

> *Strategic Goal: Reduce Transportation-Related Fatalities and Serious Injuries Across the Transportation System.*

Safety is DOT's core strategic and organizational goal. Every transportation mode requires different methods to improve safety, but common to all is stakeholder collaboration to enhance data collection and analysis, foster behavioral change, and implement lifesaving infrastructure countermeasures.

Since 1990, the total number of roadway fatalities has decreased by 26 percent despite increasing U.S. population and travel across all modes. These long term trends are attributed to a wide range of factors, including improving vehicle technologies, safer infrastructure, increased enforcement, more stringent safety standards, slower traffic speeds, and changing demographics. For example, roadway fatalities have declined substantially over the last three decades due to increased seatbelt use, the introduction of airbags, low-cost safety countermeasures, and other innovations in roadway design. Traffic fatalities in crashes involving pedestrians, bicyclists, and older drivers are a persistent challenge and account for the recent uptick in roadway fatalities (Figure 2).

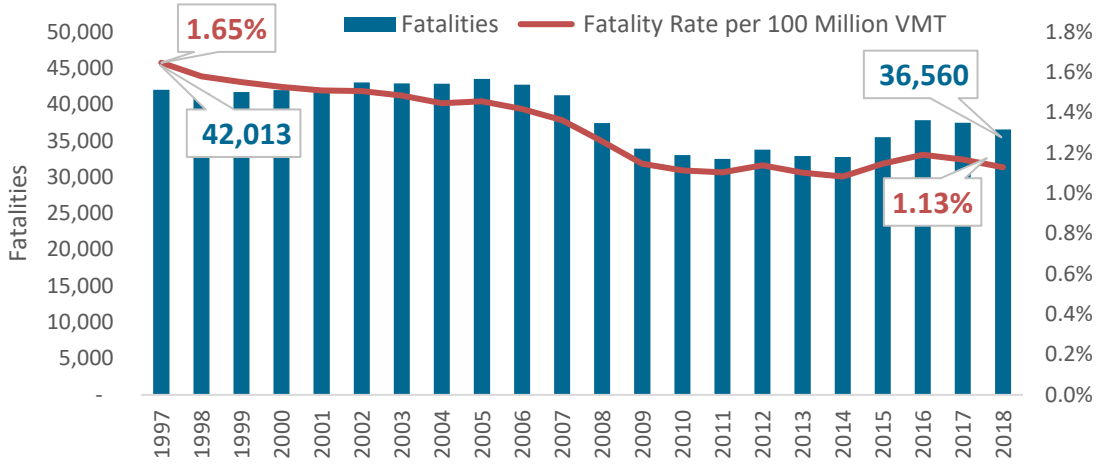

Figure 2: Roadway Fatalities and Fatality Rate (1997-2018)
Source: Bureau of Transportation Statistics[10]

[10] Bureau of Transportation Statistics; Fatalities by Mode https://www.bts.gov/content/transportation-fatalities-mode; Bureau of Transportation Statistics; Roadway Vehicle-Miles Traveled (VMT) and VMT per Lane-Mile by Functional Class https://www.bts.gov/content/roadway-vehicle-miles-traveled-vmt-and-vmt-lane-mile-functional-class.

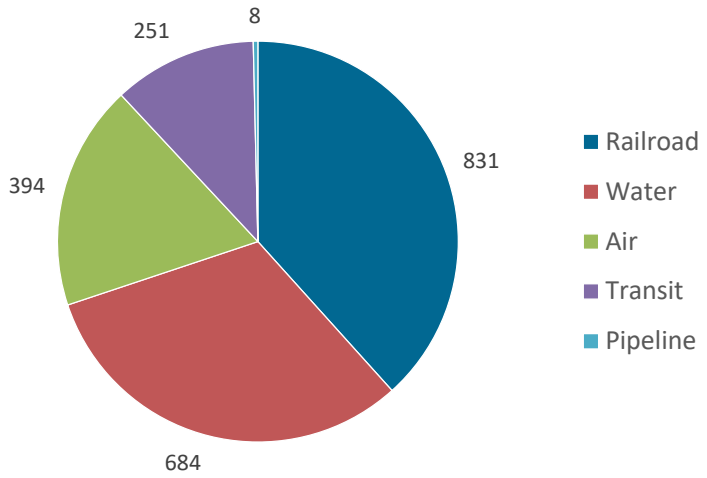

Figure 3: Fatalities in Other Modes of Transportation (2018)
Source: Bureau of Transportation Statistics[11]

Although a large majority of total transportation fatalities are on roadways, 2,168 fatalities, or six percent of the 38,516 total fatalities, were across other modes in 2018 (Figure 3). Fatalities in commercial aviation are exceedingly rare, and fatalities in rail and on waterborne transportation have steadily declined.

There has only been one fatality on a U.S. commercial aircraft since 2013. All but one of the 394 air-traffic fatalities in 2018 are attributed to private, General Aviation aircraft. Ninety-three percent of water-based fatalities are attributed to recreational boating and 64 percent of railroad fatalities were trespass incidents.

The strategy to improve overall safety has been a systematic safety approach using data-driven strategies to identify and prioritize safety risks. Part of this strategy involves working with a wider variety of stakeholders, including State, local, and tribal communities, and integrating traditional data sources with new, external data sources to increase capacity to identify safety risks.

[11] Ibid.

Infrastructure

Strategic Goal: Invest in Infrastructure to Ensure Mobility and Accessibility and to Stimulate Economic Growth, Productivity, and Competitiveness for American Workers and Businesses.

High-performing infrastructure can aid mobility for tourists and travelers throughout the U.S. The condition of highway infrastructure in the U.S. is mixed. In general, highways with heavier traffic volumes are in better condition than highways with lesser traffic volume. In 2014, 1.8 percent of the Interstate Highway System, 8.9 percent of the National Highways System, and 17.1 percent of Federal-aid highways, when weighted by lane miles, had poor pavement ride quality. However, infrastructure condition is declining in many transportation networks throughout the U.S. Poor road conditions can hinder travel on the nation's roadway systems by imposing costs on drivers, like additional wear on vehicle tires and suspension, and delays caused by potholes or other unexpected surface conditions. In 2014, 78 percent of highways were in acceptable condition, down from 87 percent in 2002 (Figure 4)[12]. One area of improvement is the decrease in structurally deficient bridges. In 2016, there were 56,007 structurally deficient bridges, down from 84,031 in 2002.[13]

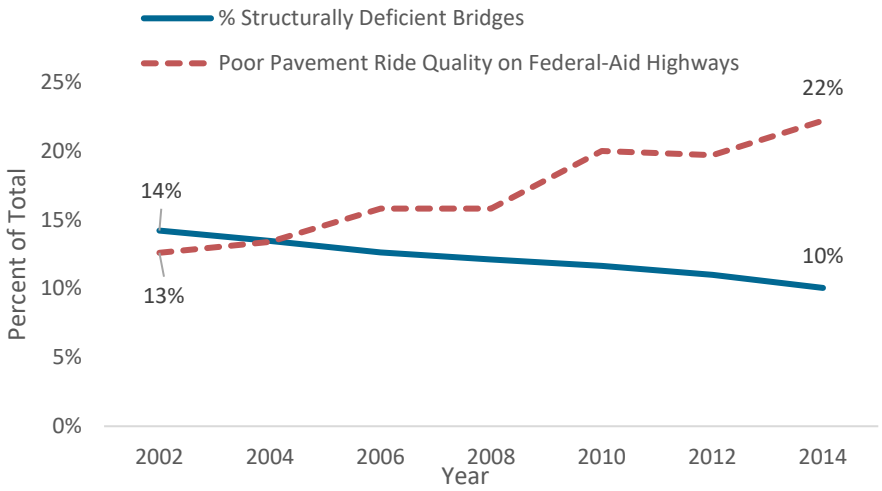

Figure 4: Percent of Structurally Deficient Bridges and Roads with Poor Ride Quality (2002-2014)
Source: Federal Highway Administration[14, 15]

DOT estimated that the cost to address all cost-beneficial existing and new highway and bridge needs in the U.S. arising between 2015 and 2034, and to support existing spending on non-Federal-aid highways, is $786 billion.[16] To address these needs, capital spending would need to be 29 percent higher on average over this time period relative to 2014 levels, and States would need to select only cost-beneficial projects on the Federal-aid highway system. The performance of the existing highway network has been sub-optimal for travel in urban areas of all sizes. Figure 5 shows how travel time has

[12] In 2009, a change in the pavement data collection methodology created a one-time decrease in the number of acceptable pavement quality that partially contributes to this larger trend.

[13] FHWA; Archived Deficient Bridges by Highway System; https://www.fhwa.dot.gov/bridge/deficient.cfm.

[14] FHWA; Conditions and Performance Report; Chapter 3 Systems Conditions: Highways and Bridges.

[15] FHWA; 23rd Edition, *Status of the Nation's Bridge, Highways, and Transit: Conditions and Performance,* "Executive Summary," FHWA, Highlights, Highway Investment Scenarios. https://www.fhwa.dot.gov/policy/23cpr/.

[16] Ibid.

steadily increased in all urban areas, including small urban areas (populations of less than 500,000) and in very large urban areas (populations of more than 3 million). The travel time index shows the ratio of travel time in the peak period to travel time at free-flow conditions. For very large urban areas, a 1.32 travel time index means that a 60-minute trip takes 79 minutes at peak travel times.

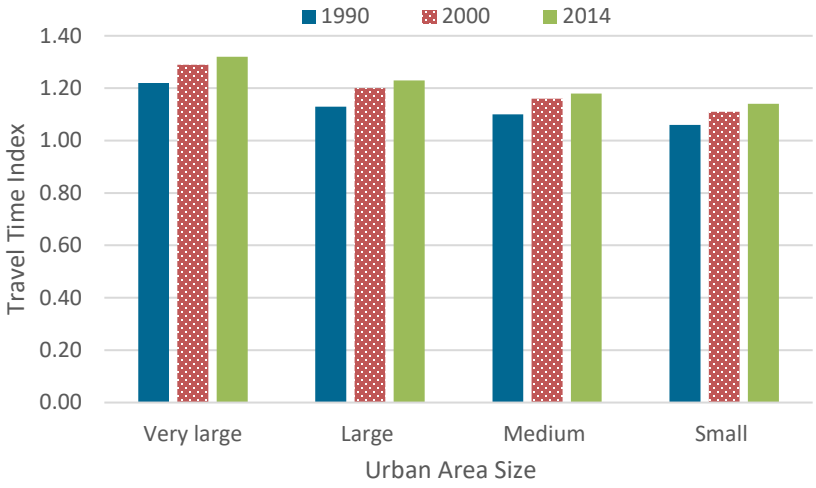

Figure 5: Travel Time Index by Urban Area Size (1990-2014)
Source: Bureau of Transportation Statistics[17]

DOT recognizes that there are multiple challenges and solutions to repairing and preserving the nation's modes of travel. Current strategies for improvement include streamlining permitting and environmental review processes; leveraging funding from state, local, and private sector investment sources; building partnerships to drive Public Private Partnerships (P3s); asset management planning; performance monitoring; and targeted infrastructure investment.

Some recent targeted investments have been facilitating tourism, especially to smaller urban and rural areas. The Airport Improvement Program (AIP) is a $3 billion annual grant program overseen by the FAA. The program funds infrastructure and equipment improvements at approximately 3,330 urban and rural airports. In FY 2017, $2.4 billion, or 74 percent of total AIP funding, was distributed to smaller airports. This funding allows for travel to more remote tourist destinations that travelers may not otherwise visit, which provides economic gains in smaller urban or rural parts of the country.

Facilities, especially those supporting intermodal travel, are another target area for investment. Two examples, further described in the Appendix B case studies, are Penn Station in New York City and the Port of Miami. Both facilities are increasing their infrastructure capacity to support intermodal transfers between rail, car, bus, plane, and cruise travel. Rest stops and welcome centers are a class of single-mode facilities that serve as important break areas for long-distance car and bus travelers. There are over 1,100 rest areas along the U.S. interstate system, with the most being on the cross-country I-80, I-90, and I-70 corridors.[18] Investments at single-mode and intermodal facilities create more connected, more efficient, and safer transportation networks that help travelers arrive at their final destination.

[17] BTS Travel Time Index; National Transportation Statistics Table 1-70; https://www.bts.gov/content/travel-time-index.

[18] Roundabout Publications; Interstate Rest Areas; https://www.interstaterestareas.com/.

Innovation

Strategic Goal: Lead in the Development and Deployment of Innovative Practices and Technologies that Improve the Safety and Performance of the Nation's Transportation System.

Emerging technologies present opportunities to advance the national transportation network by improving safety, efficiency, and accessibility. Long-distance travelers experience these improvements through Mobility on Demand (MoD), Mobility as a Service (MaaS), Intelligent Transport Systems (ITS), and automated driving systems (ADS), among many others. These innovative developments allow a safer and more cohesive experience for travelers as they start their first mile from their residence to the last mile at their final destination. Once mature and suitably effective, technology should be deployed to realize potential safety and efficiency gains. Realizing these benefits requires collaboration with stakeholder groups and government regulators to ensure policies enable technology deployment.

Despite these potential benefits, there are increasingly important challenges with technology, including cybersecurity, consumer protection of data, and cost-effectiveness. Several of DOT's modal agencies have created pilot projects to implement more advanced technology into their programs. Some prominent pilot programs focused on innovative transportation are the FTA's Mobility on Demand Sandbox and OST-Research's ITS programs. Each has allocated funding and support to build innovative methods for transportation systems to increase efficiency, safety, connectivity, and accessibility.

DOT has also focused on increasing the inclusivity of innovative transportation technologies. In October 2019, the Department hosted the Access and Mobility for All Summit to raise awareness of DOT and government-wide efforts to improve access and mobility and identify priority Federal and non-Federal activities and innovations that can provide more efficient, affordable, and accessible vehicles and mobility services such as transit and ridesharing. The Summit focused on individuals with disabilities, older adults, and individuals of low income. At the event, Secretary Chao announced a number of initiatives related to innovation and accessibility, including the Complete Trip – ITS4US Deployment Program, the Inclusive Design Challenge, FTA's FY 2020 Mobility for All Pilot Program, and the interagency Coordinating Council on Access and Mobility (CCAM) strategic plan.

Consumers are also moving towards innovative transportation solutions provided by the private sector. With many new, unique options brought to the market, innovative transportation technologies have allowed travelers to rethink their transportation needs when planning a trip. These innovative options allow greater user choice, which may stimulate more trips and greater economic activity.

Accountability

Strategic Goal: Serve the Nation with Reduced Regulatory Burden and Greater Efficiency, Effectiveness, and Accountability.

A high-performing transportation network requires government efficiency and streamlined administrative processes. Greater accountability is a key driver for this government efficiency. As it relates to transportation networks, accountability has been seen in eliminating or reforming programs that are no longer operating effectively and creating more predictable and less burdensome regulatory requirements.

In 2017, Executive Order 13807, or the President's "One Federal Decision" mandate, called for the establishment of discipline and accountability in the environmental review and permitting process for infrastructure projects.[19] This includes reducing the duration of Environmental Impact Statements (EIS) to no more than an average of approximately 2 years, measured from the date of the publication of a notice of intent. Based on data from FHWA, the median EIS has taken almost four years (Table 1), with slight increases over time.

Table 1: Median Environmental Impact Statement Completion Time (FY 2012-2018)
Source: Federal Highway Administration[20]

Fiscal Year	2012	2013	2014	2015	2016	2017	2018
Median Time (months)	41	42	46	45	44	46	47

[19] Executive Order 13807 (August 15, 2017); Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects; https://www.federalregister.gov/documents/2017/08/24/2017-18134/establishing-discipline-and-accountability-in-the-environmental-review-and-permitting-process-for.

[20] Federal Highway Administration. Environmental Review Toolkit https://www.environment.fhwa.dot.gov/nepa/timeliness_of_nepa.aspx.

2 Issues Creating Congestion and Barriers to Travel and Tourism

Seamless, multimodal travel options are critical to supporting business and leisure travel in the United States. Approximately nine out of ten long-distance (greater than 50 mile) passenger trips involve use of a personal vehicle. Air travel is the second most utilized mode of long distance travel, accounting for approximately 6 percent of trips. The remaining 4 percent are made by intercity buses and motor coaches, rail (Amtrak), cruise ships, and smaller aircraft. The U.S. DOT does not have comprehensive data encompassing all modes of long-distance travel since 1995. This makes it difficult to differentiate congestion and barriers for travel and tourism trips from all trips on the transportation system. This section summarizes overall growth in long-distance travel (domestic trips and foreign arrivals); public investment trends; modal volume, congestion, and performance trends; and infers key issues and trends for this plan.

Growth in Long-Distance Travel

Over the last 10 years, domestic trips accounted for approximately 97 percent of the 2.2 billion annual long-distance trips within and to the United States. Over that period, overall long distance travel grew at an annual estimated rate 2.1 percent (Figure 6). While starting from a much smaller base, the annual growth rate of foreign arrivals is more than double (3.7 percent) that of domestic trips (2.0 percent) (Figure 7).

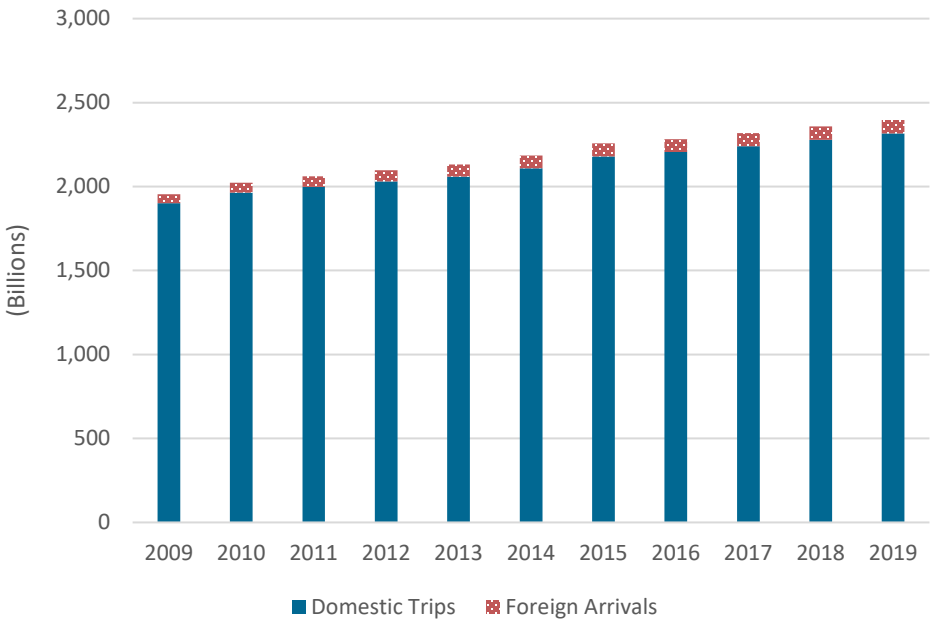

Figure 6: Annual Long-Distance Trips in and to the United States (2009-2019)
Source: U.S. Travel Association and U.S. Department of Commerce[21]

[21] U.S. Travel Association and U.S. Department of Commerce; U.S. Travel and Tourism Overview Factsheet; https://www.ustravel.org/system/files/media_root/document/Research_Fact-Sheet_US-Travel-and-Tourism-Overview.pdf.

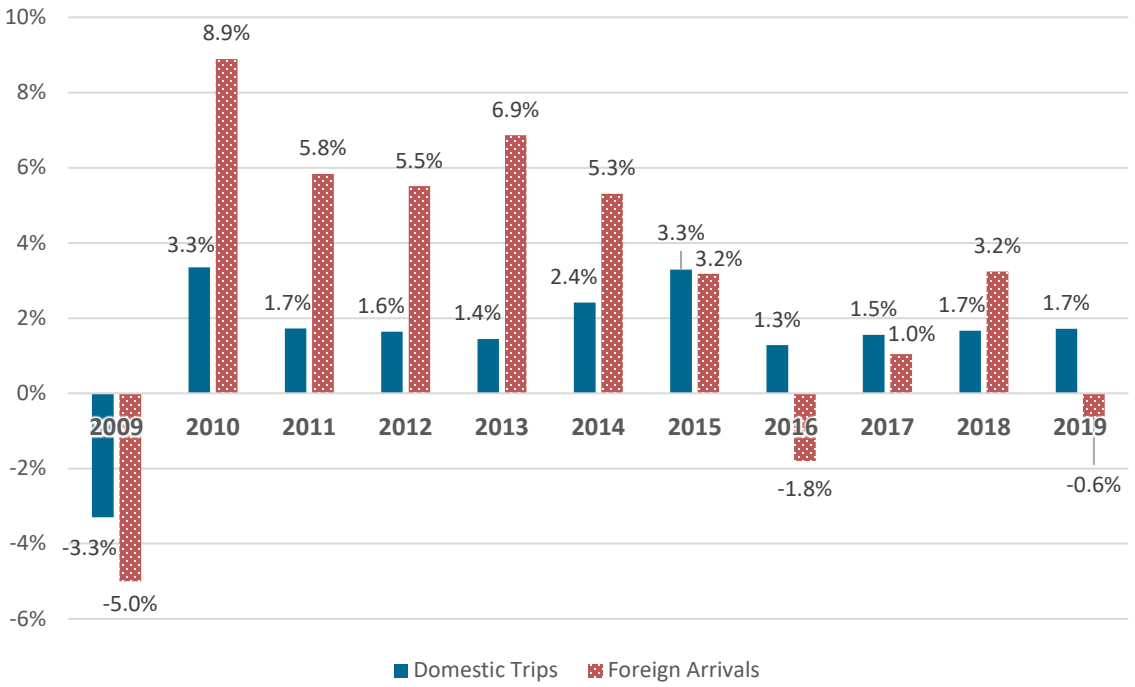

Figure 7: Annual Percent Change in Long-Distance Trips in and to the United States, (2009-2019)
Source: U.S. Travel Association and U.S. Department of Commerce[22]

International travelers typically contribute more to the economy, spending more on their visits and staying for longer compared to domestic travelers. In 2017, international travelers represented 3 percent of overall tourism travel but accounted for 15 percent of total U.S. tourism expenditures.

Foreign visitors enter the United States at ports-of-entry at land borders, airports, and ports. In 2017, 188 million people crossed land border checkpoints, 102.5 million people arrived via commercial airlines, and 5.6 million cruise ship passengers visited U.S. ports.[23, 24, 25]

Approximately half of all foreign arrivals to the United States are residents of either Canada or Mexico. About 85 percent of visitors from Canada or Mexico travel by surface transportation. The United Kingdom, Japan, and China round out the five most common countries of residence for foreign visitors to the U.S. Travelers originating from other overseas countries typically have different transportation needs. They tend to utilize larger airport hubs or stay for longer durations. An important caveat to these trends is that international travel is based on arrivals into a country, rather than the general definition used in this report of traveling 50 miles and staying overnight. Accordingly, Mexico and Canada are likely to include a significant number of day-trips between border towns, which differs from the general traveler and tourist definition used elsewhere in this report.

[22] U.S. Travel Association and U.S. Department of Commerce; U.S. Travel and Tourism Overview Factsheet; https://www.ustravel.org/system/files/media_root/document/Research_Fact-Sheet_US-Travel-and-Tourism-Overview.pdf.
[23] Bureau of Transportation Statistics, Border Crossing/Entry database.
[24] Bureau of Transportation Statistics, T-100 International Market (All Carriers).
[25] https://cruising.org/-/media/CLIA/Research/Global%202018%20EIS.

The number of visitors from China has grown a remarkable 367 percent since 2009, when approximately 650,000 visited, increasing to nearly 3 million in 2019, moving up the list from 11th to 5th place in 10 years. The U.S. also saw significant growth in tourism from South Korea, Brazil, India, Argentina, and Colombia over that period.

Insufficient Infrastructure Investment

As our population, tourism, and travel grows, so too does the strain on our existing highway and bridge infrastructure. According to the U.S. DOT's Office of Inspector General's Fiscal Year 2021 Top Management Challenges, billions of dollars are needed to tackle pressing infrastructure needs.[26] The transit state of good repair backlog was $98 billion in 2014, and was estimated to reach $116 billion in 2034 if 2014 spending levels are sustained. As of 2014, the backlog of cost-beneficial highway and bridge projects was estimated to be $786.4 billion. Nearly $2 trillion was projected for additional projected pavement, bridge, and capacity needs that might arise over the next 20 years (2015-2035).[27] DOT estimated that, in order to implement all cost-beneficial highway projects between 2014 and 2034, average annual capital spending would need to be $135.7 billion, 28.8 percent higher than actual 2014 capital spending. In general, significant investment is needed to keep up with a mounting infrastructure maintenance backlog and ensure that the transportation system is able to meet the growing demands of the traveling public.

Modal Volume and Performance Trends

This section summarized available volume, congestion, and performance trends for surface transportation, air travel, passenger rail, ports, and intermodal connections.

Surface Transportation

In the U.S., most tourist travel occurs in personal vehicles. Intercity bus and motor coach are also significant modes of travel. In 2015, there were more than 600 million passenger trips taken by a motor coach, nearly as many as U.S. airlines and twenty times as many as Amtrak. While there is greater usage of public roads today than there was thirty years ago, road capacity has increased by about eight percent while VMT has increased by about 50 percent (Figure 8). This lack of capacity can lead to severe congestion at various times of the year, week, and day, especially in urban areas. In the 52 largest metropolitan areas, the 2018 average duration of daily congestion was 4 hours and 16 minutes, which is a minute less than it was in 2017.[28,29]

[26] DOT OIG; Top Management Challenges; https://www.oig.dot.gov/library-item/38076.

[27] FHWA; Status of the Nation's Highways, Bridges, and Transit; https://www.fhwa.dot.gov/policy/23cpr/index.cfm

[28] FHWA Office of Operations; 2018 Urban Congestion Trends Improving Operations, Improving Performance; https://ops.fhwa.dot.gov/publications/fhwahop19026/index.htm.

[29] The source above defines hours of congestion as the amount of time when freeways operate less than 90 percent of free-flow freeway speeds.

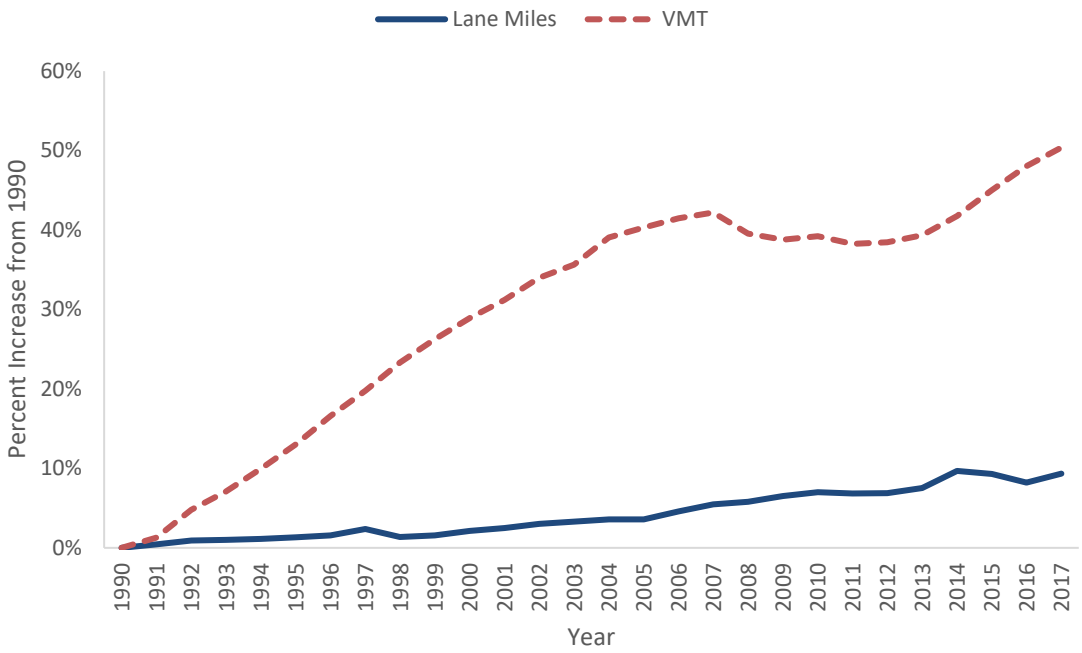

Figure 8: Yearly Vehicle Miles Traveled and Road Miles (1990-2017)
Source: Bureau of Transportation Statistics [30]

[30] FHWA Office of Highway Information; Public Road Mileage, Lane-Miles, and VMT 1900 – 2017; https://www.fhwa.dot.gov/policyinformation/statistics/2017/vmt421c.cfm.

Air Travel

Air travel and enplanements (passenger boardings) at U.S. commercial airports increased to an all-time high in 2018. In 2018, U.S. airports experienced nearly 900 million enplanements, an increase of 37 percent since 1998.[31] A small number of airports see an increasingly disproportionate share of enplanements. Of the top 28 airports in 1998, ten increased their 2018 enplanements by more than 50 percent (Table 2).

Table 2: Major Airport Hub Enplanements
Source: Bureau of Transportation Statistics[32]

Airport	1998 Enplanements	2018 Enplanements	% Change (1998-2018)
Atlanta, GA (ATL)	35,254,849	51,357,979	46%
Chicago, IL (ORD)	34,275,979	39,775,365	16%
Los Angeles, CA (LAX)	29,124,323	42,388,204	46%
Dallas/Fort Worth, TX (DFW)	28,423,672	32,890,345	16%
San Francisco, CA (SFO)	19,205,448	27,894,688	45%
Denver, CO (DEN)	17,325,676	30,849,865	78%
Miami, FL (MIA)	16,316,123	20,732,677	27%
Newark, NJ (EWR)	16,112,546	22,563,741	40%
Detroit, MI (DTW)	15,456,583	17,345,916	12%
Phoenix, AZ (PHX)	15,412,536	21,487,562	39%
New York, NY (JFK)	15,379,686	29,890,416	94%
St. Louis, MO (STL)	14,398,291	7,520,199	-48%
Las Vegas, NV (LAS)	14,393,296	23,633,265	64%
Minneapolis/St. Paul, MN (MSP)	14,255,027	18,414,438	29%
Houston, TX (IAH)	14,126,938	20,694,370	46%
Orlando, FL (MCO)	13,128,323	22,407,345	71%
Boston, MA (BOS)	12,661,728	19,648,942	55%
Seattle, WA (SEA)	12,467,503	23,700,448	90%
Philadelphia, PA (PHL)	11,470,165	15,124,617	32%
Charlotte, NC (CLT)	11,377,491	22,315,937	96%
New York, NY (LGA)	11,116,169	15,050,400	35%
Honolulu, HI (HNL)	10,770,795	9,565,264	-11%
Cincinnati, OH (CVG)	10,352,131	4,189,368	-60%
Pittsburgh, PA (PIT)	10,174,826	4,597,987	-55%
Salt Lake City, UT (SLC)	9,808,236	12,067,556	23%
Washington, D.C. (DCA)	7,574,624	11,457,536	51%
San Diego, CA (SAN)	7,317,952	12,001,009	64%
Baltimore, MD (BWI)	7,269,682	13,343,240	84%

[31] Bureau of Transportation Statistics: Transtats; https://www.transtats.bts.gov/Data_Elements.aspx?Data=1.
[32] FAA; FAA Terminal Area Forecast (TAF); https://taf.faa.gov/.

Figure 9: Major Airports Change in On-Time Arrival (2003-2018) shows on-time performance at major U.S. commercial airports in 2003 and 2018. Of the 28 airports displayed, only four airports—Hartsfield-Jackson Atlanta, Chicago O'Hare, Miami, and Minneapolis-St Paul—increased their overall percent of on-time arrivals, compared with 2003.

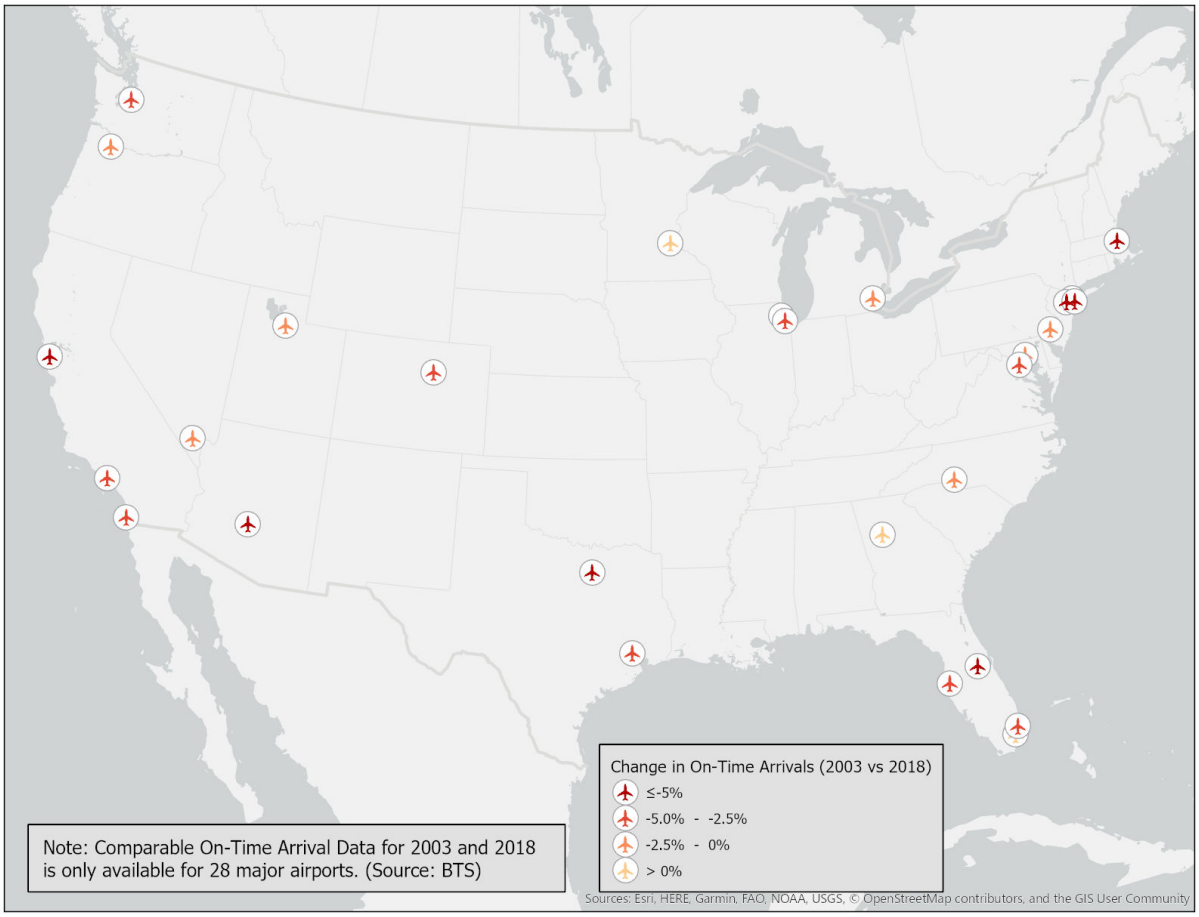

Figure 9: Major Airports Change in On-Time Arrival (2003-2018)
Source: Bureau of Transportation Statistics[33]

[33] Bureau of Transportation Statistics: Table 4 Annual On-Time Arrival Rankings for Major Airports; https://www.bts.gov/node/224131.

Passenger Rail

Amtrak serves more than 500 destinations in 46 states, the District of Columbia, and three Canadian provinces. Amtrak operates 45 routes across more than 21,000 miles of tracks, approximately 70 percent of which are owned by host freight railroads. Amtrak experienced a 56 percent increase in riders between 2000 and 2019 (Figure 10). From FY15 to FY18, ridership on the Northeast Corridor and State Supported lines increased the most, at four percent and three percent increases over the four years. Ridership on long distance lines only increased by one percent during this time.

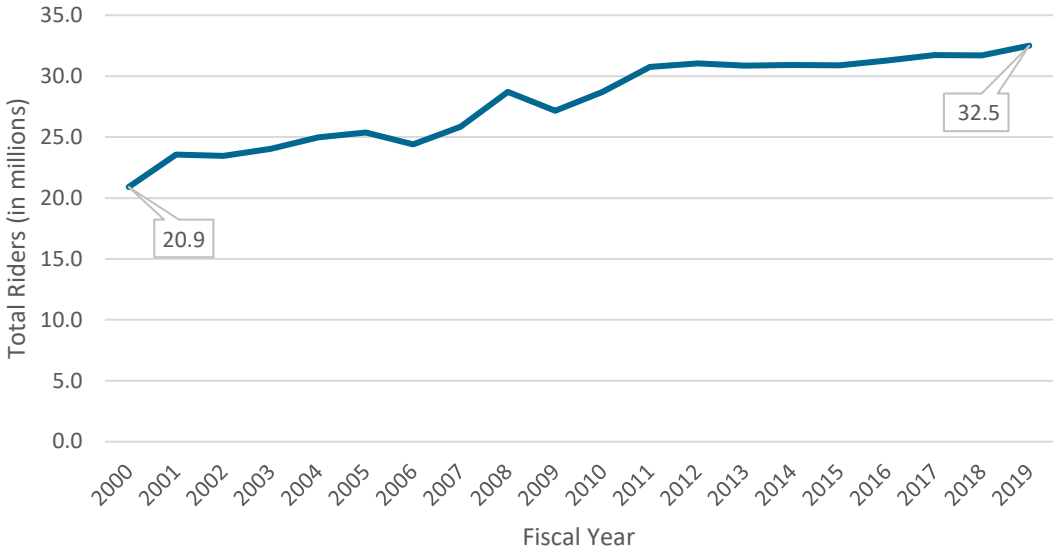

Figure 10: Amtrak Ridership (FY2000-2019)
Source: Bureau of Transportation Statistics, Amtrak[34, 35]

[34] Bureau of Transportation Statistics: Amtrak Ridership: FY2000–FY2015; https://www.bts.gov/archive/publications/passenger_travel_2016/tables/fig2_20.

[35] Amtrak FY16, FY18 media fact sheets; https://media.amtrak.com/wp-content/uploads/2015/10/Amtrak-FY16-Ridership-and-Revenue-Fact-Sheet-4_17_17-mm-edits.pdf; https://media.amtrak.com/wp-content/uploads/2018/11/FY18-Ridership-Fact-Sheet-1.pdf.

Figure 11 displays the overall rail network and the FY2018 ridership (which includes boardings and alightings) for each Amtrak station. Amtrak ridership is especially strong in megaregions, including the Northeast Corridor (between the District of Columbia, New York, and Boston), the Chicago Hub area, and the West Coast.

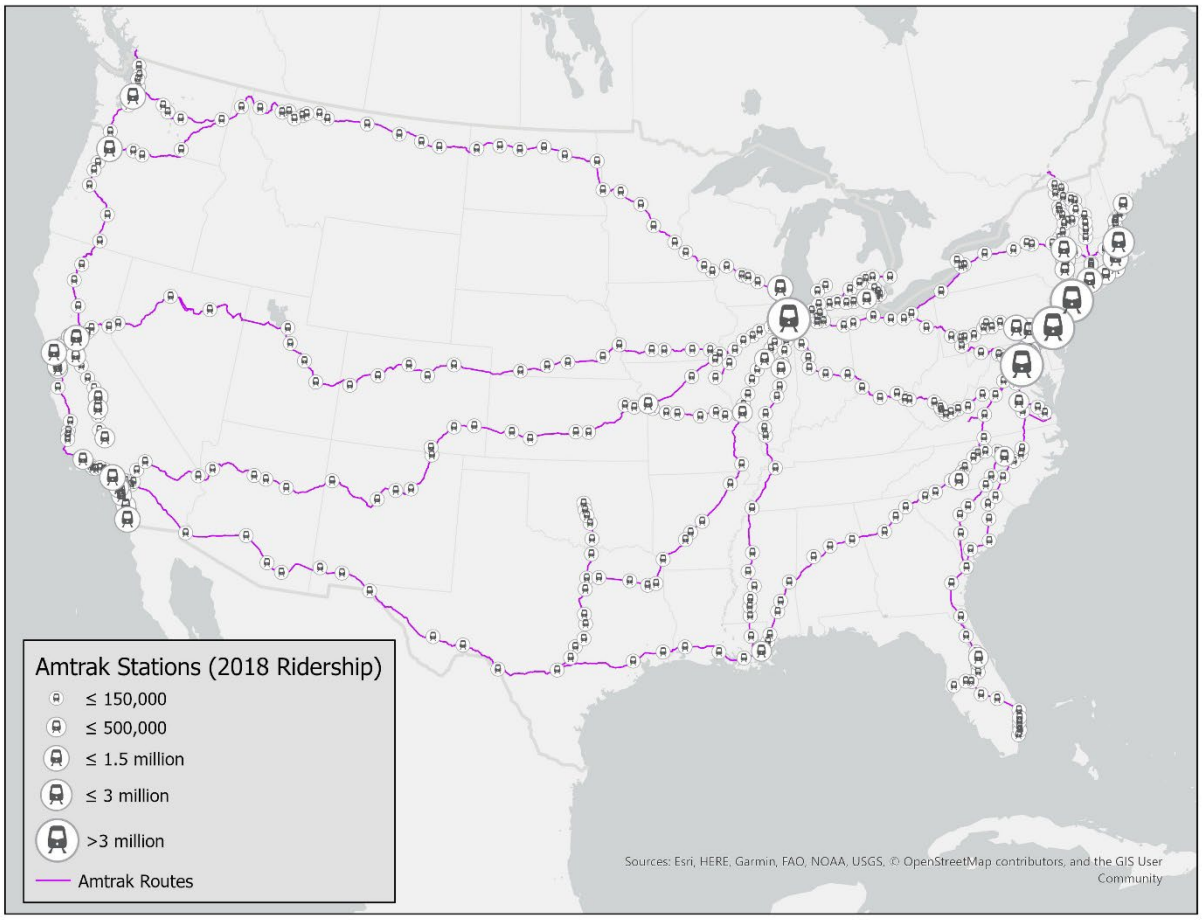

Figure 11: Amtrak Yearly Ridership by Station (2018)
Source: Rail Passengers Association[36]

Table 3: Amtrak Ridership (FY 2018 and FY 2019)displays the FY2018 and FY2019 ridership along all routes. Year over year, Amtrak increased overall ridership by 2.5 percent. The Northeast Corridor, including Amtrak's high-speed rail Acela Express, accounts for nearly 40 percent of all Amtrak ridership. Other routes, like Pennsylvania's Keystone route, New York's Empire South route, and California's Pacific Surfliner, Capitol Corridor, and San Joaquins routes all have over one million riders as well. Increasing highway and airport congestion make Amtrak an attractive travel alternative, particularly for trips between 100 and 500 miles.

[36] Rail Passengers Association; Ridership Statistics https://www.railpassengers.org/all-aboard/tools-info/ridership-statistics/.

Table 3: Amtrak Ridership (FY 2018 and FY 2019)

Source: Amtrak[37]

			Ridership		
NEC Spine			***FY19***	***FY18***	***% change vs. FY18***
Acela			3,577,455	3,428,338	+4.3
Northeast Regional			8,940,745	8,686,930	+2.9
NEC Special Trains			7,402	8,375	-11.6
Subtotal			**12,525,602**	**12,123,643**	**+3.3**
State Supported		***by state(s)***	***FY19***	***FY18***	***% change vs. FY18***
Northeast Routes					
	Downeaster	ME	557,248	540,038	+3.2
	Empire South	NY	1,214,206	1,150,498	+5.5
	Empire West/Maple Leaf	NY	390,355	366,696	+6.5
	Adirondack	NY	117,490	111,740	+5.1
	Ethan Allen	NY/VT	50,515	49,669	+1.7
	Vermonter	VT/MA/CT	99,280	97,909	+1.4
	New Haven-Springfield	MA/CT	362,442	286,477	+26.5
	Keystone	PA	1,575,959	1,519,936	+3.7
	Pennsylvanian	PA	215,081	214,827	+0.1
Southern Routes					
	Washington-Lynchburg/Roanoke	VA	220,850	206,252	+7.1
	Washington-Newport News	VA	335,227	322,265	+4.0
	Washington-Norfolk	VA	239,929	152,611	+57.2
	Washington-Richmond	VA	128,651	158,318	-18.7
	Carolinian	NC	244,779	256,886	-4.7
	Piedmont	NC	214,218	167,203	+28.1
	Heartland Flyer	OK/TX	68,744	68,075	+1.0
Midwest Routes					
	Hoosier State	IN	20,853	27,876	-25.2
	Wolverine	MI	501,124	483,670	+3.6
	Blue Water	MI	181,832	185,020	-1.7
	Pere Marquette	MI	97,593	95,540	+2.1
	Hiawatha	WI/IL	882,189	844,396	+4.5
	Lincoln Service	IL	627,599	586,166	+7.1
	Illini/Saluki	IL	266,972	245,876	+8.6
	Illinois Zephyr/Carl Sandburg	IL	192,616	191,612	+0.5
	Missouri River Runner	MO	154,417	169,471	-8.9
Western Routes					
	Pacific Surfliner	CA	2,776,654	2,946,239	-5.8
	Capitol Corridor	CA	1,777,136	1,706,849	+4.1
	San Joaquins	CA	1,071,190	1,078,707	-0.7
	Cascades	WA/OR	828,247	806,121	+2.7
Buses & Special Trains					
	Unallocated Buses*		-	-	-
	Non-NEC Special Trains		25,408	42,192	-39.8
	Subtotal		**15,438,804**	**15,079,135**	**+2.4**
Long Distance			***FY19***	***FY18***	***% change vs. FY18***
Southeast Routes					
	Silver Star		389,995	368,518	+5.8
	Silver Meteor		353,466	337,023	+4.9
	Palmetto		345,342	387,919	-11.0
	Auto Train		236,041	224,837	+5.0
	City of New Orleans		235,670	237,781	-0.9
	Crescent		295,180	274,807	+7.4
Central Routes					
	Cardinal		108,935	96,710	+12.6
	Capitol Limited		209,578	219,033	-4.3
	Lake Shore Limited		357,682	337,882	+5.9
	Empire Builder		433,372	428,854	+1.1
	California Zephyr		410,844	418,203	-1.8
Southwest Routes					
	Southwest Chief		338,180	331,239	+2.1
	Coast Starlight		426,029	417,819	+2.0
	Texas Eagle		321,694	335,771	-4.2
	Sunset Limited		92,827	97,078	-4.4
	Subtotal		**4,554,835**	**4,513,474**	**+0.9**
	Amtrak Total		**32,519,241**	**31,716,252**	**+2.5**

*Ticket revenues on bus routes 70, 71, 72 and 73 are allocated to train routes 05, 39, 35, and 37 respectively. Ticket revenues on all other bus routes (74 to 85) are combined. Bus ridership is not shown in this report.

Note: Ridership to some locations south and west of Chicago is shared by state-supported and long distance trains, as shown above. Combined Amtrak ridership for all trains on these corridors is as follows for FY19: Chicago-St. Louis, 756,062 Chicago-Carbondale, 331,150; and Chicago-Quincy, 226,772.

[37] Amtrak; Amtrak FY19 Ridership; http://media.amtrak.com/wp-content/uploads/2019/11/FY19-Year-End-Ridership.pdf.

In FY 2019, 75.1 percent of Amtrak trips were on time for passengers (Figure 12). Of the remaining 25 percent of trips that are delayed, many are due to freight railroads having ownership, and therefore the dispatching control, on many of the rail lines. The hours of delay experienced by passengers has fluctuated over the past two decades, averaging around 65,000 hours annually. DOT recently published a final rule setting forth metrics and a minimum standard to measure the performance and service quality of Amtrak intercity passenger train operations, including metrics relating to on-time performance and train delays, customer service, financial, and public benefits.

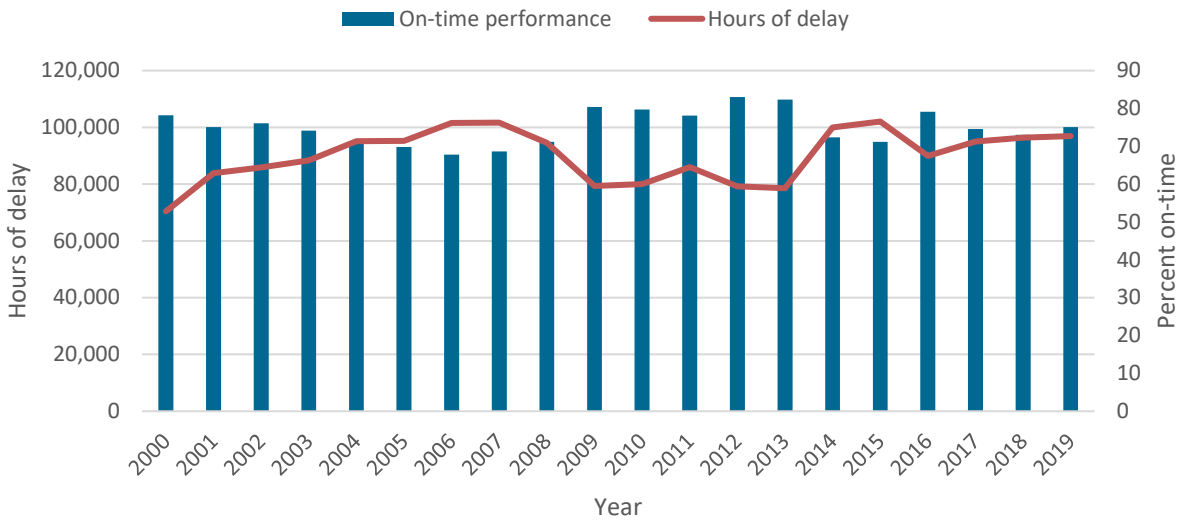

Figure 12: Amtrak On-Time Performance and Delays (FY2000-2019)
Source: Bureau of Transportation Statistics[38]

Ports

Thirty-four cities in the U.S. operated ports and tracked their cruise ship passengers between 2013 and 2017, according to compiled data from the American Association of Port Authorities. In 2017, there were 29.2 million embarkations, disembarkations, or transit passengers using cruise ships in these U.S. ports. Figure 13: U.S. Cruise Industry Yearly Revenue Passengers (2013-2017) shows these by year, from 2013 to 2017. The number of cruise ship passengers increased each year and by about 15 percent in total over that time span.

[38] Bureau of Transportation Statistics; Table 1-73: Amtrak On-Time Performance Trends and Hours of Delay by Cause; https://www.bts.gov/content/amtrak-time-performance-trends-and-hours-delay-cause.

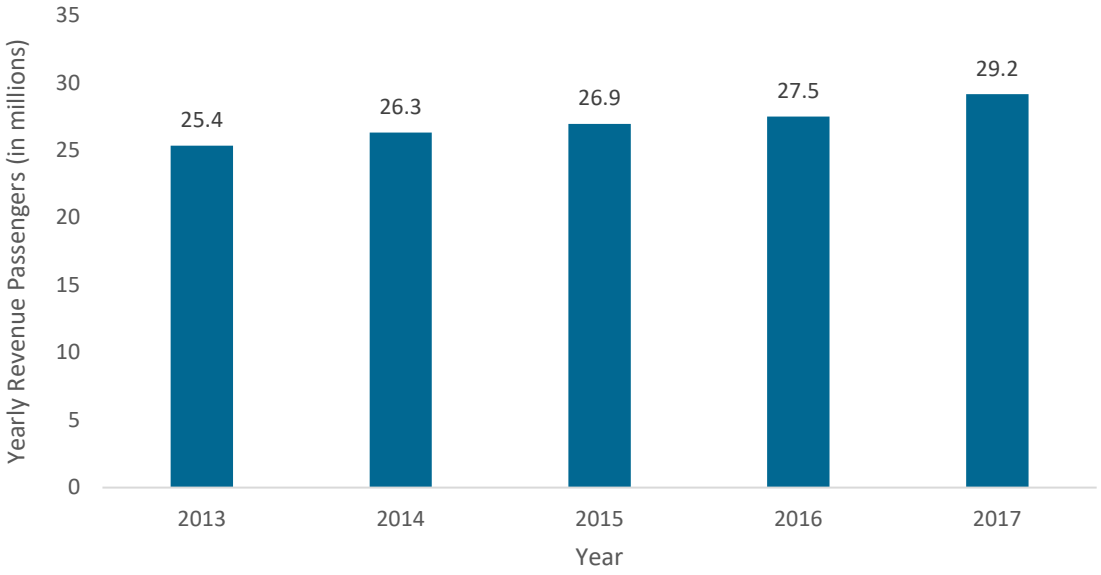

Figure 13: U.S. Cruise Industry Yearly Revenue Passengers (2013-2017)
Source: American Association of Port Authorities[39, 40]

Intermodal Connections

For many long-distance travelers, lack of intermodal and last-mile connections can make it a challenge to reach their final destination using desired modes. A seamless experience from front door to final destination requires the availability and integration of various modes, though this can be inconsistent. As shown in Figure 14: Availability of Intermodal Connectivity by Facility Type there are more intercity bus stops (2,637) than air (666) and intercity rail facilities (529), yet passengers traveling via intercity bus have far fewer intermodal connections than those using other modes. These mobility gaps extend to all modes, as the percentage of intercity bus stops connecting to another transportation mode (12.6 percent) is also low for both airports (23.7 percent) and intercity rail facilities (54.1 percent).

Section 4 of this report describes a multimodal network to help identify mobility gaps across users, modes, and geographic boundaries. This network will include a comprehensive analysis of key national facilities and corridors to identify where gaps in intermodal connectivity exist and facilitate critical long-haul travel to and within the United States.

Collecting multimodal data for the network will be a challenge because of the vast set of possible connections in an intermodal network. Presently, there is limited operational and usage data available for current intermodal connections, presenting an additional barrier to addressing mobility and last-mile gaps. In New York City, the AirTrain is one example of an intermodal connection that collects usage data.

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[39] American Association of Port Authorities; NAFTA/Region Port Cruise Traffic; 2013-2015; http://aapa.files.cms-plus.com/Statistics/CRUISE%20TRAFFIC%20NORTH%20AMERICA%202013-2015.pdf; 2015-2017; http://aapa.files.cms-plus.com/Statistics/CRUISE%20TRAFFIC%20NORTH%20AMERICA%202015-2017%20REVISED.pdf.

[40] Note that the AAPA data includes transit passengers, which the CLIA data presented later in this report does not. According to CLIA, there were 2.7 more transit passengers than embarkations in North America in 2018.

The AirTrain connects the JFK International Airport with local rail and bus transport options. In 2019, 8.7 million paid passengers used the AirTrain to travel to or from JFK airport, up from 3.95 million in 2006.[41]

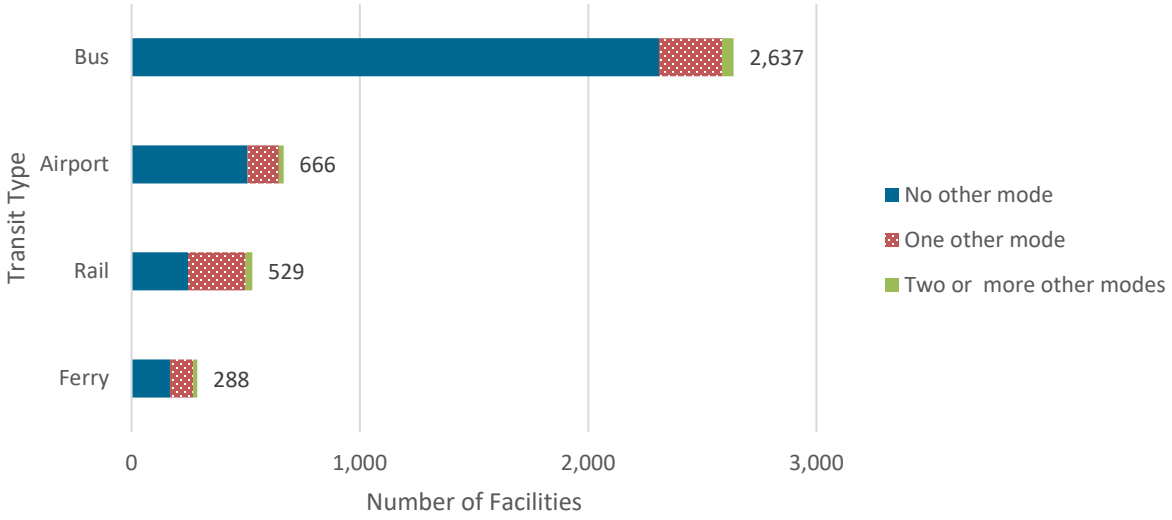


Figure 14: Availability of Intermodal Connectivity by Facility Type
Source: Bureau of Transportation Statistics[42]

[41] Port Authority of New York and New Jersey; 2019 Annual Airport Traffic Report; 2020; https://www.panynj.gov/airports/en/statistics-general-info.html.
[42] Bureau of Transportation Statistics; Intermodal Passenger Connectivity Database; https://www.bts.gov/content/intermodal-passenger-connectivity-database.

3 Forecasts of Travel & Tourism

Global economic, social, and technological trends drive changes in long-distance travel. Forecasts allow planners and policymakers to make data-driven infrastructure investment decisions. This section reviews key domestic and foreign travel and tourism forecasts, including overall and mode-specific projections.

The FAST Act legislation requested 20-year forecasts of travel and tourism trends. Forecasts with this time horizon are prioritized in this section, but shorter- and, in some cases, longer- term forecasts are used when these are not available.

Long-Distance Travel Forecast

In 2018, there were 2.28 billion domestic long distance trips taken in the U.S. As shown in Table 4, domestic trips are forecasted to increase between 1.4 and 1.9 percent each year until 2023. By 2023, this is projected to amount to an 8.6 percent increase from the 2018 trip totals. Leisure trips make up approximately 80 percent of all domestic trips in the U.S. each year. This category of trips is expected to grow at a faster rate than the overall average. Business trips account for the remaining 20 percent, and these types of trips are expected to grow, but at a slower rate.

Impacts of COVID-19 on Travel Forecasts

Severe macroeconomic and societal disruptions, such as the COVID-19 public health emergency, can have significant near-term and long-term effects on travel and tourism and demonstrate the uncertainty associated with any forecast that relies on assumptions and trends that may be subject to dramatic changes as a result of historic events. The forecasts presented in this section are based on the most recent annual data available, which was 2018 and in some cases 2019, from different Federal agencies. These agencies will be revising these forecasts given current and on-going impacts related to the COVID-19 public health emergency. At this time, however, there is significant uncertainty about the timing and pace of recovery for future business and leisure travel.

Table 4: Domestic Travel Forecast (2018-2023)
Source: U.S. Travel Association and U.S. Department of Commerce[43]

	2018 (Actual)	Travel Forecast					
		2019	2020	2021	2022	2023	5 Year % Change
Person Trips (millions)	2,278	2,317	2,349	2,386	2430	2475	8.6%
Business	459	464	469	476	483	490	6.8%
Leisure	1819	1853	1880	1910	1948	1985	9.1%
Person Trips (yearly % change)	1.7%	1.7%	1.4%	1.6%	1.8%	1.9%	-
Business	1.1%	1.1%	1.1%	1.5%	1.5%	1.4%	-
Leisure	1.8%	1.9%	1.5%	1.6%	2.0%	1.9%	-

[43] U.S. Travel Association and U.S. Department of Commerce; Travel Forecast 2019-2023; https://www.ustravel.org/research/travel-forecasts. This forecast was released prior to 2020 and does not reflect the impacts of COVID-19 on current or future travel.

Worldwide, international tourism across all countries grew from 1 billion trips in 2012 to 1.4 billion in 2018, with an estimated 1.8 billion or more by 2030.[44] In 2018, the U.S. was the destination for about 80 million international trips.[45] Of note, this number is based on all entries into the U.S., which includes local travelers crossing the border that may not stay overnight or travel 50 miles, as discussed earlier. Nearly 40 million, or 50 percent, of those trips came from Canada and Mexico.[46] This proportion is expected to remain relatively stable through 2024.[47] Significant (i.e., greater than average) growth in tourism from the United Kingdom, China, Brazil, France, and India is also anticipated. [48] By 2030, China is projected to account for a quarter of worldwide international travel. A larger U.S. share of China tourism could significantly increase international travel; however, Canada and Mexico will still be the most significant countries of origin.

Modal Forecasts and Performance Trends

Surface Transportation

Surface transportation has and likely will remain a significant part of U.S. tourism travel into the future. Vehicle miles traveled (VMT) for light-duty vehicles are projected to increase by 0.9-1.2 percent annually over 20 years, with lower growth rates projected in the out years of the 30-year forecast (Table 5).

Table 5: Alternative Forecasts of VMT Growth
Source: Federal Highway Administration[49]

Vehicle Class	Compound Annual Growth Rates to VMT			
	Pessimistic Economic Outlook		Optimistic Economic Outlook	
	2017 - 2037 (20 Year)	2017 - 2047 (30 Year)	2017 - 2037 (20 Year)	2017 - 2047 (30 Year)
Light-Duty Vehicles	0.9%	0.6%	1.2%	0.9%

By 2045, significant congestion is expected on many highways (Figure 15).[50] This congestion along highway networks will greatly affect tourism travel, as passenger vehicles and motor coaches will be caught in congested highway stretches alongside major freight networks. Many of these currently

[44] UN World Tourism Organization; https://www.unwto.org/global/press-release/2019-01-21/international-tourist-arrivals-reach-14-billion-two-years-ahead-forecasts. This forecast was released prior to 2020 and the impacts of COVID-19.

[45] U.S. Department of Commerce, "Forecast of International Travelers to the United States by Top Origin Countries;" https://travel.trade.gov/tinews/archive/tinews2019/20191010.asp. This forecast was released prior to 2020 and does not reflect the impacts of COVID-19 on current or future travel.

[46] *Ibid.*

[47] *Ibid.*

[48] *Ibid.*

[49] FHWA; Forecasts of Vehicle Miles Traveled (VMT): Spring 2019; https://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt_forecast_sum.cfm.
This forecast was released prior to 2020 and does not reflect the impacts of COVID-19 on current or future travel.

[50] U.S. Department of Transportation, Office of Research and Technology; Peckett, et al.; *Metropolitan Planning Organizations and Transportation Planning for Megaregions*; 2014. While these forecasts were specifically for truck travel on highways, we note that the congestion at these locations would also affect travel and tourism travel, and that we do not currently have comparable forecasts for long-distance passenger highway travel.

congested highway sections align with megaregions, defined as networks of metropolitan centers and surrounding areas with shared cultural, environmental, economic, and infrastructure characteristics. Forecasts for 2045 suggest that congestion will continue to increase in these high-growth megaregions. Forecasts also suggest drivers will increasingly experience significant congestion in areas currently outside megaregions.

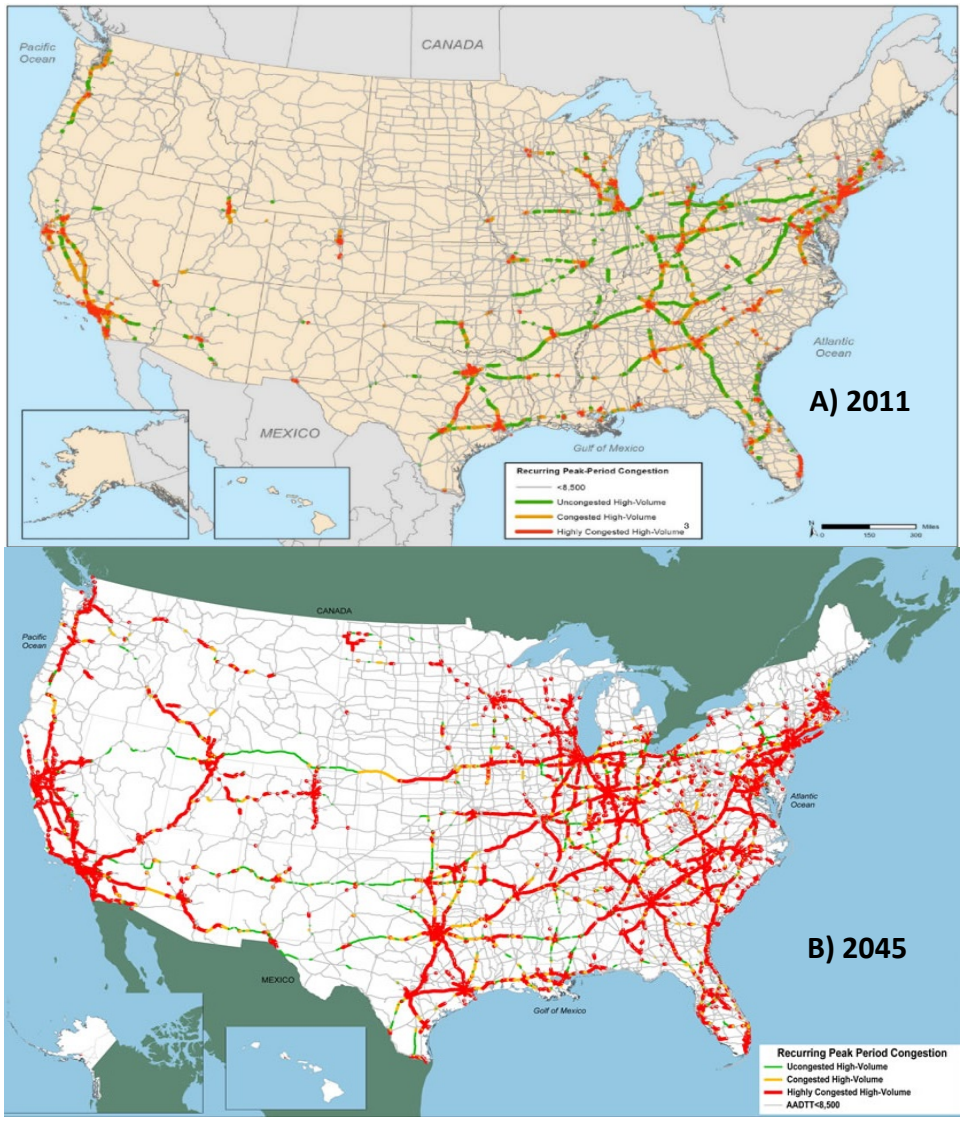


Figure 15: Peak-Period Congestion on High-Volume Truck Networks: A) 2011 Actual (top), B) 2045 Projected (bottom)
Source: Federal Highway Administration[51]

[51] **Notes:** High-volume truck portions of the National Highway System carry more than 10,000 trucks per day, including freight-hauling long-distance trucks, freight-hauling local trucks, and other trucks with six or more tires. Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95. **Source:** FHWA, Office of Freight Management and Operations; Freight Analysis Framework, version 4.3, 2017. https://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/nhsconghvtrk2045.htm. This forecast was released prior to 2020 and does not reflect the impacts of COVID-19 on current or future travel.

Air Travel

Total enplanements generally increased between 1990 and 2019. Air travel tends to be more prevalent when there is a strong U.S. and global economy, and future economic growth is expected to lead to increased demand for air travel in the long term (notwithstanding the recent unprecedented, severe drop in domestic and international air travel due to the COVID-19 public health emergency). The most recent forecasts showed enplanements increasing to 1.5 billion in the year 2045, an increase of 68.9 percent from 2018 (Figure 16).

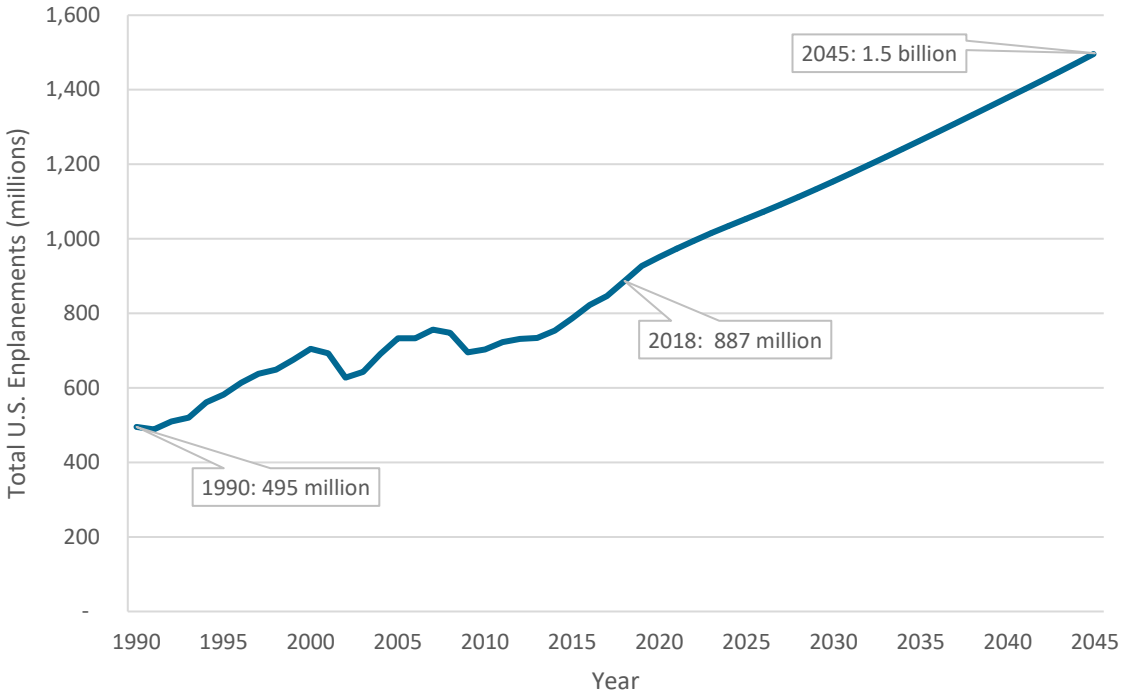


Figure 16: U.S. Enplanements and Forecast Enplanements by Year (1990-2045)
Source: Federal Aviation Administration[52]

[52] FAA; FAA Terminal Area Forecast (TAF); https://taf.faa.gov/. This forecast was released prior to 2020 and does not reflect the impacts of COVID-19 on current or future travel.

Significant increases in enplanements are expected at every major airport in the country in the next 20 years (Figure 17). The airports forecast to have the greatest increase over a 20-year period are Fort Lauderdale, FL; Austin, TX; San Jose, CA; Raleigh-Durham, NC; Newark, NJ; and Nashville, TN.

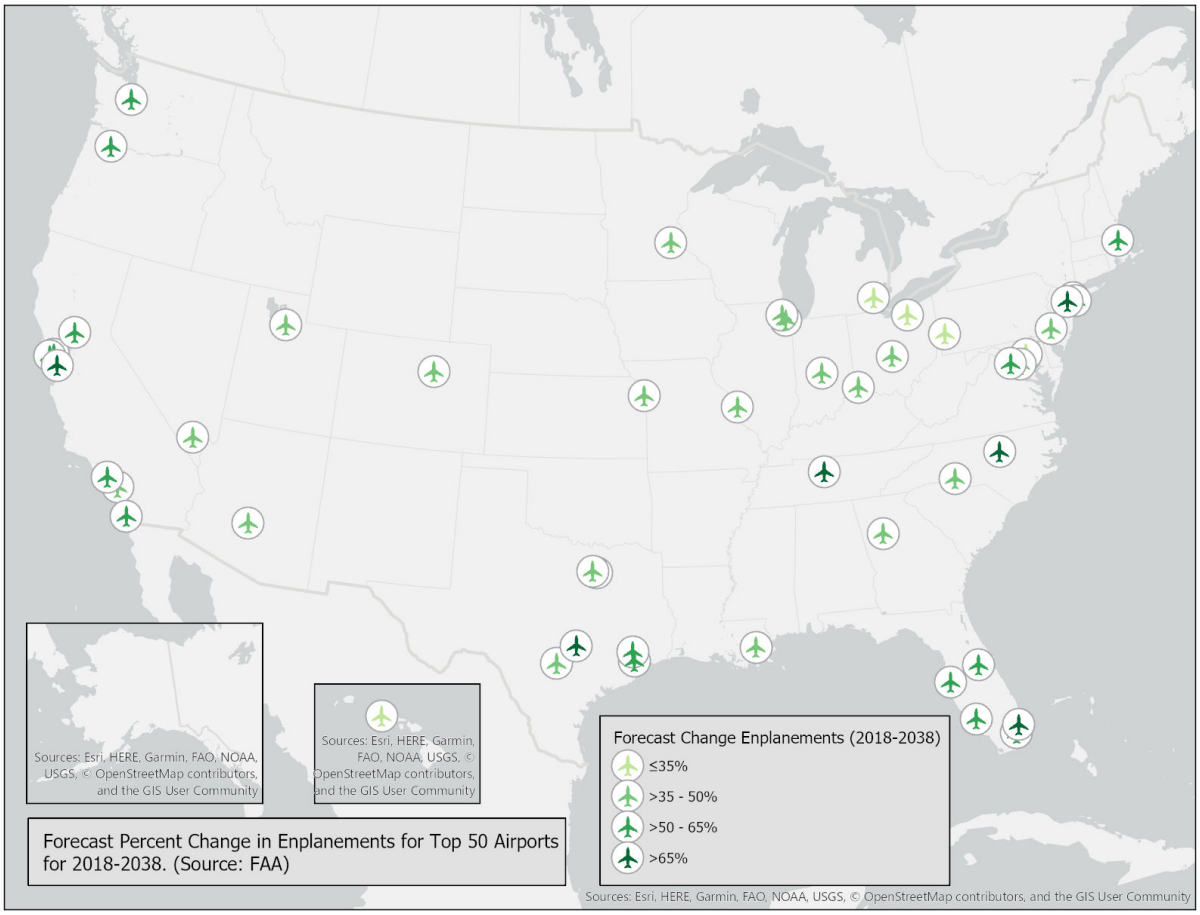


Figure 17: Forecast Percent Change in Enplanements for Top 50 Airports (2018-2038)
Source: Federal Aviation Administration[53]

[53]FAA; FAA Terminal Area Forecast (TAF); https://taf.faa.gov/. This forecast was released prior to 2020 and does not reflect the impacts of COVID-19 on current or future travel.

Passenger Rail

As the trend of urbanization continues, especially through the northeast corridor, Amtrak is set to take advantage with current and planned passenger rail services. In FY 2018, 31.7 million riders used Amtrak, generating $2.2 billion in ticket revenue. Figure 18 shows how Amtrak was expecting ridership to increase by 2024 across its major rail networks, prior to the COVID-19 public health emergency. Ridership on long-distance lines is planned to increase only slightly, likely due to the faster alternative of flying during cross-country travel. In contrast, travel is planned to increase significantly in the Northeast Corridor and on State-supported service lines. These are likely due to increasing population density and travel in U.S. megaregions, which makes passenger rail a more attractive transportation option for travelers.

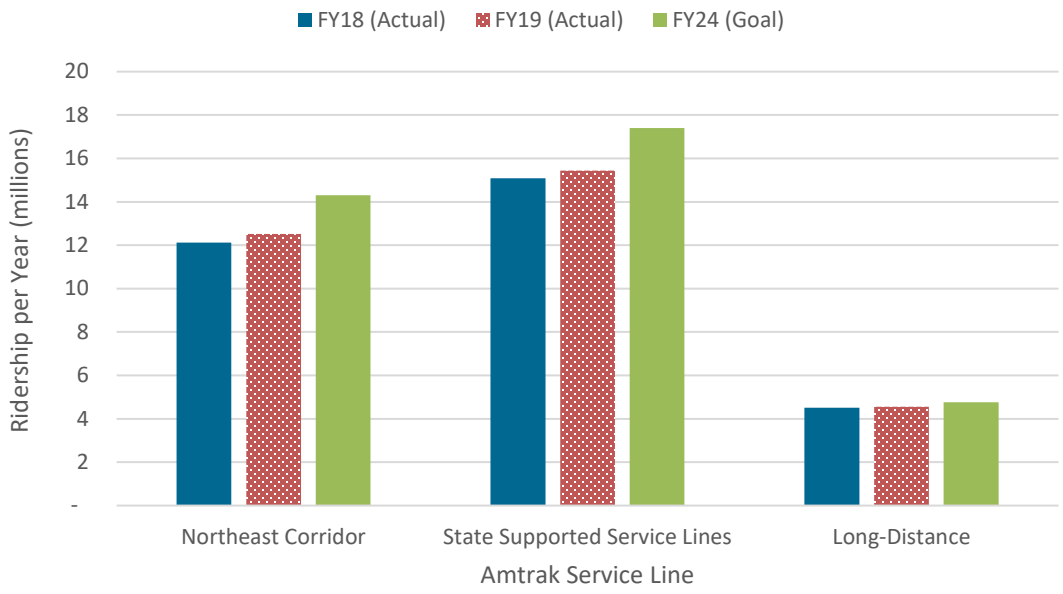


Figure 18: Yearly Amtrak Service Ridership by Line
Source: Amtrak[54]

[54] Amtrak; Five Year Service Line Plans; https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/businessplanning/Amtrak-Service-Line-Plans-FY20-24.pdf. This forecast goal was released prior to 2020 and does not reflect the impacts of COVID-19 on current or future travel.

Ports

Cruises have been increasingly entering into and embarking from ports around the U.S. and the rest of North America in recent years. In 2003, 8.2 million passengers embarked on a cruise from a North American port. By 2018, this number increased to 14.3 million, nearly 50 percent growth. Figure 19: Millions of Sourced Passengers at North America Ports (2003-2018) shows the annual changes in cruise ship passengers over a 15-year time-period. During that time, cruise ship ridership increased in every year except two. 2008 had the greatest decrease, at 1.5 percent decline in ridership, which was followed by six consecutive years of ridership increases.

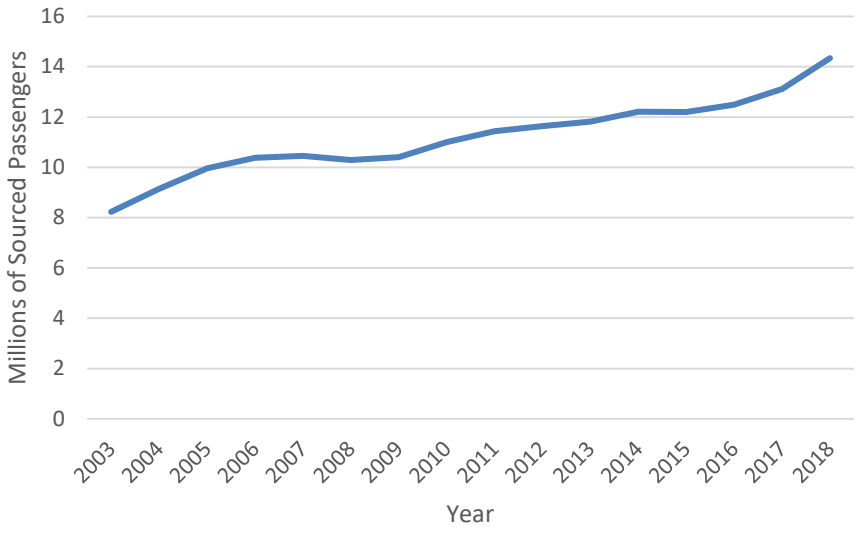


Figure 19: Millions of Sourced Passengers at North America Ports (2003-2018)
Source: Cruise Lines International Association[55]

[55]Cruise Lines International Association; The Global Economic Contribution of Cruise Tourism 2013-18, https://cruising.org/news-and-research/research.

Figure 20 displays the U.S. ports by cruise passenger ridership. Cruise ridership has increased the most in the ports around the Caribbean, specifically in Florida, Louisiana, and Texas, reflecting the increasing popularity of cruises to those destinations.

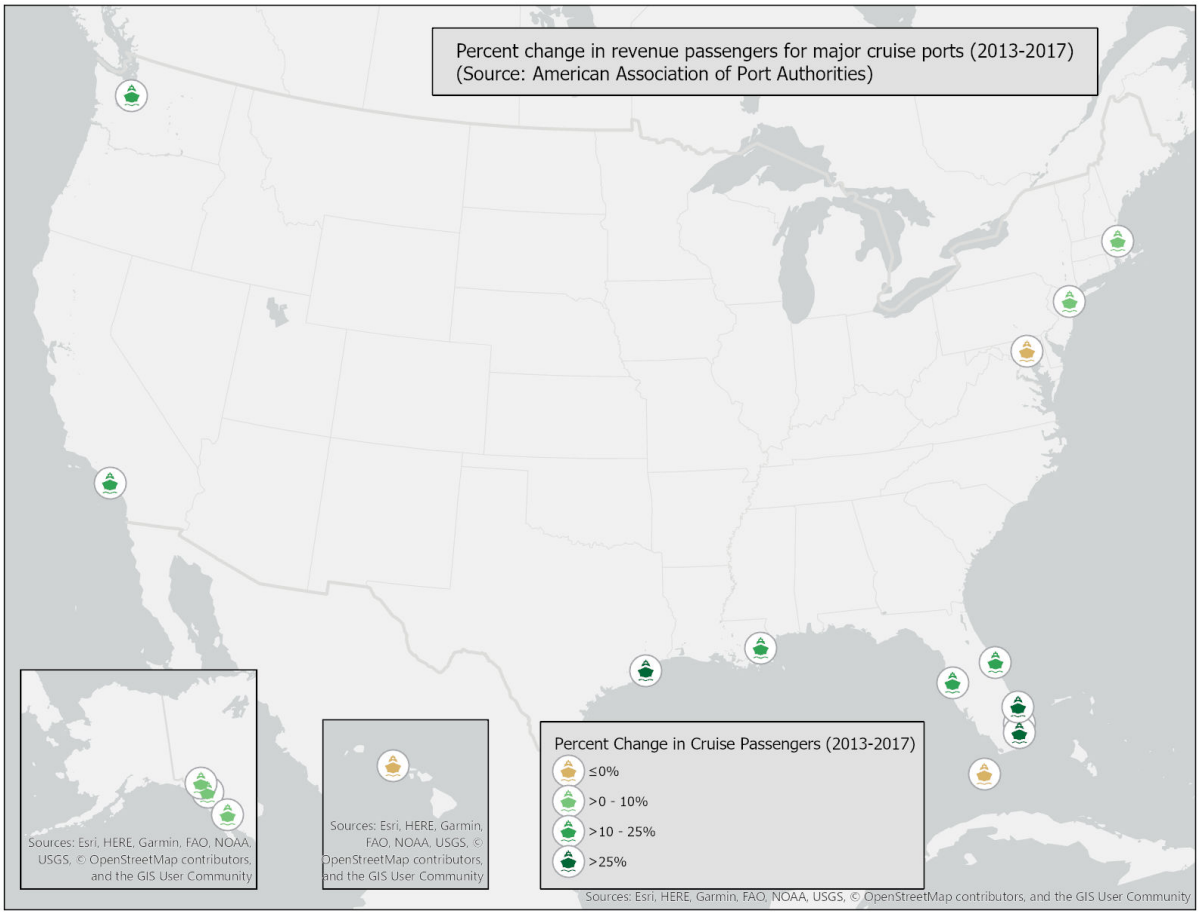


Figure 20: Percent Change in Revenue Passengers for Major Cruise Ports (2013-2017)
Source: American Association of Port Authorities[56]

[56] American Association of Port Authorities; NAFTA Region Port Cruise Traffic; 2013-2015; http://aapa.files.cms-plus.com/Statistics/CRUISE%20TRAFFIC%20NORTH%20AMERICA%202013-2015.pdf; 2015-2017; http://aapa.files.cms-plus.com/Statistics/CRUISE%20TRAFFIC%20NORTH%20AMERICA%202015-2017%20REVISED.pdf.

4 Major Travel and Tourism Facilities & Corridors

A sound, effective, and connected travel and tourism infrastructure strategy depends on a common understanding of where major transportation facilities and corridors are located. Federal, State, local, and private transportation and tourism stakeholders have separately monitored usage of the transportation system and travel and tourism activity for decades. However, there is no comprehensive national analysis or identification of key facilities and corridors based on current and forecast travel and tourism volumes, which has led to significant mobility gaps for travelers. This section describes a national Multimodal Travel and Tourism Network (MTTN), along with developments and evaluation criteria by mode.

Multimodal Travel and Tourism Network

The U.S. DOT assembled a national MTTN as a starting point to inform planners, private sector stakeholders, and the public about where major travel and tourism infrastructure is located and when special attention may be warranted (Figure 21).[57] The MTTN does not provide project exclusive or preferred Federal transportation funding. The MTTN consists of:

- **Major Highways Network**
  Includes 67,584 centerline miles of Interstates and other Freeways and Expressways (NHS functional classification 1 and 2 routes).[58] This subset of roads includes over 30 percent of the overall NHS and the majority (88 percent) of rural NHS mileage with average annual daily traffic (AADT) over 20,000 (excluding trucks and buses).

- **Major Airport Network**
  Includes 70 major commercial airports that represent 90 percent of enplanements (passenger boardings) in calendar year 2018. This subset includes 13 percent of the 520 FAA-designated commercial service airports.

- **Major Passenger Rail Network**
  Includes Amtrak stations and rail lines that represent 90 percent of Amtrak ridership in 2018 (boardings and alightings). This subset includes 18,787 route miles of high-volume railways and 117 high-volume stations, which represents 86 percent and 24 percent of the nation's railway route miles and stations, respectively.

- **Major Cruise Ports Network**
  Includes 17 major ports responsible for 90 percent of revenue cruise passengers in 2017. This subset includes approximately half of the 35 cruise ports for which revenue passenger data was available for 2017.

[57] Note: 90 percent is an arbitrary threshold that the authors used to identify "major" components of the MTTN.
[58] Filtering the NHS based on functional class rather than AADT minimizes the number of connectivity gaps created by strict AADT criteria.

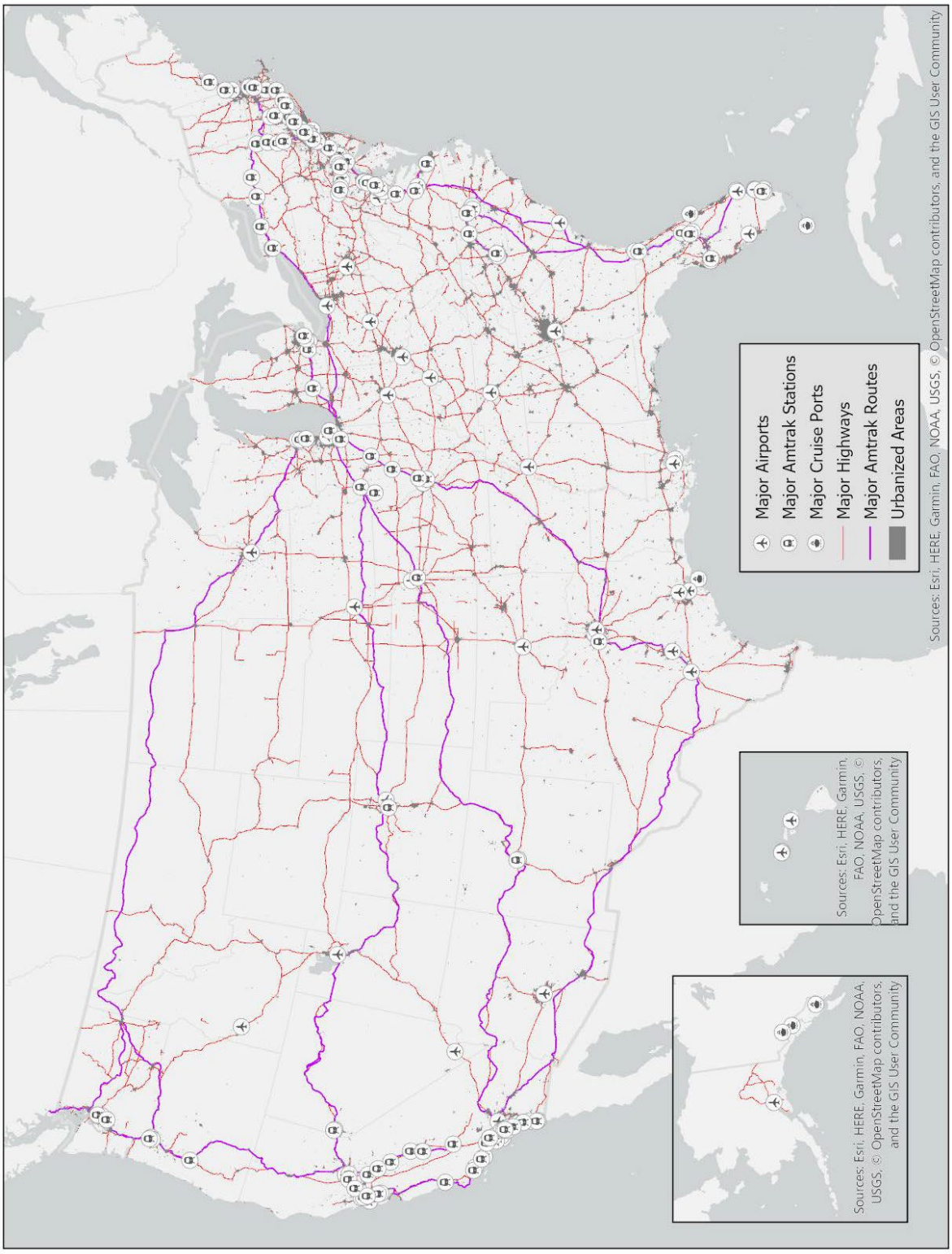


Figure 21: Combined MTTN
Source: Volpe Center[59]

[59] Figure combines data sources used in Figures 22-25.

Major Highway Network

U.S. DOT developed a Highway MTTN map using the set of criteria listed below (Figure 22).

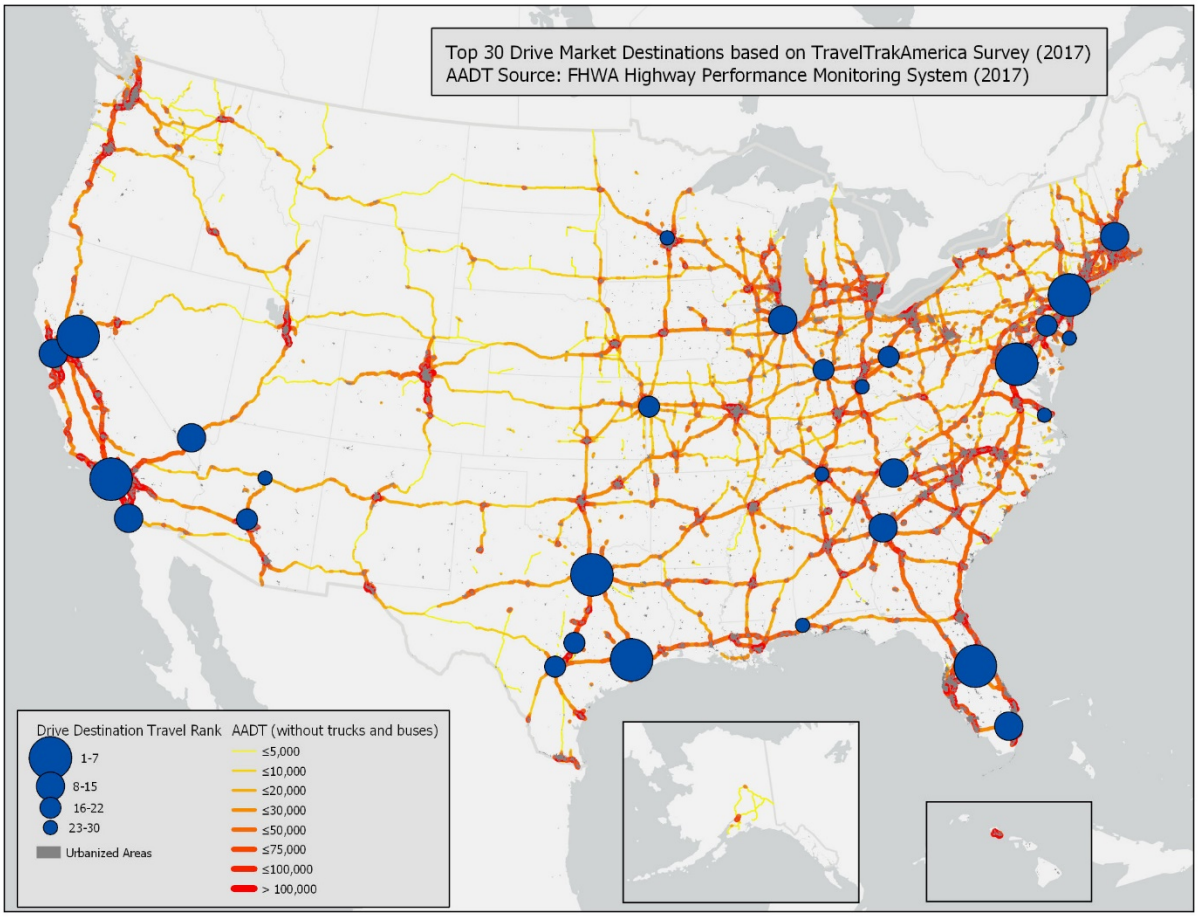


Figure 22: Highway MTTN
Source: Volpe Center[60, 61]

Highway Criteria:

- **National Highway System (NHS)**: Includes all NHS Interstates and other Freeways and Expressways (functional classification 1 and 2 routes).[62] This subset of roads includes the majority (88 percent) of rural NHS mileage with average annual daily traffic (AADT) over 20,000 (excluding trucks and buses).

The highway component of the MTTN consists of approximately 67,584 centerline miles of major, NHS functional class 1 and 2 routes. This network encompasses over 30% percent of the NHS, but less than 2 percent of the nation's total public road system.

[60] AADT Source: FHWA Highway Performance Monitoring System (2017).
[61] The top 30 drive market destinations are provided for illustrative purposes.
[62] Filtering the NHS based on functional class rather than AADT minimizes the number of connectivity gaps created by strict AADT criteria. Urban roadways were excluded from the AADT coverage analysis because they are assumed to consist of a greater proportion of commuters and other short-distance travelers.

Major Airport Network

U.S. DOT developed an Airport MTTN map using the set of criteria listed below (Figure 23).

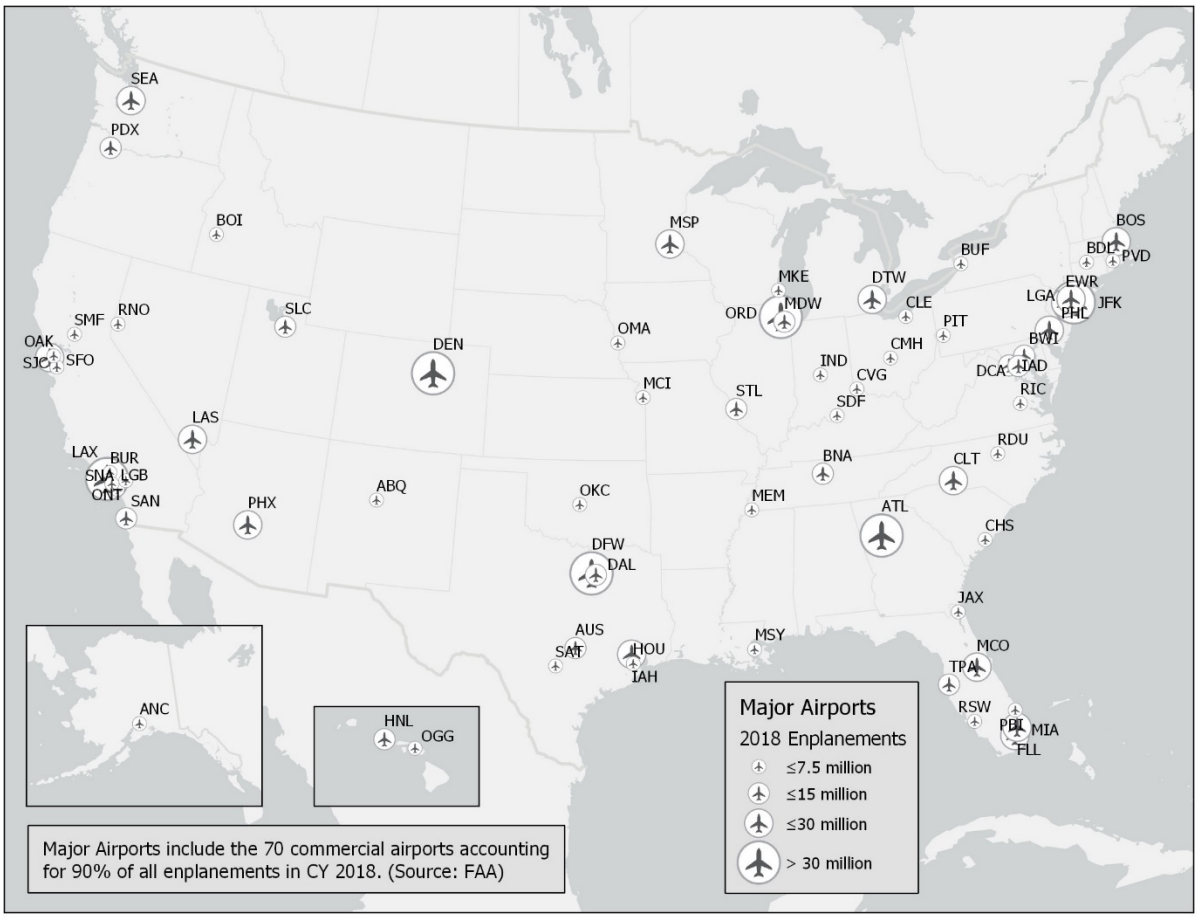


Figure 23: Airport MTTN
Source: Volpe Center[63]

Airport Criteria:

- **Enplanements**: Includes all commercial airports that represent 90 percent of enplanements (passenger boardings) in calendar year 2018.

The airport component of the MTTN consists of 70 major airports, representing 13 percent of the 520 FAA-designated commercial airports.

[63] FAA; Terminal Area Forecast (TAF); https://taf.faa.gov/.

Major Passenger Rail Network

U.S. DOT developed a Passenger Rail MTTN map using the set of criteria listed below (Figure 24).

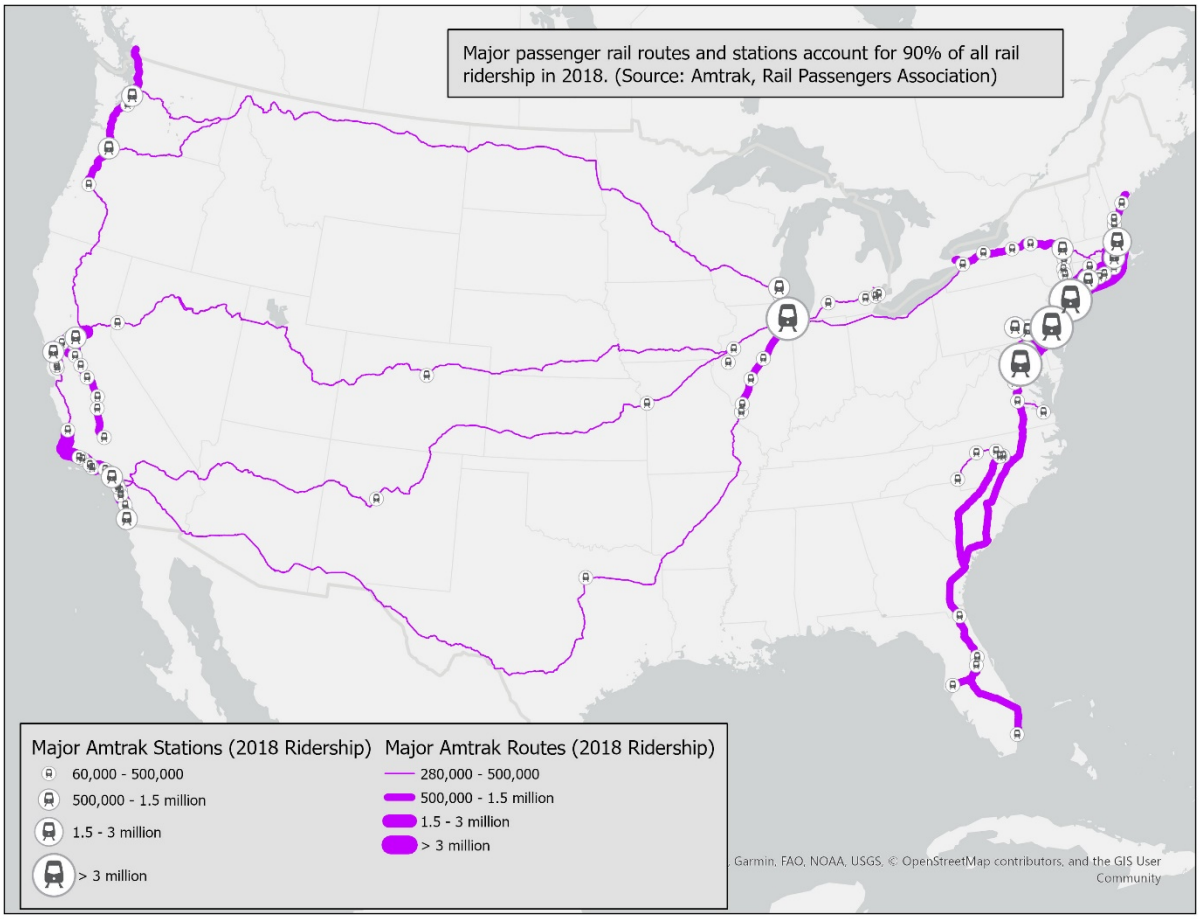


Figure 24: Rail MTTN
Source: Volpe Center[64]

Rail Criteria:

- **Amtrak ridership**: Includes Amtrak stations and rail lines that represent 90 percent of Amtrak ridership in 2018 (boardings and alightings).[65]

The passenger rail component of the MTTN consists of both railways and rail stations, 18,787 route miles of high-volume railways and 117 high-volume stations. This represents 86 percent and 24 percent of the nation's railway route miles and stations, respectively.

[64] Amtrak; Amtrak FY19 Ridership; http://media.amtrak.com/wp-content/uploads/2019/11/FY19-Year-End-Ridership.pdf.

[65] Stations that meet the above criteria but that do not occur along a major rail line as defined above, are excluded.

Major Port Network

U.S. DOT developed a Port MTTN map using the set of criteria listed below (Figure 25).

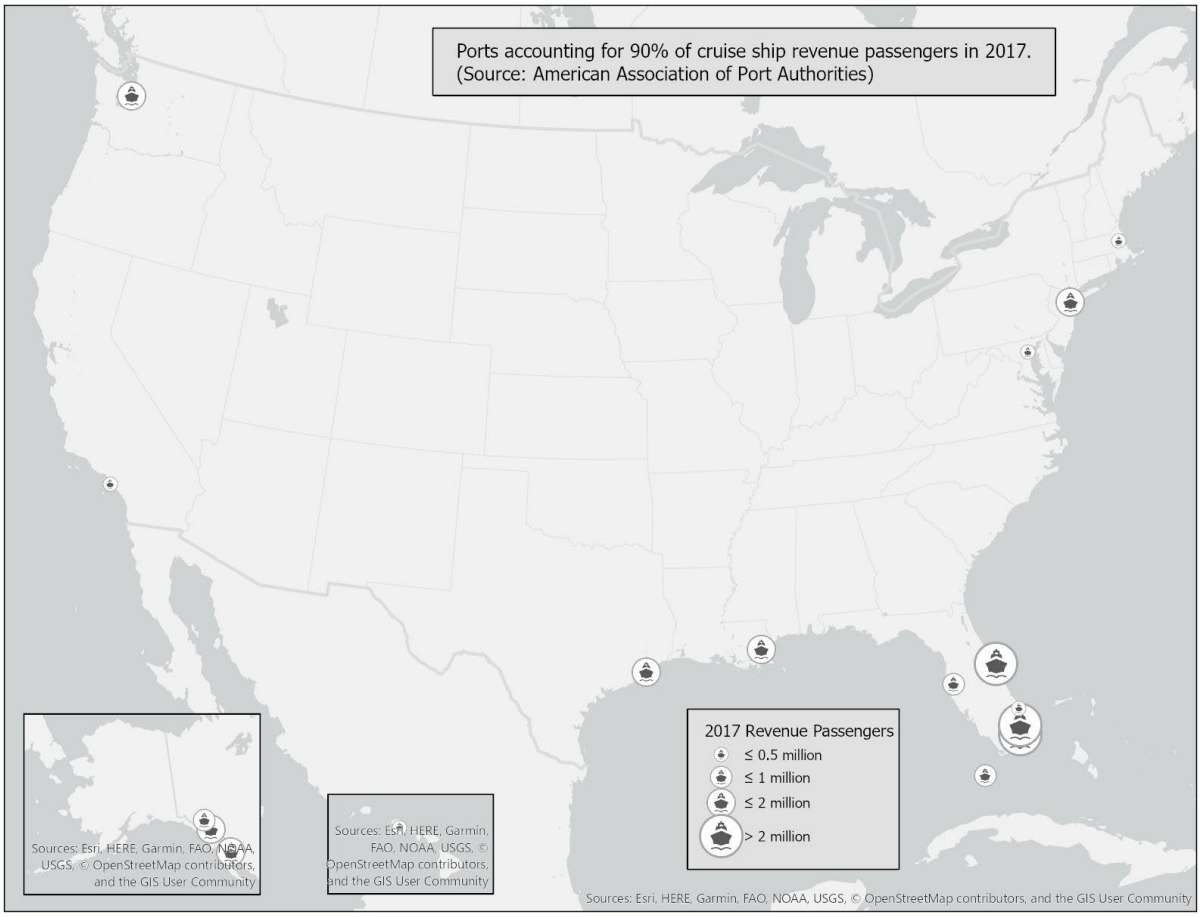


Figure 25: Port MTTN
Source: American Association of Port Authorities[66]

Cruise Port Criteria:

- **Cruise ship revenue passengers**: Include domestic ports that represent 90 percent of domestic revenue passengers.

The port component of the MTTN consists of 17 major ports responsible for 90 percent of revenue cruise passengers in 2017. This subset includes approximately half of the 35 cruise ports for which revenue passenger data was available from the American Association of Port Authorities for 2017.

[66] American Association of Port Authorities; NAFTA Region Port Cruise Traffic; 2013-2015; http://aapa.files.cms-plus.com/Statistics/CRUISE%20TRAFFIC%20NORTH%20AMERICA%202013-2015.pdf; 2015-2017; http://aapa.files.cms-plus.com/Statistics/CRUISE%20TRAFFIC%20NORTH%20AMERICA%202015-2017%20REVISED.pdf.

5 Barriers to Long-Haul Passenger Travel

Across the transportation system, different types of barriers hinder long-distance passenger travel. This section identifies key statutory, regulatory, technological, institutional, and financial barriers; opportunities to overcome each barrier; and potential DOT programs and initiatives that could implement solutions.

Statutory Barriers

Statutory barriers represent impediments to long-distance travel in the U.S. Code. No specific challenges were identified; however, a challenge to implementing statutory requirements does exist.

- ***Statewide and metropolitan planning factors and stakeholders:*** The FAST Act added "enhance travel and tourism" as a planning factor for the statewide and nonmetropolitan and the metropolitan planning processes (FAST Act Section 1201 and 1202; 23 U.S.C. 134 (h)(1)(J) and 135 (d)(1)(J)). The legislation stipulates that metropolitan planning organizations (MPOs) "should consult with agencies and officials responsible for tourism when developing metropolitan transportation plans." However, states and MPOs may have difficulty determining how best to incorporate long-distance tourism travel into planning processes, particularly if they are unfamiliar with travel and tourism stakeholders and data.

Opportunities

- ***Develop new guidance and best practices for the travel and tourism planning factor*:** Develop guidance and best practices for incorporating travel and tourism stakeholders and data analysis into the statewide and metropolitan transportation planning process.

Potential Implementation Programs and Initiatives

- ***FHWA Transportation Capacity Building Program (TPCB):*** The TPCB Program fosters a comprehensive, integrated, and interdisciplinary view of transportation planning. The program helps decision makers, transportation officials, and staff resolve complex issues that arise in their communities through training and technical assistance. Support is targeted to state, local, regional, and tribal governments, transit operators, and community leaders.

Regulatory Barriers

Regulatory barriers can create administrative burden and may hinder long-distance travel. An example is:

- ***Environmental compliance:*** Agency implementation of the National Environmental Policy Act (NEPA) can delay the project development process for major infrastructure projects, particularly if the Federal environmental review process is not coordinated, predictable, and transparent.

Opportunities

- ***Streamline regulations*:** Streamlining regulatory processes allows for faster review and permitting, and therefore quicker implementation of projects on the ground.

Potential Implementation Programs and Initiatives

- ***Permitting Dashboard:*** This online tool for Federal agencies, project sponsors and the public provides transparency of the environmental review and authorization process for infrastructure projects. As the Dashboard continues to expand the scope and number of tracked projects and improve the functionality of tracking tools for stakeholders, it increases predictability for project sponsors and promotes government accountability in the review and permitting processes.
- ***One Federal Decision:*** Executive Order 13807 called for the establishment of discipline and accountability in the environmental review and permitting process for infrastructure projects. This includes reducing the duration of Environmental Impact Statements (EIS) to no more than an average of approximately 2 years, measured from the date of the publication of a notice of intent.

Technological Barriers

Technological barriers stymie long-distance travel by limiting opportunities for innovation to improve transportation. An example is:

- ***Public knowledge and acceptance:*** Additional information and education is needed for members of the traveling public who may be hesitant to embrace or have difficulty adapting to new and unfamiliar technologies, such as automated and connected vehicles or Mobility as a Service (Maas). Ease and speed of new technology deployment may also be stymied by difficulties faced by the industry in preparing for and supporting implementation.

Opportunities

- ***Reduce time-to-market for technology applications:*** Time-to-market is critical for new technologies to become profitable and implemented. New processes and multi-modal collaboration can reduce and coordinate the time-to-market for new technology applications across transportation modes.
- ***Encourage adoption of innovative and effective technologies:*** Encourage increased development, deployment, and utilization of effectives technologies across modes. Existing Federal programs, including grant and loan programs (such as Transportation Infrastructure Finance and Innovation Act (TIFIA) loans and Railroad Rehabilitation and Improvement Financing (RRIF) loans) may be available for innovative projects and activities that harness technology to improve multimodal travel options.

- ***Encourage public-private partnerships:*** Expanded and incentivized public-private partnership (P3) and private investment opportunities can attract private-sector resources to develop and implement innovative projects and activities that improve transportation network efficiency and expand mobility options.

Potential Implementation Programs and Initiatives

- ***Preparing for the Future of Transportation: Automate Vehicle (AV) 4.0:*** AV 4.0 establishes the current Federal approach to shaping policy for automated vehicles. This voluntary guidance includes three core interests that will guide U.S. DOT programs and policies on automation: protect users and community, promote efficient markets, and facilitate coordinated efforts.
- ***Complete Trip – ITS4US Deployment Program*:** This ITS Joint Program Office, OST, FTA, and FHWA program aims to solve mobility challenges for all travelers accessing jobs, education, healthcare, and other activities by making up to $40 million available to innovative communities.
- ***University Transportation Centers (UTC) Program:*** This OST-Research program provides grants to universities to conduct research on critical transportation issues, develop new technology and approaches to improve transportation systems, and support education activities for future transportation professionals.
- ***Next Generation Air Transportation System (NextGen):*** This FAA program is modernizing the National Airspace System with a series of upgrades to air traffic operations systems, procedures, technologies, and policies. In close coordination with FAA's partners in the aviation industry, key enabling technologies are being integrated with current infrastructure, such as improved communications, navigation, and surveillance capabilities, data sharing, and weather processing and distribution.

Institutional Barriers

Institutional barriers stem from aspects of departmental policy and structure that impede investments in long-distance transportation infrastructure. Specific examples include:

- ***Data gaps:*** The U.S. DOT has not collected comprehensive data encompassing all modes of long-distance travel since the 1995 American Travel Survey. Without more recent data on long-distance trip purpose, mode use, travel party size, and other socioeconomic and demographic data, transportation planners and decision makers do not have the information necessary to make informed decisions about travel and tourism infrastructure.
- ***Varied infrastructure ownership and funding streams:*** The transportation system is owned, operated, and funded by a diverse set of Federal, State, local, and private actors. These stakeholders do not have a consistent, multimodal definition of key travel and tourism facilities and corridors. Most major highway and bridge infrastructure is owned by states and funded through Federal and State sources, with some funds from user fees. Railroads are built, maintained, and funded primarily by private companies. Coastal and inland waterways are publicly owned and funded, in part with user taxes. Ports and airports are funded through a mixture of public and private monies.

Opportunities

- ***Improve long-distance travel data and modeling/forecasting approaches*:** Explore approaches to improving data and analytical approaches for long-distance transportation. This could include incorporating questions about long-distance transportation in the National Household Transportation Survey or other BTS research efforts and strengthening modeling/forecasting approaches by using new data sources, like big and mobile data.
- ***Identify key travel and tourism facilities and corridors:*** Planners, private sector stakeholders, and the public owners of facilities need a common understanding of key multimodal infrastructure to access major travel and tourism destinations and attractions. Most long-haul travel and tourism trips take place on the MTTN facilities and corridors, but many occur off the MTTN.

Potential Implementation Programs and Initiatives

- ***Departmental Program Evaluation:*** The U.S. DOT is at the start of a multi-year effort to bolster evidence-building capabilities, including program evaluation to enhance the use of data and research to examine program results, improve transportation, and save lives.

- ***National Transportation Library:*** OST's Bureau of Transportation Statistics (BTS) supplies trusted, objective data used to shape transportation policy, investments, and research across the U.S. and abroad. BTS integrates data from a wide variety of sources and makes them available through the National Transportation Library, which serves as a portal to statistical information and a repository for all DOT research.
- ***FHWA Office of Federal Lands Highway:*** The Federal government owns and manages some of America's most iconic symbols. From the Statue of Liberty to the Grand Canyon, America's national parks and public lands are critical to the travel and tourism industry. Visitation to Department of the Interior sites alone amounted to 483 million in FY 2017, creating an estimated $51.6 billion in economic output and supporting 418,000 jobs.[67] Approximately 35 percent of all international visitors arriving by air to the U.S. report visiting a national park/monument, making it the third most popular activity after shopping and sightseeing.[68] One-tenth of visitors surveyed at national parks are of international origin.[69] Federal Lands Highway helps implement two key funding programs that improve access to Federal lands. The Federal Lands Access Program provides over $250 million annually to local, county, or state projects that are located on or adjacent to, or that provide access to, Federal lands, and the Federal Lands Transportation Program provides over $350 million annually to Federal land management agency projects that are located on Federal lands.

[67] U.S. Department of the Interior; Economic Report, FY 2017. https://www.doi.gov/sites/doi.gov/files/uploads/fy_2017_econ_report_final_11_1_18.pdf.

[68] U.S. Department of Commerce; https://travel.trade.gov/research/programs/ifs/index.html.

[69] Data from 72 visitor studies conducted between 2002 and 2011, originated from the University of Idaho Park Studies Unit, Visitor Services Project. Database creation is supported by funding from the National Park Service, Social Science Division, and from individual National Park Service unit.

Financial Barriers

Financial barriers represent impediments to long-distance passenger travel due to a lack of monetary resources. An example is:

- ***Federal requirements:*** U.S. DOT administers several funding programs, some of which apply models and approaches that typically emphasize peak period commuting and freight movement, rather than temporary or seasonal visitation. While travel and tourism trips may benefit from such investments, areas with small resident populations, but significant tourism traffic, may not receive funding that corresponds to demands on transportation infrastructure.

Opportunities

- ***Assess DOT funding programs*:** Assess whether relevant DOT funding programs use models and analytical approaches that do not capture the temporary or seasonal demands on transportation infrastructure. If such funding programs are identified, either explore new models that account for all periods of passenger and freight movement or consider including data that accounts for temporary and seasonal travel in current models and analytical approaches.

Potential Implementation Programs and Initiatives

- ***Build America Bureau and credit assistance programs:*** The Build America Bureau streamlines U.S. DOT credit opportunities and grants, drawing on the expertise of the different DOT operating administrations. The Bureau serves as the single point of contact and coordination for states, municipalities and project sponsors looking to utilize Federal transportation expertise, apply for Federal transportation credit programs and explore ways to access private capital in public private partnerships.
- ***Airport Privatization Pilot Program:*** This program allows airport sponsors to explore privatization as a means of generating access to private capital for airport improvement and development. The FAA is authorized to permit up to 10 public airport sponsors to sell or lease an airport with certain restrictions and to exempt the sponsor and the private operator from certain Federal requirements that could otherwise make privatization impractical.

6 Best Practices for Improving Performance

Investment in infrastructure facilitates travel and tourism by improving infrastructure condition, increasing capacity, enhancing safety, and creating intermodal connections. This section describes 10 practice case studies of infrastructure projects and planning efforts from across the country and different modes, and concludes with highlights of innovative practices these project sponsors have engaged in to improve performance. Some of the projects are complete, while others are planned or under construction. Appendix B provides more detail on each case.

Travel and Tourism Infrastructure Case Studies

Improvements to O'Hare International Airport

The O'Hare Modernization Program and O'Hare 21 expansion are ongoing projects to expand capacity airside, through updating runways, and landside, through updates to terminals, at Chicago's O'Hare International Airport, the third busiest airport in the country. The O'Hare Modernization Project has restructured the airfield with four new east-west runways and an additional two east-west runway improvements are nearing completion. The O'Hare 21 project is an ongoing $8.5 billion project to renovate and expand the airport's terminals and complement planned landside capacity increases. The outcomes of the project reduce delays that travelers experience and expands the capacity of the airport to connect more travelers with their destinations.

I-70 Eastbound Peak Period Shoulder Lane

Colorado's Interstate 70 (I-70) Mountain Express Lane runs 13 miles eastbound on I-70 from Empire to Idaho Springs, an area that experiences considerable congestion during winter weekends (for skiing and other winter sports) and increasingly summer weekends (for hiking and other mountain sports) when tourism and leisure travel is at its peak. The lane opened in 2015 and uses variable pricing to control congestion. The lane is only open weekends and holidays and is a shoulder lane when not in use. This project benefits travelers by providing access to a congestion-free travel lane with reliable travel times.

Foothills Parkway – Great Smoky Mountains National Park

Authorized by Congress in 1944, the Foothills Parkway was envisioned as a roadway providing stunning views of Great Smoky Mountains National Park from the Tennessee foothills. The National Park Service completed construction of a 1.65-mile portion of the parkway known as the "missing link" in 2018, in partnership with the State of Tennessee and the FHWA Office of Federal Lands Highway. The western section now offers a 33-mile recreational experience for motorists and bicyclists, with breathtaking views of the Great Smoky Mountains from the Tennessee foothills.

Washington State Ferries 2040 Long Range Plan

The Washington State Ferries (WSF) system provides ferry service in Puget Sound as part of the Washington state highway system. The WSF system is integral to regional and statewide travel. In 2017, WSF carried 24.5 million riders on 10 routes and ridership is projected to grow to 32.5 million by 2040. The WSF 2040 Long Range Plan was developed to guide investment in the ferry system and establish a roadmap for operations of the ferry system over the next twenty years. Investment included in the long range plan will include new vessels, more service hours and capacity on busy routes, and improved terminals for travelers.

Moynihan Train Hall

New York State, Amtrak, the Metropolitan Transit Authority, the Port Authority of New York and New Jersey, and developers are expanding Penn Station in Manhattan with an additional train hall across the street from the existing station. The project is under construction and is targeted for completion by the end of 2020. This project benefits travelers arriving or departing at Penn Station with increased capacity, improved passenger amenities, and safer circulation when boarding or disembarking trains.

Port of Miami Tunnel

The Port of Miami Tunnel provides a direct connection between the Port of Miami (PortMiami), MacArthur Causeway, and Interstate 395. The new link to PortMiami provides a route for trucks to avoid having to travel the streets of Downtown Miami and a direct link for cruise passengers arriving at or departing from Miami International Airport.

Indianapolis Blue Line BRT

The Indianapolis Public Transportation Corporation (IndyGo) is planning the Blue Line, a new 23.9-mile Bus Rapid Transit (BRT) line connecting Downtown Indianapolis to Indianapolis International Airport and across Marion County using electric battery-powered buses. The project, expected to start construction in 2023 and begin service in 2025, will provide a rapid transit connection to improve access to Indianapolis International Airport for travelers.

Colorado V2X Safety and Mobility Improvement Project

Over the next two years, the Colorado Department of Transportation (CDOT) will roll out vehicle-to-everything (V2X) technology on interstates across the entire state. The first phase of the project, installing roadside V2X units along 90 miles of Interstate 70 between Golden and Vail, was completed in 2018 in partnership with Panasonic. The remaining phases of the project are being rolled out over the next few years. This project will benefit travelers by creating safer conditions for travelers on Colorado's Interstates as connected vehicles become more widespread.

Mississippi National River and Recreation Area Access

Since 2010, the National Park Service Mississippi National River and Recreation Area (NRRA) has collaborated with state, regional, and local agencies to develop an alternative transportation system along and connecting to the Mississippi River in the Minneapolis and Saint Paul metropolitan area. The resulting transportation network provides numerous multimodal opportunities for visitors to enjoy the Mississippi NRRA.

SunRail Connector to Orlando International Airport

The Florida Department of Transportation (FDOT) is considering a 5.5-mile commuter rail project connecting the SunRail system with Orlando International Airport. The project would connect the north-south SunRail system to the airport via an east-west spur and expand service to the airport to include evenings and weekends. This project benefits travelers by providing a rail transit connection between Orlando International Airport and the rest of the SunRail system.

Takeaways

Creating Intermodal Connections to Travel Hubs
SunRail Connector, IndyGo Blue Line, and Port of Miami Tunnel

Creating additional connections to travel hubs supports overall travel growth in the United States and addresses the lack of intermodal connectivity that many travelers face. Additional connections to travel hubs, especially those connections which expand travelers' transportation choice, improve access between travel hubs and traveler origins or destinations. Airports, train stations, cruise terminals, and bus depots are often significant trip generators for a metropolitan area. Therefore, improving connectivity to travel hubs improves the performance of the entire transportation network.

Expanding Capacity of Existing Travel Infrastructure
O'Hare improvements, Moynihan Train Hall, and Washington State Ferries Long Range Plan

Expanding capacity of existing travel infrastructure addresses the lack of transportation capacity for travel. As travel demand continues to increase around the country, improving infrastructure to accommodate more travelers and tourists allows the number of domestic and international travelers to rise. These projects all work to improve facilities or systems to serve a growing number of travelers.

Pursuing Innovative Solutions to Improve Capacity and Safety
Colorado V2X, I-70 Peak Period Shoulder Lane, and Port of Miami Tunnel

Innovative transportation solutions incorporate new technologies or processes to maximize the impact that infrastructure investment has on safety and mobility. Innovative projects present substantial benefits to travelers while minimizing the financial burden of the project. Innovative processes or technologies can provide different benefits depending on the project: Colorado V2X presents significant safety benefits by preparing Colorado's Interstates for advanced connected vehicles while the Port of Miami Tunnel was delivered with a public-private partnership which reduced the immediate funding burden and streamlined the project delivery timeline.

Activating Tourist Destinations
Foothills Parkway and Mississippi NRRA

Activating tourist destinations with new or improved transportation options provides new ways for travelers to explore the places they visit. These projects demonstrate how partnerships between different levels of government expand access to Federal lands, providing new ways for the traveling public to enjoy them.

7 Strategies to Improve Intermodal Connectivity

Improving intermodal connectivity for long haul passenger travel and tourism requires close coordination, communication, and collaboration among the public and private sectors. This section details strategies that the U.S. DOT will pursue to overcome key statutory, regulatory, technological, institutional, financial, and other barriers. Some strategies can be implemented within existing statutory frameworks or by leveraging existing Department initiatives and resources. Other strategies may necessitate longer term technological innovations, enhanced data collection, new partnerships, or financial and technical resources.

Strategy #1: Develop guidance and best practices to help States and MPOs address the new travel and tourism planning factor

The FAST Act added "enhance travel and tourism" as a planning factor for the statewide, nonmetropolitan and the metropolitan planning processes and encouraged MPOs to consult with appropriate public and private stakeholders. States and MPOs may have difficulty determining how best to incorporate long-distance travel into planning processes, particularly if they are unfamiliar with travel and tourism stakeholders and data. The U.S. DOT could develop guidance and best practices for incorporating travel and tourism stakeholders and data analysis into the statewide, metropolitan, and rural transportation planning process.

Strategy #2: Modernize data collection and modeling/forecasting approaches for long-distance trips

The U.S. DOT has not collected comprehensive data encompassing all modes of long-distance travel since the 1995 American Travel Survey. Without more recent data on long-distance travel, and the analytical tools to analyze them, transportation planners and policymakers cannot make informed decisions about travel and tourism infrastructure. The U.S. DOT could collect data for long-distance trips, including survey information like trip purpose, mode use, travel party size, and other socioeconomic and demographic data. The U.S. DOT could accomplish this by creating a centralized database that collects this information from States, MPOs, and P3s when requesting DOT funding, during environmental reviews, or during the permitting of infrastructure projects. The U.S. DOT could also support development of new modeling/forecasting approaches and methods that can account for travel and tourism trips. These approaches might include new data sources, like big and mobile data.

Strategy #3: Assess how DOT formula and discretionary funding programs could benefit travel and tourism projects

U.S. DOT discretionary grant programs are an important source of funding that help leverage State, local, and private dollars to make infrastructure investments in transportation projects. Often these programs fund projects, including multimodal projects, may not qualify for formula funds or have difficulty attracting other types of investment without support. U.S. DOT could identify which programs might benefit travel and tourism infrastructure projects and allow for flexible use of the funding to encourage partnerships and private investments.

Strategy #4: Communicate key travel and tourism facilities and corridors

The transportation system is owned, operated, and funded by a diverse set of Federal, State, local, and private entities. These stakeholders do not have a consistent, multimodal definition of key travel and tourism facilities and corridors. In response, the U.S. DOT is proposing a draft national Multimodal Travel and Tourism Network (MTTN) map. The purpose of the map is primarily to inform planners, private sector stakeholders, and the public of major facilities and corridors that provide multimodal access to major travel and tourism destinations and attractions (Figure 26). The MTTN does not provide project exclusive or preferred Federal transportation funding.

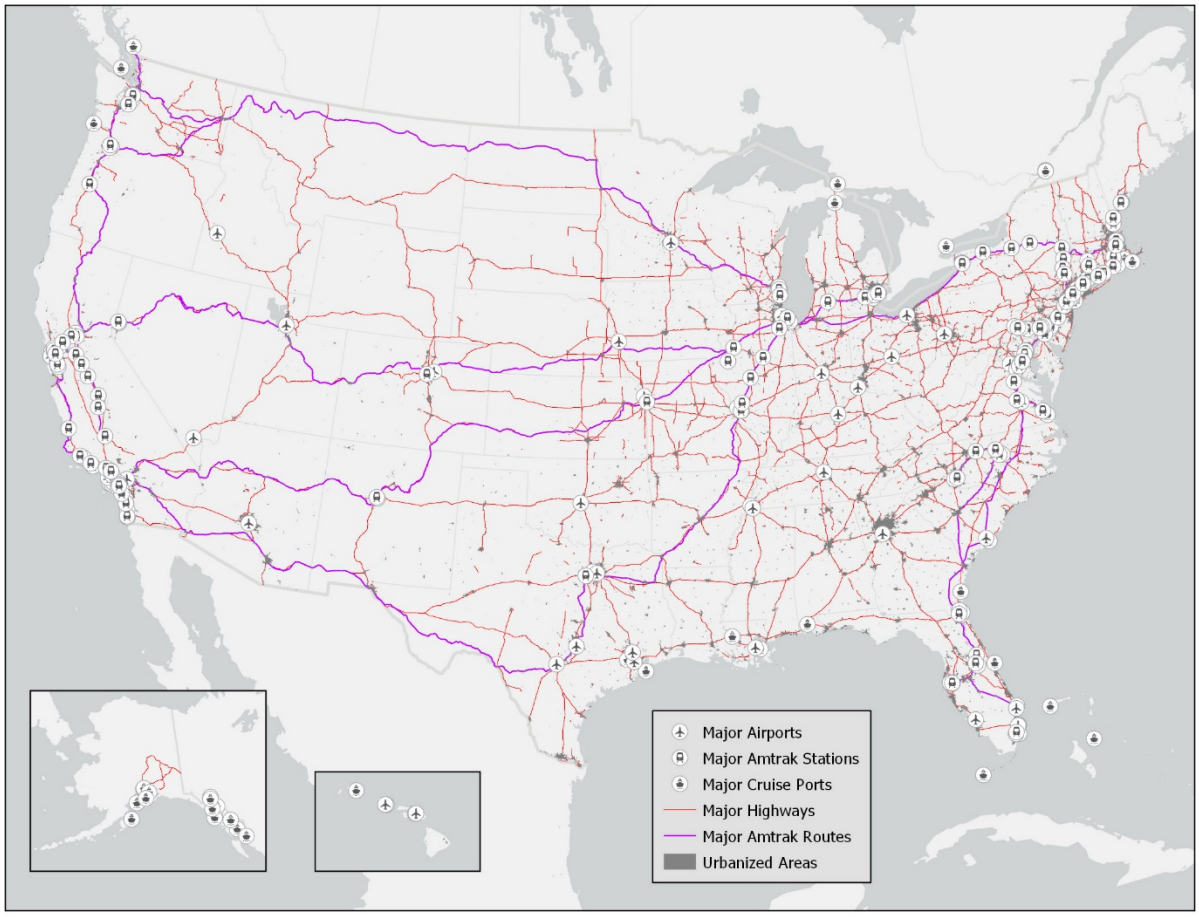


Figure 26: Combined MTTN
Source: Volpe Center[70]

[70] Figure combines data sources used in Figures 22-25.

The MTTN consists of:

- **Highways**: Includes 67,584 centerline miles of interstates and other freeways and expressways (NHS functional classification 1 and 2 routes).[71] This subset of roads includes over 30 percent of the overall NHS and the majority (88 percent) of rural NHS mileage with average annual daily traffic (AADT) over 20,000 (excluding trucks and buses).

- **Airports**: Includes 70 major commercial airports that represent 90 percent of enplanements (passenger boardings) in calendar year 2018. This subset includes 13 percent of the 520 FAA-designated commercial service airports.

- **Rail**: Includes Amtrak stations and rail lines that represent 90 percent of Amtrak ridership (boardings and alightings). This subset includes 18,787 route miles of high-volume railways and 117 high-volume stations, which represents 86 percent and 24 percent of the nation's railway route miles and stations, respectively.

- **Ports:** Includes 17 major ports responsible for 90% of revenue cruise passengers in 2017. This subset includes approximately half of the 35 cruise ports for which revenue passenger data was available for 2017.

Many long-haul travel and tourism trips take place off the MTTN facilities and corridors. As such, U.S. DOT does not intend that a project's location on the MTTN would provide it exclusive or preferred Federal transportation funding, or that projects located elsewhere would be ineligible for Federal funding.

[71] Filtering the NHS based on functional class rather than AADT minimizes the number of connectivity gaps created by strict AADT criteria. Urban roadways were excluded from the AADT coverage analysis because they are assumed to consist of a greater proportion of commuters and other short-distance travelers.

Appendices

Appendix A: National Advisory Committee on Travel and Tourism Infrastructure (NACTTI)

Section 1431 of the FAST Act requires the establishment of the National Advisory Committee on Travel and Tourism Infrastructure (NACTTI). NACTTI is designated to operate in accordance with the provisions of the Federal Advisory Committee Act (FACA). The purpose of NACTTI is to provide information, advice, and recommendations to the Secretary on matters relating to the role of intermodal transportation in facilitating mobility related to travel and tourism activities.

NACTTI is authorized to:

- Advise the Secretary on current and emerging priorities, issues, projects, and funding needs related to the use of the intermodal transportation network of the United States to facilitate travel and tourism.
- Serve as a forum for discussion for travel and tourism stakeholders on transportation issues affecting interstate and interregional mobility of passengers;
- Promote the sharing of information between the private and public sectors on transportation issues impacting travel and tourism;
- Gather information, develop technical advice, and make recommendations to the Secretary on policies that improve the condition and performance of an integrated national transportation system that—is safe, economical, and efficient; and maximizes the benefits to the United States generated through the travel and tourism industry;
- Identify critical transportation facilities and corridors that facilitate and support the interstate and interregional transportation of passengers for tourism, commercial, and recreational activities;
- Provide for development of measures of condition, safety, and performance for transportation related to travel and tourism;
- Provide for development of transportation investment, data, and planning tools to assist Federal, State, and local officials in making investment decisions relating to transportation projects that improve travel and tourism; and
- Address other issues of transportation policy and programs impacting the movement of travelers for tourism and recreational purposes, including by making legislative recommendations.

NACTTI Member List (as of August 2019):

- Ms. Rosemarie Andolino, Chairman & CEO International Development, MAG USA
- Mr. Andrew Cook, Mayor, City of Westfield Indiana
- Mr. James Dubea, Vice President, TranSystems
- Ms. Camille Ferguson, Executive Director, American Indian Alaska Native Tourism Association
- Mr. Sean Fitzgerald, Vice President, Enterprise Holdings, Inc.
- Mr. Bryan Grimaldi, Special Advisor, NYC & Company, Inc.
- Mr. Mufi Hannemann, President and CEO, Hawaii Lodging and Tourism Association
- Mr. David Harvey, Vice President of Corporate Sales, Southwest Airlines
- Mr. Steve Hill, President and COO, Las Vegas Convention and Visitors Authority
- Mr. Jim Mathews, President & CEO, Rail Passengers Association/NARP

- Mr. Sean Menke, President & CEO, Sabre
- Mr. Peter Pantuso, President & CEO, American Bus Association
- Ms. Sharon Pinkerton, Senior Vice President, Airlines for America
- Mr. John Potter, President and CEO, Metropolitan Washington Airports Authority

Appendix B: Travel and Tourism Infrastructure Case Studies

This report includes a series of nine case studies that demonstrate innovations or best practices related to supporting travel and tourism in a certain area. The U.S. DOT selected these case studies to show best practices being implemented in a wide variety of transportation modes, geographic areas, and traveler conditions. Although each case study has a unique context and circumstances, the case studies are intended to spotlight approaches that can inform different transportation entities in solving similar challenges. Each case study details the challenge, the solution, the steps to implementation, the impact on travel and tourism, and key takeaways.

The case studies are listed as follows:

- O'Hare Modernization Plan and O'Hare 21,
- Foothills Parkway at Great Smoky Mountains National Park,
- Washington State Ferries 2040 Long Range Plan,
- Moynihan Train Hall at Penn Station, Port of Miami Tunnel,
- IndyGo Blue Line,
- Mississippi National River and Recreational Area Alternative Transportation System,
- Colorado V2X Project,
- I-70 Mountain Express Lane, and
- SunRail Connector to Orlando International Airport.

Case Study: O'Hare Modernization Plan and O'Hare 21

The modernization activities include improvement and expansion of Terminal 5, the existing international terminal at the airport.

Image: O'Hare 21

Expanding Capacity Airside and Landside to Improve Traveler Experience

The O'Hare Modernization Program and O'Hare 21 expansion are ongoing projects to expand capacity airside, through updates to runways, and landside, through updates to terminals, at Chicago's O'Hare International Airport, the third busiest airport in the country. The O'Hare Modernization Project has restructured the airfield with four new east-west runways and an additional two east-west runway improvements. The O'Hare 21 project is an ongoing $8.5 billion project to renovate and expand the airport's terminals to complement planned landside capacity increases.

The Challenge

O'Hare International Airport was unable to accommodate increased airside capacities due to the layout of its six intersecting runways, which forced air traffic controllers to alternate takeoffs and landings, creating delays. Aircraft also experienced delays taxiing to and from gates due to deicing operations and other aircraft entering or exiting the taxiway.

Landside, the number of international passengers traveling through the airport increased by only 7.4 percent between 2005 and 2015, well behind other major U.S. hubs. Prior to O'Hare 21, O'Hare has spent $0 on its international terminal since 2002. For comparison, the number of international passengers at New York's John F. Kennedy International Airport increased 62 percent between 2005 and 2015. Since 2002, JFK Airport has spent $4.7 billion on its international terminals.[72]

The Solution

The O'Hare Modernization Plan and O'Hare 21 aim to meet the needs of the traveling by expanding capacity and improving amenities.[73] As part of the modernization program, the City of Chicago acquired 400 acres of land via eminent domain. On this new land, the city built three parallel east-west runways and extended a fourth east-west runway, resulting in five east-west runways at the airport. A sixth parallel east-west runway is expected to open in 2020. New taxiways will enable increased aircraft speeds travelling between gates and their assigned runways, especially when those gates are located far from aircraft's assigned runways. Also, new deicing pads will create dedicated spaces on the apron for deicing planes without blocking the movement of other aircraft. O'Hare 21 includes over $8 billion dollars to improve terminals, including the airport's international terminals.[74]

[72]Ruthhart, B.; 2018. Chicago, airlines nearing $8.5 billion deal to dramatically expand O'Hare https://www.chicagotribune.com/politics/ct-met-city-hall-story-20180223-story.html.

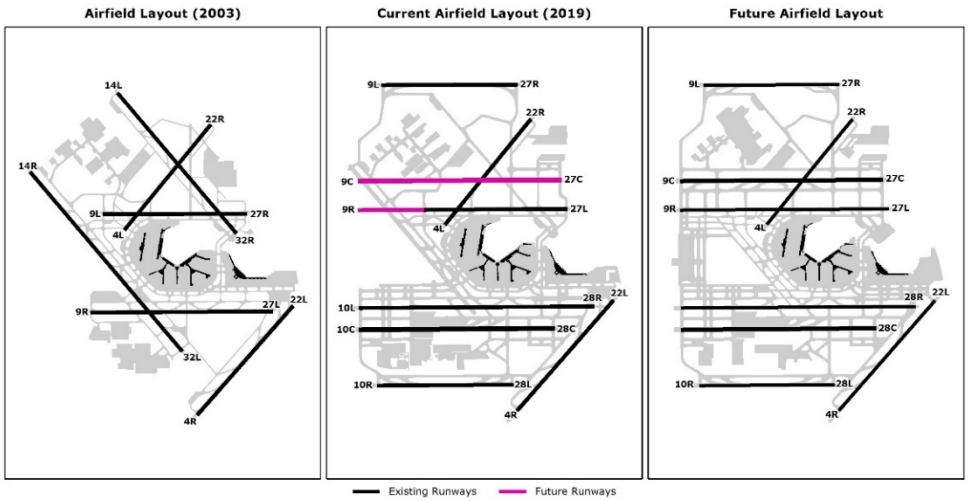
[73] O'Hare 21; 2019. Here's What's Happening. https://www.ord21.com/About/Pages/Happening-Now.aspx.

[74] Ruthhart, B.; 2018. Chicago, airlines nearing $8.5 billion deal to dramatically expand O'Hare https://www.chicagotribune.com/politics/ct-met-city-hall-story-20180223-story.html.

Implementation

The O'Hare Modernization Program completed and is completing project tasks under budget and ahead of schedule, pointing to robust planning and project management.[75]

Funding sources for the O'Hare Modernization Program and O'Hare 21 include passenger facility charges, Federal Aviation Administration Airport Improvement Program funds, general airport revenue bonds, and proceeds from increased lease payments from the airlines serving the airport.[76]



The evolution of the runway configuration at O'Hare International Airport during the O'Hare Modernization Project. Image: Chicago Department of Aviation

O'Hare 21 includes several ongoing projects aimed at improving traveler experience, including:

- Expanded travel options resulting from increased gate capacity and airline competition.
- Reduction in security wait times due to new security screening checkpoints that integrate the latest screening technology.
- Replacement of baggage handling systems that improve screening and sorting of passenger baggage.
- Reduction in airfield congestion and ground delay resulting from lack of aircraft parking positions.[77]

Impact on Travel and Tourism

The O'Hare Modernization Program and O-Hare 21 have and will continue to increase capacity airside and landside, minimizing potential barriers to tourism in the Chicago Metropolitan Area and at O'Hare International Airport. These projects will support achievement of the Strategic Plan's goals to support infrastructure, ensuring mobility and accessibility for travelers and tourists, which supports economic growth, productivity, and competitiveness for American workers and businesses. The expanded landside and airside capacities may also increase the number of international passengers at the airport, which lag behind other major airports, allowing the airport to capture a portion of the projected increase in domestic and international travelers and tourists.

Key Takeaways

- The O'Hare Modernization Program and O-Hare 21 support the DOT's vision to make the American travel and tourism industry more competitive globally by increasing airside and landside capacity and modernizing amenities available to travelers.

[75] Eno Center for Transportation; 2015. Lessons learned from the Chicago O'Hare Modernization Program. https://www.enotrans.org/eno-resources/lessons-learned-from-the-chicago-ohare-modernization-program/.

[76] Drouet, C.; 2014. O'Hare Modernization Program and Chicago Airspace Project. https://utc.uic.edu/wp-content/uploads/Ohare-2014-overview-UIC.pdf.

[77] O'Hare; 21, 2019. Here's What's Happening. https://www.ord21.com/About/Pages/Happening-Now.aspx.

Case Study: Foothills Parkway – Great Smoky Mountains National Park

The Foothills Parkway includes panoramic views of Great Smoky Mountains National Park, like the view from Bridge No. 2 in Blount County, Tenn. Bridge 2 is the longest of nine bridges constructed as part of the "missing link."

Image: National Park Service

A Parkway to Enhance Visitor Experience

Authorized by Congress in 1944, the Foothills Parkway was envisioned as a roadway providing stunning views of Great Smoky Mountains National Park from the Tennessee foothills. The National Park Service completed construction of a 1.65-mile portion of the parkway known as the "missing link" in 2018, in partnership with the State of Tennessee and the FHWA Office of Federal Lands Highway.

The Challenge

Great Smoky Mountains National Park was the most visited national park in 2018, with 11.4 million visitors coming to the park.[78] Heavy visitation to the park and the gateway region resulted in congestion, especially on the Tennessee side of the park. Existing transportation infrastructure in the area consists primarily of the Little River Road and Newfound Gap Road (U.S. 441), which are two-lane, low-speed roadways.

Construction of a portion of the Foothills Parkway was completed in 1968; however, significant and unanticipated environmental and geologic conditions were encountered, requiring redesign of a portion of the roadway, which has come to be known as the "missing link." These issues, coupled with difficulty securing funding, led to a considerable delay in completion of the parkway.

The Solution

The State of Tennessee, Tennessee Department of Transportation, the Eastern Federal Lands Highway Division, the Federal Highway Administration, and the National Park Service (NPS) partnered to analyze scenarios for completing the parkway and secure funding for the uncompleted "missing link" section of the parkway.

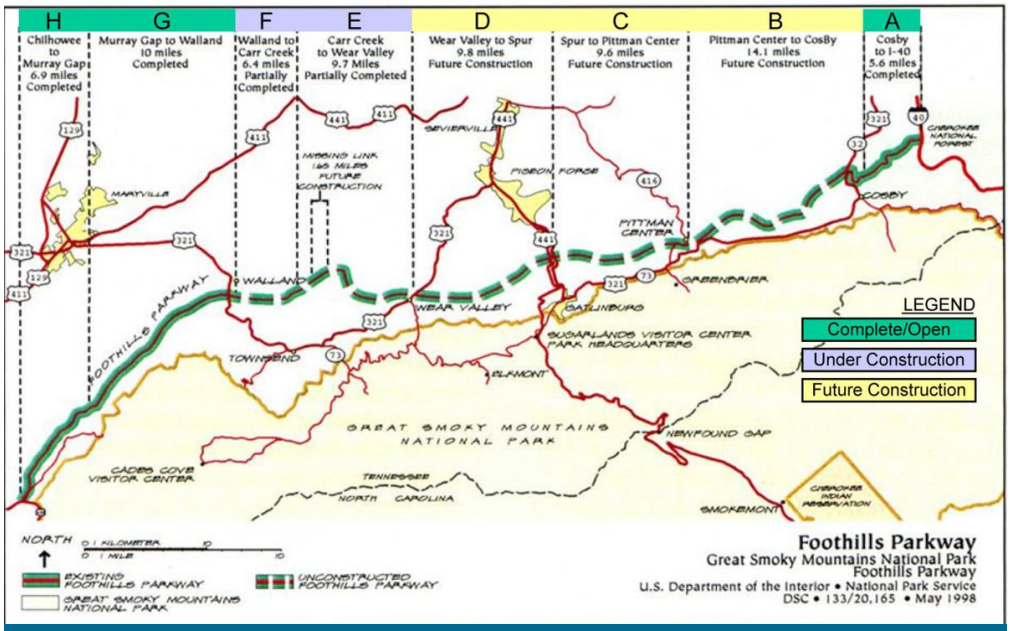
The Foothills Parkway now consists of two finished portions at either end of the originally planned 72-mile corridor. The western section now offers a 33-mile recreational experience for motorists and bicyclists, with breathtaking views of the Great Smoky Mountains from the Tennessee foothills.

[78]National Park Service; Visitation Numbers https://www.nps.gov/aboutus/visitation-numbers.htm.

Implementation

The Foothills Parkway was broken into eight segments for planning purposes. Segments A, G, and H, were completed in 1968, and section F was partially completed. The "missing link" is a 1.65-mile stretch in section E that required redesign due to challenging environmental and geological conditions.

In 1996, the National Park Service completed an environmental assessment on how to complete the missing link. The selected alternative was a series of bridges and fills.[79]



The Foothills Parkway was broken into 8 sections for planning purposes, as shown in this 1998 map. Image: National Park Service

The "missing link" and other uncompleted portions of sections E, F, G, and H roadway were completed at a total cost of $178 million through a combination of funds from the American Recovery and Reinvestment Act (ARRA), a Transportation Investment Generating Economic Recovery (TIGER) grant, and funding from the state of Tennessee and the NPS's share of the Federal Lands Transportation Program.

In late 2018, final paving and installation of barriers were completed, and the roadway was opened to the public on November 10, 2018.[80]

Impact on Travel and Tourism

Great Smokey Mountains National Park received a record number of visitors for the months of November and December 2018 following the Foothills Parkway's opening. Overall, the park saw a 0.7-percent increase in visitors in 2018, which is largely attributed to the parkway. In the first two months of its operation, 200,000 visitors used the parkway.[81]

Key Takeaways

- Construction of the Foothills Parkway improves access to tourist destinations.
- The proximity of the parkway to unique geological and ecological landscapes required extensive consideration and analysis in the planning process.
- Completion of a new segment of the Foothills Parkway led to an increased number of visits to the park.

[79] Great Smokey Mountain Association; Foothills Parkway: Connecting the Missing Link, https://www.youtube.com/watch?v=qzhr6M3YUx4.

[80] National Park Service; Foothills Parkway Opening, https://www.nps.gov/grsm/learn/news/foothills-parkway-opening.htm.

[81] National Park Service; Park Visitation Rises in 2019 with New Foothills Parkway, https://www.nps.gov/grsm/learn/news/park-visitation-rises-in-2018-with-new-foothills-parkway.htm.

Case Study: Washington State Ferries 2040 Long Range Plan

Washington State Ferries connects passengers across Puget Sound as part of the state highway system. Image: Vigor

A Plan to Guide Washington State Ferries through 2040

The Washington State Ferries (WSF) system provides ferry service in Puget Sound as part of the Washington state highway system. The WSF system is integral to regional and statewide travel. In 2017, WSF carried 24.5 million riders on 10 routes and ridership is projected to grow to 32.5 million by 2040. The WSF 2040 Long Range Plan was developed to guide investment in the ferry system and establish a roadmap for operations of the ferry system over the next twenty years.

The Challenge

The WSF system fleet is challenged by aging vessels and growing demand. By 2040, 13 of the current 22 ships in the WSF fleet are expected to reach the end of their useful lives and require replacement. Over the same period, ridership is projected to increase by approximately 33 percent.

The ferry system's terminals are also in need of investment. Many buildings are vulnerable in the event of an earthquake, which could cripple regional travel for a considerable amount of time. Changing environmental conditions could also expose some terminal and maintenance buildings to stronger storms or coastal flooding.

Since funding is constrained, the ferry system will also need to identify opportunities to use existing resources more efficiently. WSF has previously introduced reservations on high-demand routes and re-timing schedules has improved on-time performance and efficiency.

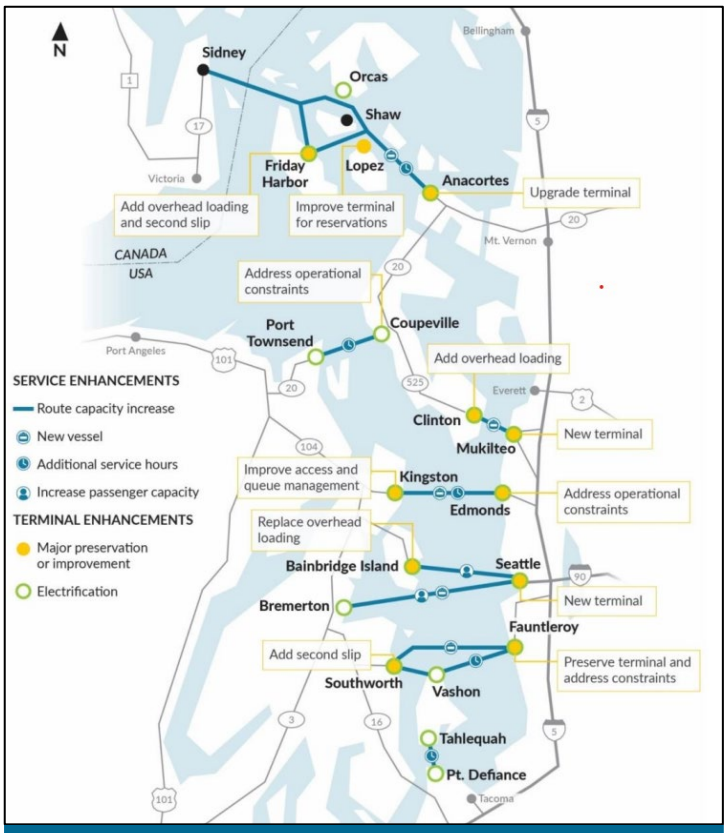
The Solution

The 2040 Long Range Plan calls for investment in 16 new vessels between now and 2038, which would replace the 13 vessels expected to reach the end of their useful life and provide an additional three relief vessels to allow for more regular service. All new vessels would use hybrid-electric propulsion and six existing vessels would be converted to hybrid propulsion. The hybrid-electric boats would use electric charging infrastructure to be added at 17 of the 20 terminals in the system. The plan also identifies routes which would see increased vessel capacity or service hours, using a combination of fleet adjustments to provide more vehicle and passenger space and schedule adjustments to increase the number of sailings.

Implementation

The plan was informed by technical analysis of the ferry system and engagement with community members and stakeholders. WSF held a community engagement process that enabled passengers and other community members to discuss their priorities for the plans and the community was later invited to comment on the Draft Plan. Technical analysis about the system included review of route operations, vessel lifespan, resilience, and progress since the previous long-range plan.

In January 2019, WSDOT delivered the results of the Long Range Plan to the Washington State Legislature for consideration. The legislature will use the document to inform state investment in the ferry system so that funds are directed where they would be the most useful. In spring 2019, the legislature approved funding for the first hybrid-electric vessel in the WSF fleet, expected to enter service in 2022.



Planned service and infrastructure improvements in the 2040 Long Range Plan. Image: WSDOT

Impact on Travel and Tourism

Investing in the Washington State Ferries system will allow the system to continue to provide regional connectivity in Western Washington as demand increases and infrastructure ages. Since the ferries provide crucial service for commuters and travelers alike, the improvements will benefit the local and regional economy.

Projecting future demand and planning future capacity are crucial exercises for maintaining a well-functioning transportation system for travel and tourism. The WSF 2040 Long Range Plan identifies areas where investment will be required to serve future demand. The plan also identifies opportunities to leverage existing and planned resources to operate the network more efficiently and sustainably.[82]

Key Takeaways

- Regular forecasting and long-range plan development allows government agencies to plan long-term improvements to adapt to changing travel patterns.
- Under constrained fiscal requirements, investing in operational improvements can provide meaningful benefits in addition to or instead of investing in capital improvements.
- Investing in aging transportation infrastructure presents opportunities to improve quality of service and sustainability, rather than simply maintain the status quo.

[82] Washington State Ferries, "2040 Long Range Plan". https://www.wsdot.wa.gov/sites/default/files/2019/01/07/WSF-2040-Long-Range-Plan-2019.pdf.

Case Study: Moynihan Train Hall

The Moynihan Train Hall will serve Amtrak and Long Island Railroad passengers at New York's Penn Station. Image: New York

Expanding a Rail Station to Increase Capacity

New York State, Amtrak, the Metropolitan Transit Authority (MTA), the Port Authority of New York and New Jersey (PANYNJ), and developers are expanding Penn Station in Manhattan with an additional train hall across the street from the existing station. The project is under construction and is targeted for completion by the end of 2020.

The Challenge

Penn Station is the primary hub for Amtrak's Northeast Corridor service and a hub for the commuter services Long Island Railroad and New Jersey Transit. The station is currently operating over capacity serving more than 650,000 passengers each weekday, significantly more than the 200,000 passengers it was designed to serve.[83] As a result, passengers cannot safely or efficiently access train platforms due to poor wayfinding and narrow passageways, staircases, and escalators.[84] This is especially the case for visitors who are not familiar with the station's layout.

The Solution

The James A. Farley Post Office Building is located across the street from Penn Station, sitting above the train tracks that serve Penn Station. The Moynihan Train Hall will be a sky-lit terminal area on the concourse level of the existing Farley building. The Hall will house ticketing, baggage, waiting areas, and passenger amenities for Long Island Railroad and Amtrak customers. Once the Moynihan Train Hall opens, New Jersey Transit services will be the only service based at the existing Penn Station, relieving crowding issues for all three operators.

[83] U.S. DOT; 2019. Moynihan Train Hall. https://www.transportation.gov/buildamerica/projects/moynihan-train-hall.

[84] Regional Plan Association; 2019. Public for Penn Station: Clock is Ticking to Make Drastically Needed Improvements. https://www.transportation.gov/buildamerica/projects/moynihan-train-hall.

Implementation

The Moynihan Train Hall is a joint project between New York State, Amtrak, the MTA (parent agency of the Long Island Railroad), the PANYNJ, and private developers. The project is funded by the following entities:

- U.S. DOT Transportation Infrastructure Finance and Innovation Act (TIFIA) Loan: $526.1 million
- Empire State Development Corporation (economic development agency of New York State) Contribution: $475.3 million
- Private Developer (The Related Companies/Vornado Realty Trust) Payment: $230 million
- PANYNJ Capital Contribution: $150 million
- Amtrak Capital Contribution: $105 million
- MTA Capital Contribution: $54.9 million
- Other: $77.06 million[85]

The design of the Moynihan Train Hall will feature a 92-foot high skylight that will rest on the Farley building's original steel trusses. Built as a companion building to the existing Penn Station, the expansion of the Farley building preserves the architectural character of the building by exposing and restoring many of the building's historic features, while creating a 21st century transportation hub.[86]

Moynihan Train Hall, the bright rectangle in the image above, will expand the capacity of the existing Penn Station, located below Madison Square Garden, the circular building in the image above. Image: U.S. DOT

Impact on Travel and Tourism

The Moynihan Train Hall will improve station capacity and passenger experience for Long Island Railroad, Amtrak, and New Jersey Transit passengers. Since Amtrak provides intercity service, its relocation from the existing Penn Station to the Moynihan Train Hall will greatly benefit tourists and travelers. This project supports the U.S. DOT's strategic goals to support infrastructure by supporting mobility and accessibility as well as safety by alleviating crowding on platforms.

Key Takeaways

- The Moynihan Train Hall supports the DOT's vision to make the American travel and tourism industry more competitive globally by improving the passenger experience and facilitation of efficient movement through this important gateway to the major tourism destination of New York City.
- Public-private partnerships (P3) involving multiple public and private sector partners and stakeholders can deliver major infrastructure projects like the Moynihan Train Hall.

[85] U.S. DOT; 2019. Moynihan Train Hall. https://www.transportation.gov/buildamerica/projects/moynihan-train-hall.
[86] Empire State Development; 2019. Moynihan Train Hall: Construction Underway. https://esd.ny.gov/moynihan-train-hall.

Case Study: Port of Miami Tunnel

The Port of Miami Tunnel project provides direct access from Interstate 395 to the cruise and cargo terminals at the Port of Miami, reducing traffic in Downtown Miami. Image: PortMiami Tunnel

Connecting a Busy Cruise Terminal to the Interstate

The Port of Miami Tunnel provides a direct connection between the Port of Miami (PortMiami), the MacArthur Causeway, and Interstate 395. The new link to PortMiami provides a route for trucks to avoid having to travel the streets of Downtown Miami and a direct link for cruise passengers arriving at or departing from Miami International Airport.

The Challenge

As of 2018, approximately 5.6 million cruise passengers travel through PortMiami annually along with $27 billion of cargo, making it the busiest passenger port in the world.[87] Before the Port of Miami Tunnel was completed, port traffic traveled along Port Boulevard onto the surface streets of Downtown Miami.

A tunnel connecting PortMiami directly to the Interstate system was first proposed for study in the 1980s under President Reagan. Though the project died shortly thereafter, it was revived during the 2000s after the Federal government approved its feasibility.[88] As the project was readying for construction, the 2008 global financial crisis struck and the original financier in the concessionaire went into liquidation the following year.[89] The project stalled in late 2008.

The Solution

After its initial cancellation, the project was saved a few months later after local officials kept it alive and the concessionaire was able to find a new partner. The project was launched later in 2009.

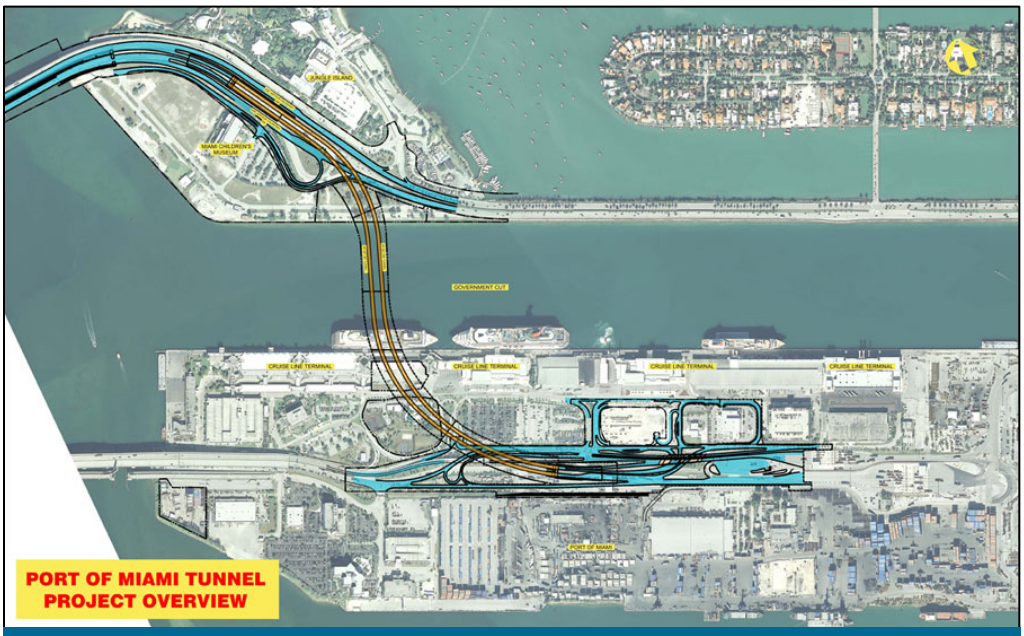
The Port of Miami Tunnel project consisted of three connected components: boring new tunnels under Government Cut, building roadway connections to the PortMiami roadway system, and widening the MacArthur Causeway Bridge to accommodate increased traffic. The tunnel portion consists of two bored tunnels, each containing two lanes of traffic and support systems. The tunnels are 4,200 feet long and reach a depth of 120 feet below the water surface.[90]

[87] PortMiami, "Port Guide 2018-19". https://www.miamidade.gov/portmiami/library/stats-brochure-2019.pdf.
[88] Miami Herald. https://www.miamiherald.com/news/local/community/miami-dade/article1964561.html.
[89] South Florida Business Journal. https://www.bizjournals.com/southflorida/stories/2009/01/19/daily6.html.
[90] Florida DOT. http://www.fdotmiamidade.com/current-projects/north-miami-dade/port-of-miami-tunnel.html.

Implementation

The project was implemented using a public-private partnership (P3) between three government entities (Florida Department of Transportation, Miami-Dade County, and the City of Miami) and Miami Access Tunnel Concessionaire, LLC.[91] The project was executed using a Design-Build-Finance-Operate-Maintain (DBFOM) contract and was funded with bank debt and a loan from the U.S. DOT's Transportation Infrastructure Finance and Innovation Act (TIFIA) program.

In addition to the innovative P3 project delivery, construction of the tunnel itself was smooth, which is relatively uncommon for large tunnel projects.[92]



The route of the PortMiami Tunnel traveling under Government Cut to provide access to cruise terminals and freight facilities. Image: Florida DOT

Impact on Travel and Tourism

The project has improved access to the PortMiami cruise terminals, especially for tourists traveling through Miami. PortMiami cruise operations have continued to grow following the project's completion, including the November 2018 completion of a $250 million-dollar terminal for Royal Caribbean cruise line.[93] The new terminal is capable of berthing the cruise line's two largest ships, each of which can accommodate 5,500 passengers and previously sailed out of Fort Lauderdale.

The project has also had positive impacts on Downtown Miami, reducing congestion in the city's core and improving safety for pedestrians and bicyclists.

Key Takeaways

- The Port of Miami Tunnel exemplifies the DOT's vision of improving access to travel hubs and improving connection between modes of transportation used by travelers.
- Innovative project funding and project delivery methods streamline the completion of important projects and reduce the fiscal burden on governments.
- Creativity and determination in the face of delays and challenges can help overcome roadblocks to project completion.

[91] USDOT, https://www.transportation.gov/tifia/financed-projects/port-miami-tunnel.
[92] Miami Herald. https://www.miamiherald.com/opinion/editorials/article29907982.html.
[93] Miami Herald, https://www.miamiherald.com/miami-com/hotels-motels/article225810475.html.

Case Study: IndyGo Blue Line

The IndyGo Blue Bus Rapid Transit Line will provide an affordable rapid transit connection between Indianapolis International Airport, downtown Indianapolis, and across Marion County. Image: IndyGo

Improving Airport Access through Rapid Transit Expansion

The Indianapolis Public Transportation Corporation (IndyGo) is planning the Blue Line, a new 23.9-mile Bus Rapid Transit (BRT) line connecting Downtown Indianapolis to Indianapolis International Airport and across Marion County using electric battery-powered buses. The project, expected to start construction in 2023 and begin service in 2025, will provide a rapid transit connection to improve access to Indianapolis International Airport for travelers.[94]

The Challenge

Public transit access to the airport in Indianapolis is currently only available via local bus service on 30-minute headways. The trip from downtown to the airport takes 43 minutes by bus today. Despite the route's relatively low frequency, Route 8 has been the most heavily traveled route in the IndyGo bus system, indicating strong demand for transit along the corridor.[95] In the early stages of the planning process, the corridor was planned to be served by light rail transit, but the cost estimate for the project was more than $1 billion, forcing planners to consider an alternative mode that would still provide frequent, convenient service along the corridor.

The Solution

The Blue Line will improve transit service between Indianapolis International Airport and downtown Indianapolis. The Blue Line would make the trip in 30 minutes—a 13-minute travel time reduction compared to the current service—with buses arriving every 10 minutes on weekdays.[96] The bus will achieve the travel time reduction by consolidating stops along the corridor and by introducing dedicated travel lanes, off-board fare payment, level boarding, and off-board fare collection. The service will also use 60-foot electric battery-powered buses, reducing noise and environmental impacts compared to conventional diesel buses.

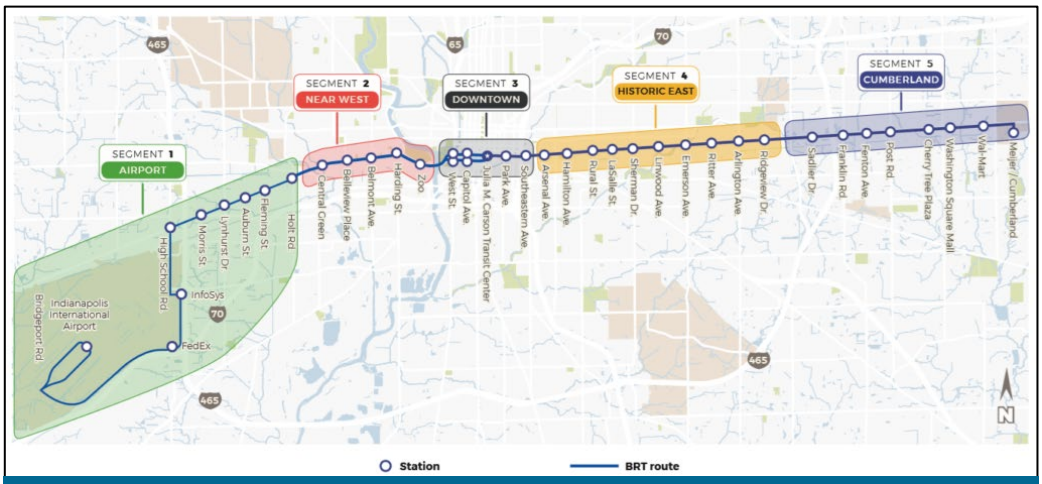
[94] IndyStar; "Why Blue, Purple lines will be delayed at least a year." https://www.indystar.com/story/news/local/transportation/2019/07/02/purple-line-and-blue-line-construction-start-delayed-indygo/1620573001/.

[95] Indianapolis MPO; Blue Rapid Transit Line Alternatives Analysis, https://d16db69sqbolil.cloudfront.net/mpo-website/downloads/Regional/Regional-Transit/Blue-Line-Executive-Summary-Report-11_27_13.pdf.

[96] IndyStar; "The Blue and Purples lines are coming to Indianapolis. Here's what that means." https://www.indystar.com/story/news/2019/05/21/blue-line-and-purple-line-red-line-brt-bus-indianapolis-what-happens/3681960002/.

Implementation

The project is currently in the planning stages. During the process, the alignment of the route, especially in the area around the airport, has changed. In the first Locally Preferred Alternative from 2013, service to the airport was considered for a future phase of the project.[97] Later, the option of serving the airport was included, but at a lower frequency than the rest of the line. Finally, the most recent plan for the line includes full service to the airport, though this could change again as the route completes environmental review this fall.



Route map for the IndyGo Blue Line, serving Downtown Indianapolis, Marion County, and Indianapolis International Airport. Image: IndyGo

The project was funded primarily with Federal and local funds through IndyGo bonds. The project's financial plan notes funding sources as follows:[98]

- Federal Transit Administration (FTA) Small Starts grant: $100 million
- IndyGo Income Tax Revenues and Bonds: $84.35 million
- Metropolitan Development Commission airport TIF District Revenues: $12.50 million
- Indianapolis Department of Public Works General Fund: $1.15 million
- Indianapolis Neighborhood Housing Partnership Cash Contribution: $2.00 million

Impact on Travel and Tourism

Though serving the airport is only one of the many benefits of the IndyGo Blue Line, including airports in regional transit plans improves travel for locals and visitors alike. For Indianapolis and most other cities, airports are important trip generators, meaning that many people travel to and from there on a daily basis. Providing frequent, quality transit between regional destinations and important trip generators provides transportation choices and greater access for all users.

Key Takeaways

- The Indianapolis Blue Line project supports the U.S. DOT's objective to improve connectivity between modes to provide travelers an easy connection between the airport and downtown.
- Investment in high-quality rapid transit improves transportation choice for local residents and visitors alike.
- Using modern, all-electric transit vehicles improves the sustainability of the transportation system by minimizing fuel consumption.

[97] Indianapolis MPO; Blue Rapid Transit Line Alternatives Analysis.

[98] FTA; "IndyGo Blue Line Profile"; https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/funding/grant-programs/capital-investments/1153.

Case Study: Mississippi National River and Recreational Area Alternative Transportation System

A bike share program is one component of the Mississippi National River and Recreational Area's Alternative Transportation System.

Image: National Park Service

An Alternative Transportation System to Provide Access to a National Park Service Unit

Since 2010, the National Park Service (NPS) Mississippi National River and Recreation Area (NRRA) has collaborated with state, regional, and local agencies to develop an alternative transportation system along and connecting to the Mississippi River in the Minneapolis and Saint Paul metropolitan area. The resulting transportation network provides numerous multimodal opportunities for visitors to enjoy the Mississippi NRRA.

The Challenge

The Mississippi NRRA is a 54,000-acre area along a 72-mile stretch of the Mississippi River that runs through a major metropolitan area. Established by Congress in 1988, the park is managed by 25 partner organizations with the NPS owning very little of the land.

In 2010, the NPS set out to create an alternative transportation system that would allow visitors to access the Mississippi NRRA without a vehicle, thereby reducing congestion, emissions, and protecting park resources. A major goal was to create a seamless, well-defined network of multimodal opportunities that visitors would recognize as a way to access the Mississippi River and the Mississippi NRRA.[99]

The Solution

The NPS collaborated with landowners, local governments, state agencies, non-profits, and private organizations to develop and fund a transportation network linking new and existing infrastructure to the surrounding metropolitan area. The resulting system includes:

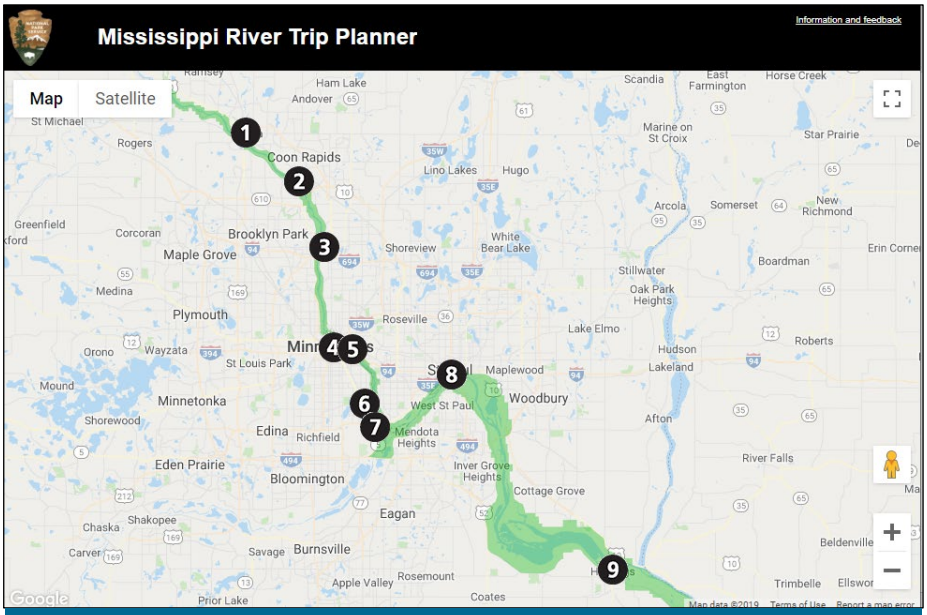
- Bike share program
- Paddle share program
- Light rail and commuter rail stations
- Bus stops and stations
- Bicycle/pedestrian connections
- Multi-use trails
- Signage and marketing

[99] NPS; 2011. ATP Transportation Implementation Plan. https://www.nps.gov/miss/learn/news/upload/FINAL-Transportation-Implementation-Plan_02-01-11-2.pdf.

Implementation

NPS's implementation efforts focused on overseeing and securing Federal funding for partner projects, ensuring compliance with Federal regulations, and marketing the alternative transportation system to increase public awareness.

Over the past decade, the NPS has received over $10 million in Federal Transit Administration, Federal Lands Access Program, and Federal Lands Transportation Program funds to implement the alternative transportation system.[100]



The NPS worked with partner organizations to create an interactive trip planner for visitors to the Mississippi NRRA. Image: NPS

The resulting transportation network builds on existing public transportation infrastructure, river access, and multi-use trails including the Mississippi River Trail. Partner organizations own and operate the components of the alternative transportation system while the NPS coordinates marketing to build a cohesive identity. One component of this is a Google Maps-based trip planner with embedded park destinations and alternative transportation information. The planner is oriented around nine alternative transportation "nodes" that provide car-free access to the river.[101]

Impact on Travel and Tourism

The resulting transportation network replaces thousands of vehicle trips a year, increasing access to the Mississippi NRRA and reducing vehicle miles traveled. The paddle share program, the first kayak rental program of its kind, has also drawn new visitors, as the Mississippi River has become a paddling destination.[102]

Key Takeaways

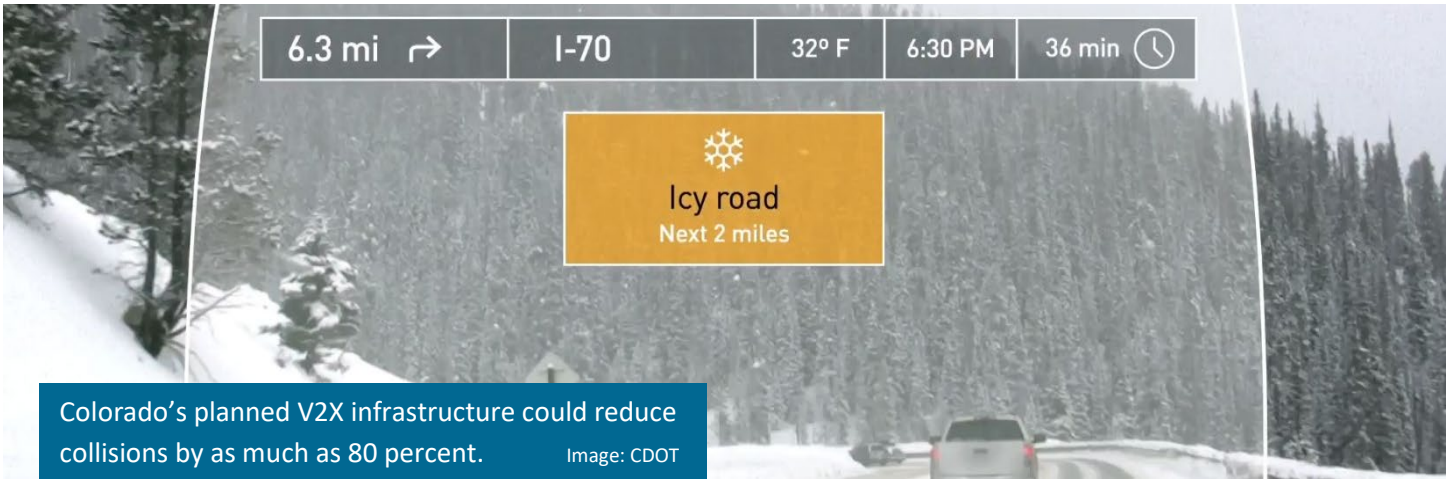
- The Mississippi NRRA Alternative Transportation System aligns with the DOT's vision for improving travel infrastructure by improving access to and recreation opportunities in an urban recreation area, which draws new visitors to the site.
- Close collaboration between multiple jurisdictions and stakeholders facilitates the implementation of a seamless transportation plan with unified marketing.

[100] NPS; 2019. Alternative Transportation Plan: Mississippi National River and Recreation Area Receives over $1 million for Pilot Alternative Transportation Project https://www.nps.gov/miss/learn/management/atp.htm.

[101] NPS; 2019. About the Planner. http://rivertripplanner.org/info.html.

[102] Overson, S.; 2018. Mississippi National River and Recreation Area: Mississippi River Paddle Share, 2018 National Outdoor Recreation Conference, Burlington, VT, April 23-26, 2018. https://www.recpro.org/assets/Conference_Proceedings/2018/Tuesday/Overson%202018NORC.pdf.

Case Study: Colorado V2X Project



Colorado's planned V2X infrastructure could reduce collisions by as much as 80 percent. Image: CDOT

Using V2X Technology to Improve Safety and Mobility Statewide

Over the next two years, the Colorado Department of Transportation (CDOT) will roll out vehicle-to-everything (V2X) technology on interstates across the entire state. The first phase of the project, installing roadside V2X units along 90 miles of Interstate 70 between Golden and Vail, was completed in 2018 in partnership with Panasonic.[103] The remaining phases of the project are being rolled out over the next few years.

The Challenge

Over the last six years, the number of traffic fatalities on Colorado roads has risen by 45 percent.103 While some of this is attributable to an increase in vehicle miles traveled, roadway fatality rates across the United States have actually increased. Modern technology, including autonomous vehicles and connected vehicles (CV), may be able to significantly improve safety.

Intelligent Transportation Systems (ITS) infrastructure has gradually been introduced into more and more areas around the country, but is oftentimes limited to high-trafficked roads in urban areas. As ITS capabilities expand to incorporate developing CV technology, expanding their installation to rural roads may be costly, but will also present significant safety benefits to long-distance drivers.

The Solution

Colorado is installing cellular V2X (C-V2X) roadside units on 537 miles of highway over the next few years. The technology uses a cellular-like network to communicate information from vehicles to other vehicles and sensors mounted on the infrastructure. C-V2X can be used to deliver warnings about road conditions (such as areas of ice), traffic conditions (such as slower vehicles), or work zones (such as indicating lane closures).[104]

C-V2X has been billed as a faster alternative to the previous standard dedicated short-range communications (DSRC) technology. The Colorado system will require broadband installation along sections of road where it is not already available but will be able to quickly transfer data to a central facility.[105]

[103] CDOT; "CDOT and Panasonic take First Steps to Turn I-70 into Connected Roadway" https://www.codot.gov/news/2018/july/cdot-and-panasonic-take-first-steps-to-turn-i-70-into-connected-roadway.

[104] Colorado Sun; "Colorado's Internet of Roads Is a Go" https://coloradosun.com/2018/12/26/colorado-internet-roads-x-technology/.

[105] Denver Post; "Denver the Testing Ground for a New Connected-Car Technology. https://www.denverpost.com/2018/08/15/denver-connected-car-technology/.

Implementation

The statewide implementation of V2X infrastructure will be funded with a mix of Colorado state funds, $36 million in private sector contributions from extending broadband into rural communities, and a $20 million Federal BUILD grant. This partnership between public and private organizations is an innovative funding practice not widely used.

Though not many cars are currently equipped with CV sensors, most carmakers are planning to incorporate this technology into upcoming models. Vehicle units will also be mounted on CDOT vehicles such as maintenance trucks and snow plows. Snowplows can be equipped with friction sensors to communicate road surface conditions to roadside units and other vehicles.

A pilot project C-V2X roadside unit mounted above I-70 along Colorado's Mountain Corridor. Image: CDOT

CDOT projects that the statewide V2X system will generate more than 2 billion safety messages per hour from vehicles.103 For comparison, Twitter averages 28 million tweets per hour, so CDOT will be handling tremendous volumes of data and processing it to deliver actionable messages to vehicles. Panasonic is providing a cloud-based data platform to interpret incoming signals from cars and push out traffic warnings to appropriate vehicles across the state.

Impact on Travel and Tourism

Widespread installation of connected vehicle technology can make driving much safer and efficient. While many urban areas have equipped roads with ITS infrastructure to manage congestion and notify drivers of closures, ITS has not spread as significantly to rural areas. This project will benefit travel and tourism in Colorado by improving safety and mobility on rural roads that travelers use to access tourist attractions and other destinations across the state.

Key Takeaways

- Colorado's V2X project aligns with the U.S. DOT's vision of improving traveler safety by preparing infrastructure for new connected vehicle technology.
- Leveraging private funding opportunities minimizes the amount of public funds that are required for a project while generating identical benefits to the public.

Case Study: I-70 Mountain Express Lane

Colorado's I-70 Mountain Express Lane is only open on weekends and holidays, and is a shoulder lane when not in use.

Image: CDOT

An Express Lane to Alleviate Congestion during Peak Periods along a Key Tourist Corridor

Colorado's I-70 Mountain Express Lane runs 13 miles eastbound on I-70 from Empire to Idaho Springs, an area that experiences considerable congestion during winter (for skiing and other winter sports) and increasingly summer (for hiking and other mountain sports) weekends when tourism and leisure travel is at its peak. The lane opened in 2015 and uses variable pricing to control congestion. The lane is only open weekends and holidays and is a shoulder lane when not in use.[106]

The Challenge

As the only east-west interstate across Colorado, Interstate 70 (I-70) is a vital channel for tourism, education, freight, medical services, and employment in the Denver area. The narrow mountain corridor historically produces debilitating congestion during winter weekends, with travel time sometimes exceeding two hours to travel eight miles.

The Solution

The Colorado Department of Transportation (CDOT) I-70 Mountain Express Lane project upgraded 13 miles of eastbound I-70 within CDOT's existing right-of-way. This work created a wide shoulder that operates as a third travel lane along eastbound I-70.

Rather than being open all the time, the lane is open for up to 100 days per year when the highway experiences the highest traffic congestion (primarily holidays and weekends). This provides much-needed relief to the busiest recreation highway in the state. When the lane is not open, the overhead signage indicates that it is closed and is being used as a shoulder. The project provided an innovative approach to maximize use of existing highway infrastructure by opening and tolling highway shoulders to ease peak-period congestion. By reducing congestion, the lane improves travel times, enhances productivity, and boosts the tourism economy.[107]

[106] CDOT; 2017, I-70 Mountain Express Lane. https://www.codot.gov/projects/archived-project-sites/I70mtnppsl.

[107] FHWA; 2017. Context Sensitive Solutions: I-70 Eastbound Peak-Period Shoulder Lane. https://www.fhwa.dot.gov/environment/environmental_excellence_awards/eea_2017/page06.cfm.

A map of the I-70 Mountain Express Lane (Eastbound PPSL Area) in the context of the Mountain Corridor. Image: CDOT

Implementation

Crews expanded eastbound I-70 from two lanes to three between Idaho Springs and Empire. Because the shoulder lane is narrower, travel is restricted to cars, and CDOT can close the lane in inclement weather conditions.

The project cost $72 million, which included a loan of $24.6 million from the Colorado High Performance Transportation Enterprise. Toll revenues from the Express Lane will be used to repay the loan.[108]

In July 2019 CDOT began construction adding peak period shoulder lane to the westbound stretch of I-70 from the Veterans Memorial Tunnels to U.S. Highway 40.[109]

Impact on Travel and Tourism

Since opening in December 2015, the Mountain Express Lane has relieved traffic congestion by diverting cars from the general-purpose lanes. CDOT reports that the lane reduces travel time by nearly half from the Eisenhower/Johnson Memorial Tunnels (EJMT on the map) to the top of Floyd Hill east of Idaho Springs, resulting in an average time savings of 30 minutes for those who use the Express Lane. CDOT, local communities, and travelers are benefitting from the I-70 Mountain Express Lane via decreased travel times and faster, more consistent speeds. The lane has also helped reduce congestion due to traffic incidents.[110]

Key Takeaways

- The I-70 Mountain Express Lane project supports the DOT's goal of increasing capacity to allow travel growth with a targeted investment that provides more capacity when it is most needed.
- Lanes using variable congestion-management pricing can reduce congestion and improve travel time reliability on busy interstates during periods of high traffic.
- The project makes the most of the existing infrastructure to reduce the amount of investment needed to increase capacity.

[108] CDOT; 2017. I-70 Mountain Express Lane FAQ. https://www.colorado.gov/pacific/sites/default/files/Express%20Lane%20FAQ%20Long.pdf.

[109] Murray; 2019. Colorado kicks off new 1-70 express lane, *Denver Post*, July 11, 2019. https://www.denverpost.com/2019/07/11/cdot-i-70-mountain-express-lane/.

[110] CODOT; 2017, I-70 Mountain Express Lane. https://www.codot.gov/projects/archived-project-sites/I70mtnppsl.

Case Study: SunRail Connector to Orlando International Airport

Florida's SunRail Commuter Rail began service in 2014. Image: SunRail

Expanding Commuter Rail Service to Connect to a Major Airport

The Florida Department of Transportation (FDOT) is considering a 5.5-mile commuter rail project connecting the SunRail system with Orlando International Airport. The project would connect the north-south SunRail system to the airport via an east-west spur and expand service to the airport to include evenings and weekends.

The Challenge

Florida's SunRail commuter rail system began service in 2014 and is considering expanding to Orlando International Airport. Shuttle service currently requires passengers to disembark from the train and board a shuttle bus for an approximately 15 minute trip to the airport.

Over 23 million people boarded flights at Orlando in 2018, making it the 10th busiest airport in the country.[111] Tourist destinations in the area include Disney World, Universal Orlando Resort, SeaWorld, and downtown Orlando. Public transit connections to the airport are limited.[112]

The Solution

The proposed SunRail Connector to Orlando International Airport would replace the existing shuttle service linking the commuter rail to the airport.[113] The commuter rail connector would transport passengers to the Intermodal Terminal just south of the airport. There visitors could board an automated people mover for a 4-minute ride to the terminal, or connect to planned service from Virgin Trains USA high-speed rail to Miami.

[111] FAA; 2019. Commercial Service (Rank Order) Based on Calendar Year 2018. https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/media/preliminary-cy18-commercial-service-enplanements.pdf.

[112] Lynx; 2019. SunRail Connections. https://www.golynx.com/plan-trip/riding-lynx/sunrail-connections.stml.

[113] FTA; 2018. SunRail Connector to the Orlando International Airport Orlando, Florida. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/funding/grant-programs/capital-investments/69756/fl-orlando-sunrail-connector-oia-fy19-profile.pdf.

Implementation

The Orlando International Airport Connector project is part of the third phase of development of the SunRail system.

An advertisement for SunRail's existing shuttle service to Orlando International Airport, which would be replaced by the Connector. Image: FDOT

The first phase of development launched service to 12 stations over 32 miles. The second phase of development extended service further north and south, where SunRail currently operates 40 trips per day, Monday through Friday.[114] Expansion to Orlando International Airport would require additional service on weekends. FDOT plans to analyze the operational impacts of a service expansion.

In October 2015, the SunRail Connector to the Orlando International Airport entered Small Starts Project Development, which is a Federal Transit Administration (FTA) Program that provides grants for transit projects that have completed initial phases of project development. FDOT completed the environmental review process for the connector with receipt of a Categorical Exclusion from FTA in December 2015. FDOT is currently re-evaluating the project to reduce costs.[115]

Impact on Travel and Tourism

In addition to expanding service to the airport on weekends, the project would provide direct commuter rail service between the airport, downtown Orlando, and points to the north and south of Orlando for the 20,000 airport employees and the 100,000 air passengers who board daily at the airport.[116]

Key Takeaways

- The SunRail Connector to Orlando International Airport would support the DOT's vision of improving connections between transportation modes and expand transportation options for those traveling through Orlando International Airport.

[114] Sunrail; 2019. Media Information. https://corporate.sunrail.com/media-info/.

[115] FTA; 2018. SunRail Connector to the Orlando International Airport Orlando, Florida. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/funding/grant-programs/capital-investments/69756/fl-orlando-sunrail-connector-oia-fy19-profile.pdf.

[116] Fluker, A.; 2015, Sunrail takes steps on plans for Phase 3 to Orlando airport. https://www.bizjournals.com/orlando/blog/2015/09/sunrail-takes-steps-on-plans-for-phase-3-to.html.

U.S. Department of Transportation