U.S. Department
of Transportation

Capacity Assessment

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INTRODUCTION

In accordance with the Foundations for Evidence-Based Policymaking Act of 2018, Public Law No. 115-435 (Evidence Act), the United States Department of Transportation (DOT or the Department) is pleased to present the Capacity Assessment. The following report assesses DOT's research, statistics, and evaluation capabilities based on a number of criteria defined in Office of Management and Budget (OMB) Memorandum M-19-23. In accordance with the Evidence Act and relevant OMB guidance, this document covers:

   a. A list of the highest priority activities and operations of DOT that are currently being evaluated and analyzed;

   b. The extent to which the research, statistics, and evaluation efforts and related activities of the DOT support the needs of various divisions within the Department;

   c. The extent to which the research, statistics, and evaluation efforts and related activities of the DOT address an appropriate balance among competing needs related to organizational learning, ongoing program management, performance management, strategic management, interagency and private sector coordination, internal and external oversight, and accountability;

   d. The extent to which DOT uses methods and combinations of methods that are appropriate to DOT divisions and the corresponding research questions being addressed, including an appropriate combination of formative and summative evaluation, research, and analysis approaches;

   e. The extent to which the evaluation and research capacity is present within the DOT to include personnel and DOT processes for planning and implementing evaluation activities, disseminating best practices and findings, and incorporating employee views and feedback; and

   f. The extent to which the DOT has the capacity to assist DOT staff and program offices to develop the capacity to use evaluation, research, and analysis approaches and data in the day-to-day operations.

In FY 2022, the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law, created generational investments to improve our nation's roads and bridges, promote safety for all road users, help combat the climate crisis, and advance equitable access to transportation. This legislation may provide the Department will additional opportunities to advance its evidence-building practices.

The document is structured by major evidence-building practice – research, statistics, and evaluation – and includes a discussion of the coverage, quality, methods, effectiveness, and independence of each evidence type. Using the results of this assessment, the Department seeks to establish initial understanding of DOT's ability, capacity, and infrastructure to carry out evidence-building activities to inform future evidence-based decision-making. This assessment also provides senior officials with the information needed to:

   • Fulfill the Evidence Act's intent of improving DOT's ability to support the development and use of evaluation;

   • Coordinate and increase technical expertise available for evaluation and related research activities within DOT; and

   • Improve the quality of evaluations and knowledge of evaluation methodologies and standards across the Department.

This document was created by the Office of the Chief Financial Officer and Assistant Secretary for Budget and Programs (OST-B), in collaboration with DOT's Evidence Act senior officials and a variety of key stakeholders from across the Department who possess subject matter expertise in research, statistics, and evaluation. OST-B interviewed several senior leaders within the Office of the Secretary and the Operating

Administrations to develop conclusions included below. The Capacity Assessment will serve as a living document and be updated to inform capacity building throughout the Department in the coming years.

CONCEPTS AND PRINCIPLES

In its Memorandum M-19-23, OMB directs agencies to assess their evidence activities across five dimensions: coverage, quality, methods, effectiveness, and independence. For the purpose of the Capacity Assessment, DOT used the following definitions for these dimensions, which are adapted from OMB Circular A-11 Section 290: Evaluation and Evidence-Building Activities:

- *Coverage:* Describes the evidence activities that are happening and where in the Department the activities are occurring.

- *Quality:* Describes the extent to which data and other information used in the course of conducting evidence activities are of high quality with respect to utility, objectivity, and scientific integrity.

- *Methods:* Describes the techniques, systems, and processes used in evidence generation. Methods may vary by evidence type; however, all methodologies should include an appropriate level of rigor and take an empirically proven approach.

- *Effectiveness:* Describes the extent to which evidence activities are meeting their intended outcomes, including serving the needs of stakeholders and being disseminated appropriately.

- *Independence:* Describes the extent to which the activities being carried out are free from bias and inappropriate influence.

ACTIVITIES AND OPERATIONS CURRENTLY BEING EVALUATED AND ANALYZED

DOT conducted a data call to all Operating Administrations to inventory the highest-priority activities and operations currently being evaluated or analyzed across the Department. The results of this data call are available in the Appendix. This inventory is not a comprehensive list of all ongoing evaluations and analyses but represents the most critical activities as identified by the Operating Administrations. In future years, the Department may continue building out this inventory to gain a more robust understanding of the Operating Administrations' evaluation and analysis functions.

Additionally, in accordance with 49 U.S.C. 6501, the Office of the Assistant Secretary for Research and Technology (OST-R) publishes an Annual Modal Research Plan for each Operating Administration detailing planned studies and analyses for the upcoming fiscal years beyond what is included in the Appendix of this document.

RESEARCH

COVERAGE

DOT conducts a wide range of research activities to help solve transportation challenges and address issues of national significance. OST-R works closely with the Departmental Operating Administrations and all segments of the transportation sector to identify gaps in research and appropriately invest Federal resources to improve the performance of the national transportation system. OST-R maintains a five-year Research, Development, & Technology (RD&T) Strategic Plan, which meets the requirement set forth in 49 U.S.C. 6503. The plan was recently updated with an addendum to address the impact of the COVID-19 pandemic on research priorities. 49 U.S.C. 6501 also requires "the head of each Operating Administration and joint program office[1]" to submit an Annual Modal Research Plan, consistent with the Department's RD&T Strategic Plan, for review and approval by OST-R. (Note that the Great Lakes St. Lawrence Seaway and the Office of the Inspector General do not submit Annual Modal Research Plans because they either do not receive appropriated research funding or they do not have a research office conducting RD&T programs.) The Annual Modal Research Plans provide a comprehensive overview of Operating Administrations' research plans for the upcoming fiscal year, as well as a detailed outlook for the following fiscal year. The reviews conducted by OST-R are intended to identify and eliminate duplicative research efforts performed by different organizations across the Department and to ensure that Operating Administrations' research activities are consistent with the DOT RD&T Strategic Plan. The most recent Annual Modal Research Plans are available on OST-R's website.

OST-R and the Operating Administrations often partner with the John A. Volpe National Transportation Systems Center (Volpe Center) and fund their research efforts through the Innovative Research Program Office. This office oversees and coordinates five key research programs around small business innovation, exploratory advanced research, Intelligent Transportation Systems (ITS), technology transfer, and highway safety countermeasures. The Volpe Center works closely with both OST-R and the Operating Administrations to serve the innovative research needs of the Department.

OST-R facilitates research collaboration with external transportation organizations such as the Transportation Research Board and the American Association of State and Highway Transportation Officials, as well as universities and institutes of higher education. These partnerships help to optimize the efficiency, relevance, and deployment of transportation research, data, and findings and provide opportunities to coordinate and align research initiatives across the nation.

QUALITY

OST-R guides the quality of research activities through the Scientific Integrity Policy, DOT Public Access Plan, Public Access Implementation Working Group, and the RD&T Planning Team. In accordance with the Scientific Integrity Policy, all research used to support DOT policy decisions must undergo an independent peer review by qualified experts. The DOT Public Access Plan requires research conducted through grants to be assigned a DOT grant manager who ensures data used in research meets quality standards. The Public Access Implementation Working Group supports several DOT research programs that focus on developing new, high-quality data sources, tools, and models to enable the exchange and analysis of data used to inform decision-making. The RD&T Planning Team also convenes monthly to discuss best practices in research quality and incorporates these practices into Operating Administration guidance on Annual Modal Research Plan development. At the Operating Administration level, 13 documents were identified as standards or guidance to improve research quality. These documents complement Department-wide policies and guidance. DOT is assessing ways to improve transparency of research findings. To expand public access, the Department is currently responding to the Public Access directive to develop and implement new processes

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[1] Includes the Intelligent Transportation Systems Joint Program Office.

to implement the Public Access Plan. The Department is also working to improve data completeness and accuracy in the Research Hub.

METHODS

Research bodies across the Department are responsible for determining the appropriate methods to conduct research activities. OST-R strives to facilitate the widest possible awareness and coordination among recipients of research funding so they may draw upon one another's data, methods, or findings. OST-R's centralized review of Annual Modal Research Plans facilitates the sharing of methods across similar research activities. The Department is also taking steps to incorporate cutting-edge methodologies, such as big data in cybersecurity, Artificial Intelligence learning, analysis of multimodal connectivity, and safety assessments. Several Operating Administrations host external events to seek feedback on methods and future research.

EFFECTIVENESS

The Department has a centralized and thorough process to prioritize research activities and eliminate duplication. In FY 2018, OST-R led the creation of 11 topical research working groups on topics aligned to the Department's FY 2018 – 2022 strategic goals. The working groups are currently being restructured to align to the new strategic goals as defined in the DOT FY 2022 – 2026 Strategic Plan and associated RD&T Strategic Plan. The Department recognizes the challenges of assessing the value of research investments and outcomes and seeks to strengthen its evaluation processes. The recent publication of the Research and Development logic model is a significant step towards identifying the series of long-term outcomes that could be measured, as is the establishment of a new Performance Management Data System (PMDS) that allows OST-R to track and coordinate the Department's research portfolio at the project level.

A Research Review Working Group, chaired by OST-R, annually reviews and makes recommendations to DOT leadership on the research activities of the Operating Administrations to ensure that the Department's research portfolio aligns with Secretarial policy priorities, complies with statutory mandates, and makes effective and efficient use of its research funds. This working group has proven vital to the research community at the Department in delivering resource efficiencies and accelerating the sharing and deployment of new technologies and research results. To encourage widespread use of said results, OST-R encourages Operating Administrations to make their research outcomes and technical reports publicly available on the DOT Research Hub and the National Transportation Library (NTL).

The Department is working to define and monitor progress toward long-term research outcomes. A Technology Transfer, Evaluation and Performance Measurement working group leads this effort and seeks to incorporate leading practices from other agencies. In addition, OST-B and OST-R will collaborate to continue to align the RD&T Strategic Plan and Learning Agenda to strengthen the effectiveness of the Department's research activities.

INDEPENDENCE

Since FY 2009, OST-R has maintained a Scientific Integrity Policy and accompanying implementation manual to ensure political appointees do not exert undue influence over scientists in the conduct of scientific research. The Operating Administrations abide by the Department-level policy. The Department has had no formal complaints filed by DOT employees, nor have any external recipients of DOT research funding claimed to have experienced impediments by management against publication.

In compliance with the Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking, the Department named a Chief Science Officer and Scientific Integrity Officer to ensure the highest level of integrity in all aspects of the Department's involvement with scientific and technological processes. OST-R is leading an effort to review and update the Department's Scientific Integrity policy to comply with all requirements of the memorandum, including conducting routine training on the policy.

The Department is exploring ways to monitor and assess the implementation of the Scientific Integrity Policy. Department has an opportunity to strengthen its monitoring and assessment practices. Through this process, the Department can also ensure alignment between the Scientific Integrity Policy and the Evaluation Framework per the presidential memorandum referenced above.

STATISTICS

COVERAGE

The Bureau of Transportation Statistics (BTS), an OMB-designated Principal Statistical Agency in DOT, provides statistics that encompass all modes of transportation, and ensures that the statistics compiled are designed to support transportation decision-making. Specifically, BTS is one of the primary sources of statistics on commercial aviation, multi-modal freight, and transportation economics, and provides context to decision makers and the public for understanding statistics on transportation. BTS provides timely, accurate, and credible information on the National transportation system, the movement of people and goods, and the consequences of transportation for the economy, society, and the environment. To complete the statistics life cycle, BTS' NTL curates, archives, and disseminates all transportation information. The NTL is a permanent, publicly accessible home for research publications and data from throughout the transportation community; the gateway to all DOT data; and the help line for the Congress, researchers, and the public for information about transportation. BTS publishes the Transportation Statistics Annual Report, which characterizes the state of the transportation system and the state of transportation statistics and submits this report each year to Congress and the President. In addition to the responsibilities described above, BTS offers guidance to and serves as a resource for Operating Administrations' statistical offices, and the BTS Director serves as the senior advisor to the Secretary on data and statistics and as the Department's Statistical Official. An overview of additional BTS products and services is available in the BTS Strategic Plan.

The BTS Director leads the Bureau's approximately 55 employees, including more than 40 statisticians, economists, and specialists in geospatial statistics, data science, and library science. The BTS workforce is supplemented by BTS Fellows and contractors. The Bureau provides opportunities for its staff to strengthen their skill sets through trainings, conferences, and university programs, such as the Joint Program in Survey Methodology.

The Operating Administrations perform critical statistical functions to collect and organize information about their respective modes of transportation. There are an estimated seven OMB-recognized statistical units performing statistical functions within the Operating Administrations with more than 100 full time-equivalent employees. The National Highway Traffic Safety Administration's (NHTSA) National Center for Statistics and Analysis is the largest recognized statistical unit at the Department with 70 full time-equivalent employees.

The Department is working on several initiatives to improve the coverage of statistical activities:

- *Increase frequency of national data collection on personal and household travel:* The Federal Highway Administration (FHWA) conducts the National Household Travel Survey, the authoritative source of travel behavior of the American public. This survey is conducted every five to seven years. The COVID-19 pandemic is leading to a "new transportation normal" and increased uncertainty around travel behaviors. Decreasing time between surveys, or developing scaled-down versions of the survey, would provide necessary information to understand how, when, and why the American public is traveling.

- *Collection of real-time transit data*: The Federal Transit Administration (FTA) receives transit ridership data that is months or sometimes years old and driven by legislative requirements. The COVID-19 pandemic has impacted assumptions on ridership, and real-time data would help FTA understand the potential "new normal" for transit. During FY 2022, FTA plans to propose a timelier data collection method in the Federal Register.

- *Increase staff capacity on statistical science or transportation topics:* DOT is working to train staff to have a combination of statistical competencies and transportation subject matter expertise.

- *Improve data collection from States on safety interventions:* Increasing the timeliness of reporting and data collection from State DOTs would improve NHTSA's understanding of the effectiveness of specific safety interventions. NHTSA will be undertaking a new initiative under the recently authorized Crash Data Program to improve its knowledge of roadway incidents.

- *Improve the coverage and timeliness of data on supply chain visibility and bottlenecks:* DOT is working to improve coverage and timeliness of data on supply chain to better characterize and address supply chain challenges in the freight and logistics sector. Improving the coverage and timeliness of this data would enhance the evidence-building activities of the Department in support of Executive Order No. 14017 and the Supply Chain Disruptions Task Force.

- *Improve data collection needed to adequately advance transportation equity:* The Department is exploring ways to collect data to inform statistical analyses of equity in transportation with respect to underserved populations and communities. Based on the data assessment results from the 200-Day Equity report to OMB, and inputs provided by stakeholders through a Request for Information and by others, improving the coverage and geospatial granularity of socioeconomic and transportation data would enhance the evidence-building activities of the Department in support of Executive Order No. 13985.

QUALITY

BTS provides statistical policy leadership through its participation in the Interagency Council on Statistical Policy, Federal Geographic Data Committee, American Statistical Association, and DOT Geospatial Data Council, as well as its sponsorship of the Committee on National Statistics and the Transportation Research Board. While BTS does not exercise direct authority over Operating Administrations' statistical offices, it encourages collaboration and quality improvement among DOT statistical programs. BTS also provides advice on good statistical practice, performance measurement, geographic data coordination, and minimization of response burden. This includes the development of the Annual Performance Data Completeness and Reliability Template, and review of Information Collection Request packages containing surveys, censuses, or employing statistical methods that DOT submits to the OMB Office of Information and Regulatory Affairs.

The Department is assessing ways to expand BTS's ability to provide advice on statistical quality to Operating Administrations and to increase staff capacity for data quality assessment.

STATISTICAL METHODS

Congress requires BTS to "continually improve surveys and data collection methods of the Department to improve the accuracy and utility of transportation statistics."[2] BTS promotes innovative methods of data collection, statistical modeling, analysis, visualization, and dissemination to improve operational efficiency, examine emerging topics, and create relevant and timely statistics. While BTS continues to improve traditional methods, the rapid advancement in statistical sciences requires BTS to investigate new methods of data collection, processing, analysis, quality assurance, dissemination, and preservation to enhance future products and services.

The Department has identified five initiatives to improve statistical methods:

- *Keep pace with innovation in data collection and analysis methods:* As the demand for data and statistics continues to grow, methods of collection and analysis are undergoing major change. Surveys that are compliant with the Paper Reduction Act requirements remain a critical source of data, but their cost-effectiveness is declining. The widespread replacement of paper with electronic transactions in businesses, the growth of online shopping, the exploding use of electronic sensors for

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[2] 49 U.S.C. § 6302(b)(3)(B)(iv)

controlling everything from vehicle engines to traffic signals, extensive coverage of cell phones, and the complete coverage of publicly available aerial imagery provide new sources of data on transportation and its consequences. These new data sources often involve unexplored privacy concerns, data sharing complications, poorly documented quality problems, and integration challenges. Alternative data sources such as administrative records and sensor data can also present data quality issues that require time to identify and resolve. Furthermore, access to and use of some alternative data sources can require complex negotiations to balance proprietary interests and confidentiality concerns with the desire to provide public access to the data. Such negotiations take time and require experience to perform effectively.

- *Provide recruitment and training on advanced statistical methods:* Statistical methodologies and data sciences are rapidly evolving. The Bureau often relies on fellowship programs and other channels to fill knowledge gaps. BTS will focus its recruitment and training efforts on cutting-edge methodologies to improve its capacity in this area.

- *Improve statistical sampling systems to understand crashes:* NHTSA has collected crash data since the early 1970s to support its mission to reduce motor vehicle crashes, injuries, and deaths on our nation's highways. The Crash Investigation Sampling System is one of several components of NHTSA's crash data collection program. Expansion of the Crash Investigation Sampling System program in combination with increased use and acquisition of electronic crash data would provide several benefits: increased data to improve overall accuracy; improved statistical efficiency through increased sample selection size; and further protect data that could be deemed sensitive or personally identifiable information using advanced security measures.

- *Develop improved methods to estimate distributional equity impacts of regional transportation investments:* In addition to improvements in data collection needed to adequately advance transportation equity as described above, there is also a need for the development and adoption of improved methods for assessing the impacts of transportation programs and policies on underserved communities. The development and adoption of such methods would enhance the evidence-building activities of the Department in support of Executive Order No. 13985.

- *Develop improved methods to gain increased visibility into supply chains and to better understand the nature of supply chain bottlenecks:* Improvements in the coverage and timeliness of data on supply chains is required to better characterize and address supply chain challenges in the freight and logistics sector. There is a need to explore the use of alternative data from both public and private sources such as administrative records, location-based services device data, and pulse surveys, and to integrate and link the data from these multiple sources. Improving the coverage and timeliness of supply chain data would enhance the evidence-building activities of the Department in support of Executive Order No. 14017 and the Supply Chain Disruptions Task Force and help the Department to address supply chain challenges in the freight and logistics sector.

EFFECTIVENESS

By law, the BTS Director is the senior advisor to the Secretary of Transportation on data and statistics.[3] BTS carefully manages its budget and staff to meet ever-growing national needs for its services, support the Secretary's strategic objectives, provide evidence to decision makers, fulfill the BTS legislated mandates, and meet increased demand for transportation statistics with useful, timely, and credible products. To achieve this balance, BTS concentrates its activities on its core areas of expertise and on improvements in developing and delivering BTS products. In carrying out its responsibilities under the Evidence Act, BTS represents the transportation community in the Federal Interagency Council on Statistical Policy, including participation in the Standard Application Process Technical Working Group of the Interagency Council on Statistical Policy

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[3] 49 U.S.C. § 6302(b)(3)(A)(i)

that is focused on facilitating the sharing of confidential data among principal Federal statistical agencies for purposes of developing evidence, as required under Title III of the Evidence Act. BTS also participates in the Federal Committee on Statistical Methodology.

DOT has identified three areas to improve the effectiveness of statistical activities related to the following DOT strategic goals:

- *Equity:* In response to the recent Executive Order No. 13985, the Department plans to examine the extent to which its programs and policies disproportionately negatively impact people of color and other underserved communities. The Department requires additional data to inform statistical analyses of existing inequities in transportation due to racial, ethnic, geographic, and disability disparities. National and State-level equity data could be bolstered by obtaining additional data at the local level to inform decisions about underserved communities. To this end, the Department will build on public comments received on its Request for Information: Transportation Equity Data posted on May 25, 2021, to expand its cadre of data and assessment tools that could assist in these statistical activities.

- *Climate solutions:* To develop and improve analytical tools to support decision-making around climate-related topics such as transportation energy use, emerging technologies, and greenhouse gas emissions, the Department requires robust data collection and analysis frameworks. DOT will focus on the placement of electric vehicle charging stations. The Department will consider social and demographic data to identify areas of high need. Furthermore, additional data could be collected to help the Department define and understand aspects of the transportation infrastructure that are affected by climate shocks and variability. These data could improve DOT's ability to develop resiliency measures and assess the impacts of service disruptions on the populations the Department serves.

- *Transformation and economic growth:* DOT has new responsibilities to efficiently and effectively allocate IIJA funds to improve the condition of highways, bridges, runways, and other facets of the Nation's transportation infrastructure. The Department will improve data and analytical tools to support the prioritization of these infrastructure investments and facilitate data-driven decisions.

INDEPENDENCE

BTS is required by statutory law to assure that all products are developed with rigor, transparency, independence from undue influence (49 U.S.C. 6302(d)). BTS also abides by the *Statement of Commitment to Scientific Integrity by Principal Statistical Agencies* and *OMB Statistical Policy Directives*. Given these statutory requirements and BTS' adherence to them, the Department has not identified any areas of capacity building needed to improve independence in statistical activities.

EVALUATION

At DOT, the definition of evaluation has been historically broad and inclusive of a variety of study designs. OMB Memorandum M-20-12, published in March 2020, provides clear definitions of evaluation and associated terms. Upon review of DOT evaluation activities that meet the definition in this memorandum, the Department has determined it has significant opportunities for improvement.

COVERAGE

Several Operating Administrations have undertaken evaluation activities in recent years, including FHWA, FTA, NHTSA, the Federal Motor Carrier Safety Administration (FMCSA), and the Federal Railroad Administration (FRA). Within the Operating Administrations, there are few employees with program evaluation competencies. Most ongoing evaluations are conducted in partnership with the Volpe Center, which is staffed with highly trained individuals who can provide objective, on-demand evaluation expertise on transportation programs and policies. It is fully funded by the Operating Administrations that choose to undertake projects through Volpe, making it a unique agency within DOT. Many Volpe sponsors use evaluation, for example, to measure the effectiveness and efficiency of projects (e.g., a deployed technology), to analyze the implementation of programs, and to assess whether processes and programs are meeting their goals and objectives.

There are several ongoing efforts to identify, review, and organize evidence from domestic and foreign transportation-related evaluations. The most comprehensive effort is led by the ITS Joint Program Office . For more than 20 years, the ITS Joint Program Office has been tracking evaluations of ITS technologies; archiving studies; and documenting the benefits, costs, and lessons learned. This information is included in the world's most comprehensive databases on ITS deployment evaluation. Another notable activity is the NHTSA Countermeasures that Work report, which features an analysis of evidence-based traffic safety countermeasures to support State Highway Safety Offices in decision-making. Only measures demonstrated to be effective by several high-quality evaluations are given a five-star rating. NHTSA has released 11 editions of the Countermeasures that Work report since 2005.

The Department is developing an agency-wide framework for supporting evaluations. DOT's Office of the Secretary will aim to assist Operating Administrations by providing technical resources for conducting independent evaluations. Additionally, the Department will educate staff on the benefits of evaluation, encourage use of logic models, improve administrative data collection, and strengthen programs' overall readiness for an evaluation. DOT is also administering a new policy that requires program evaluation for all DOT programs funded at $1 billion or more.

QUALITY

The Department's Evaluation Framework aligns to OMB Memorandum M-20-12 and includes the principles of rigor, relevance, transparency, independence, ethics, and equity. This framework represents a commitment to supporting evidence-based strategic and operational decisions through evaluations that result in continuous improvement across the Department. Following publication of the Evaluation Framework, the Department will release an internal document with additional guidance on evaluations.

The Department plans to provide additional training to staff in program offices and develop an evaluation community of practice. Additional training would build staff capacity to design and execute high-quality evaluations. DOT will also review Operating Administration-level documents to align with the Department's Evaluation Framework.

METHODS

The Department's Evaluation Framework encourages Operating Administrations to apply rigor to evaluations by using robust and unbiased evaluation designs and sound methodology and analysis. The Department also recommends that Operating Administrations use evaluation methods that produce findings that stakeholders can rely upon, while providing a clear explanation of the limitations of the data and the methods used. The Capacity Assessment identified several planned or ongoing formative, implementation, and outcome evaluations, which are described in DOT's FY 2022 and FY 2023 Evaluation Plans. These documents do not include any impact evaluations. The Department is preparing internal guidance to improve evaluation methods. Given the evaluation design and methodology challenges that DOT faces, the guidance will focus on improving methodologies for evaluations with small sample sizes and methods that mitigate the effect of a low degree of control.

EFFECTIVENESS

The Department is taking several steps to improve the effectiveness of its evaluation activities. This includes publishing an Evaluation Framework, creating Annual Evaluation Plans, and providing technical resources to the Operating Administrations. Additional planned actions will further strengthen the effectiveness of evaluation:

- *Improve timeliness of results:* Emerging technologies such as drones and self-driving cars are constantly evolving. To guide the future of technology in transportation, the Department must make program and policy decisions using rapidly generated evidence. Because of the nature of DOT's mission, activities such as evaluations with a randomized control trial may, unless specifically designed for rapid execution, run the risk of producing obsolete findings, especially given Paperwork Reduction Act requirements. The Department will explore how to design and conduct rapid evaluations to inform timely decision-making.

- *Facilitate data collection, use, and sharing for equity evaluations:* In response to Executive Order 13985, the Department has identified actionable opportunities to improve data collection, use, and sharing that would allow for disaggregation, enable DOT to assess whether services are being delivered equitably, and improve understanding of the impact of policies and programs on underserved communities.

- *Encourage and incentivize experimentation among State DOTs and grant recipients:* The Department will encourage State DOTs and other grant recipients to use experimentation as an effective tool to achieve enhanced program outcomes.

- *Explore priority topics for evaluations:* Interviews with the Operating Administrations revealed several potential areas for evaluation – improving understanding of Federal highway investments' impact on safety, building evidence to support recruiting and training of the aviation and aerospace workforce, and building evidence to improve sustainability and resilience of Federal Aviation Administration (FAA) facilities.

INDEPENDENCE

Under the new Evaluation Framework, the Department will strive for objectivity in the planning and conduct of evaluations and in the interpretation and dissemination of findings, avoiding conflicts of interest, bias, and other partiality. The Department's Evaluation Framework provides broad principles to guide the planning and execution of evaluation activities. At the Operating Administration level, historical technical documents include guidance on evaluation activity, such as the FRA Manual for Research Development and Technology Program and Project Evaluations. These documents will be revisited and updated to ensure alignment to the Department's Evaluation Framework, Scientific Integrity Policy, and additional evaluation guidance.

ACRONYMS AND ABBREVIATIONS

BTS	Bureau of Transportation Statistics
DOT	U.S. Department of Transportation
Evidence Act	Foundations for Evidence-Based Policymaking Act of 2018
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IIJA	Infrastructure Investment and Jobs Act
ITS	Intelligent Transportation Systems
NHTSA	National Highway Traffic Safety Administration
NTL	National Transportation Library
OMB	Office of Management and Budget
OST-B	Office of the Assistant Secretary for Budget and Programs
OST-R	Office of the Assistant Secretary for Research and Technology
RD&T	Research, Development, and Technology
Volpe Center	John A. Volpe National Transportation Systems Center

APPENDIX: CAPACITY ASSESSMENT INVENTORY

This inventory describes the highest-priority or most critical activities being evaluated or analyzed as identified by the Operating Administrations. These include both ongoing and planned activities.

Mode	Activity or Operation	Main Research Question(s)	Brief Summary of Methods	Use and Dissemination of Findings
FAA	FAA Regulatory and Deregulatory Actions	What are the incremental costs and benefits of each significant regulatory action by FAA?	Perform cost-benefit analyses.	Findings will be published in the Federal Register.
FAA	General Aviation Fleet and Operations	What is the expected fleet size, hours flown, and utilization rate for General Aviation aircraft over the next twenty years?	The forecast will be based on aircraft registry, market, and annual survey data.	The findings will be published in the FAA Aerospace Forecast, available at https://www.faa.gov/data_research/aviation
FAA	Passenger Demand and Aviation Activity at U.S. Airports	What is expected passenger demand and aviation activity at U.S. airports over the next twenty years?	In the Terminal Area Forecast, FAA uses regression analyses on ticket, enplanement, and economic variables to forecast passenger demand and model operations by airport.	The Terminal Area Forecast report and data are published annually and available at: https://www.faa.gov/data_research/aviation
FHWA	Americans with Disabilities Act Program	Is FHWA's Americans with Disabilities Act Program effective, efficient, and compliant?	Conduct a Program Area Profile and Enterprise Assessment.	The Enterprise Assessment results will be used in future strategic planning and performance management activities aimed at reducing discrimination.
FMCSA	FMCSA DataQ Program	Is FMCSA's DataQ program administered evenly nationwide?	FMCSA established the DataQ program in February 2004. The Agency would like to assess its effectiveness, identify best practices, and develop performance measures.	A final recommendations report will inform the development and implementation or corrective actions.
FMCSA	Large Truck Crash Causal Factor Study	What pre-crash factors are contributing to large truck crashes?	This study is being conducted in four phases. The first phase was a Request for Information from stakeholders and the public. The second phase is study planning, information technology development, and OMB clearance. The third phase is data collection related to 2,000 crashes studied	The study will provide vital data on the role of pre-crash factors, such as driving behaviors and novel technologies unavailable through other means. Results of the study could be used to identify, develop, and deploy countermeasures to keep large truck crashes from occurring. The data could also help

Mode	Activity or Operation	Main Research Question(s)	Brief Summary of Methods	Use and Dissemination of Findings
			at 32 sites nationwide and is expected to take two years to complete. The final phase will be data analysis and compilation of the final report.	FMCSA understand the role of new automation and fleet technologies, drive future rulemaking activities, and potentially be reused for additional crash causal factor studies focusing on passenger vehicles.
FMCSA	Drug and Alcohol Clearinghouse	Is FMCSA's Drug and Alcohol Clearinghouse being used effectively?	FMCSA is conducting an outcome evaluation to understand the effectiveness of the Clearinghouse four years after the June 2020 compliance data, document best practices, and identify opportunities for improvement.	A final recommendations report will inform the development and implementation of corrective actions.
FRA	Short Line Safety Institute	Is the Short Line Safety Institute (SLSI) conducting Safety Culture Assessments of short line railroads with strong fidelity? How well is SLSI executing its Leadership Development Training and what additional process improvements can SLSI implement to strengthen its training program? Do SLSI's Safety Culture Assessments result in measurable safety culture improvements for participating railroads?	*Fidelity Assessment:* Field observations, document review (procedures, guidance, Assessor manuals, etc.), and interviews with Assessors and other SLSI staff. *Process Evaluation:* Observations; document review (e.g., training materials); survey data analysis; interviews with SLSI staff, training vendors, and training participants; and benchmarking against best practices identified in literature review. *Outcome Evaluation:* Pre-post analysis of Safety Culture Assessment findings and opportunities, survey responses for a sample of short line railroads, and interviews with SLSI staff to validate findings from analysis.	Findings will be disseminated externally in public Research Reports and will be used to improve the SLSI program and the overall safety culture of short line railroads.
FRA	Confidential Close Call Reporting System	FRA intends to examine a series of questions to determine the effectiveness of the Confidential Close Call Reporting System (C3RS) program, including: • What are the strengths and weaknesses in the C3RS implementation phase (e.g., initial	Potential methods include surveys, interviews and focus groups, document reviews, data analysis (statistical and qualitative), and observations.	Results from this evaluation will be published in a report and presented to stakeholders. The results can be used to adjust the operation of the reporting program and collaboration with participating stakeholders to improve their use of this source of safety information.

Mode	Activity or Operation	Main Research Question(s)	Brief Summary of Methods	Use and Dissemination of Findings
		briefing, training, rollout), from the end user perspective? • What are the strengths and weaknesses in the C3RS post-implementation phase (after initial rollout), from the end user perspective? • How useful are the products delivered by the National Aeronautics and Space Administrations (e.g., de-identified reports, portal, safety alerts, quarterly briefings, special studies, etc.)? • What modifications to the Implementing Memorandum of Understanding process are needed (if any) to sustain and grow C3RS in a post-pilot era? • What are the barriers to railroad buy-in of the C3RS program and reporting of close calls? • Is the C3RS program achieving its stated objectives? • Is the C3RS program having an effect on safety outcomes for participating railroads (i.e., is the program effective)?		
FRA	Intercity Passenger Rail Corridor/Project Pipeline Development	What intercity passenger rail corridors and projects are ready for investment?	The IIJA directs the Department to develop two pipelines of intercity passenger rail corridors/projects to guide long-term planning, project development, and investment. The first pipeline of projects is specific to the Northeast Corridor (NEC) and intended to assist NEC states and commuter rail agencies, Amtrak, and the public with long-term capital planning to deliver the NEC Commission's consensus Connect 2035 plan. This NEC project	The project inventories will be submitted to Congress and used to guide intercity passenger rail investment decisions by the Department.

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			inventory will help to sequence the order in which projects will receive funding under the Federal-State Partnership for State of Good Repair grant program's allocation for NEC projects. The second pipeline is intended to facilitate the development of intercity passenger rail corridors across the country. The new Corridor Identification and Development Program will establish a process for eligible entities to submit proposals to partner with the Department to create service development plans for new or improved corridor services. This pipeline will also help to prioritize capital project investment under FRA's competitive grant funding.	
FRA	Discretionary Grant Programs	What are the costs and benefits associated FRA's proposed grant investments?	FRA grantees are instructed to follow the Department's Benefit-Cost Analysis Guidance for Discretionary Grant Programs when preparing benefit-cost analyses related to grant program applications. FRA economists review the applicant's submission to assess the benefit-cost analysis for several factors (such as the reasonableness of applicant's assumptions and the transparency of the analysis) and recommend adjustments based on corrections for any technical errors, applying alternative assumptions, or the consideration of benefits and costs that may have been omitted or are unquantified.	FRA will use benefit-cost analyses to systematically identify, quantify, and compare the expected benefits and costs of potential infrastructure projects.
FRA	FRA Rulemakings	What are the costs and benefits associated with FRA's proposed rulemakings?	For every rulemaking, FRA develops an economic analysis that reviews the costs and benefits associated with a proposed rule. FRA estimates costs by engaging with stakeholders, researching relevant topics, and incorporating subject matter experts.	Summary cost and benefit information is contained in the rulemaking and accompanying Federal Register notice. Detailed information is contained in the rule's Regulatory Impact Analysis, which is in the public docket established for the rulemaking.

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			To further support these rulemakings, FRA determines potential benefits by reviewing historical accident/incident and operational data gathered from railroads, as well as conducting risk analyses to capture potential risks that may not have resulted in an accident or incident. FRA also relies on peer reviewed economic papers to determine the effectiveness rate of the mitigation efforts of the proposed or final rule.	
FTA	Safety Risk Management	How can FTA leverage lessons learned from the implementation of the first four topics evaluated under the Safety Risk Management (SRM) process to enhance effectiveness and timeliness?	FTA will review lessons learned from the first four topics evaluated under the SRM process, including the Inward- and Outward-Facing Cameras safety topic.	FTA will use the lessons learned to revise the Standard Operating Procedure for the SRM process.
FTA	FTA Research Activities – Innovative Public Transit Solutions	To what extent can FTA increase the adoption of innovative or effective practices based on its funded research across the public transit industry? What are the best communication methods for sharing the results of FTA's vast portfolio of past research with public transportation professionals?	Methodologies will include: • Literature reviews within and outside the transit industry to identify research-to-practice methods that are effective in spurring adoption of research innovations within transit systems; • Written report documenting recommendations; • Assessment of the level of adoption for specific innovative technologies; and • Development of an implementation plan for research-to-practice activities.	FTA will use the findings to implement innovative research-to-practice strategies across the public transit industry. FTA will also develop an ongoing communications and outreach strategy to capture and share useful best practices.
FTA	Capital Investment Grants	To what extent did the predicted construction costs, service levels, project scope, and ridership of a transit project receiving major capital project funding from FTA match the actual construction costs, service levels, project scope, and ridership?	The before-and-after studies compare predicted versus actual values for capital cost and ridership for a set of transit projects that meet specified project criteria. Predicted construction costs are calculated by project sponsors using Year of Expenditure dollars and standardized using a template developed by FTA. Actual capital costs are determined when construction is	FTA uses the findings to improve methods for estimating capital costs, forecasting ridership, project risk assessment, and to maintain proactive oversight of projects. FTA publishes a formal before-and-after study on its public-facing website comparing capital cost and ridership for the set of all rated Capital Investment Grant projects periodically (most recently in FY 2020). FTA also provides a

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		In cases where the predicted and actuals do not match, what are causal factors for the differences?	complete. Predicted ridership is calculated by project sponsors using opening year ridership forecast methodology that is reviewed and validated by FTA. Actual ridership is calculated by sponsors using on-board rider surveys at times and locations most representative of typical travel patterns and is conducted two years after the project opens to allow the ridership market to mature.	before-and-after study report to Congress annually. Finally, FTA publishes individual before-and-after project reports on its public-facing website for projects with more than $300 million total cost or more than $100 million FTA-funded cost.
FTA	Performance Measurement of Equity in Transit	FTA plans to develop an equity performance measure for the transit sector that would involve a survey of transit agencies. FTA first needs to identify the survey population (transit providers), collect data on their associated geographic coverage areas, and link that data with U.S. Census demographic data to identify geographic areas that are "underserved" in terms of transit services (to develop a proxy measure for equity).	FTA will fully develop National Transit Map, a nationwide map of fixed routes and schedules based on General Transit Feed Specification data to include transit agencies' geographic coverage areas. Future activities will include integrating U.S. Census demographic data. Once sufficient transit agency participation in the National Transit Map is achieved, FTA plans to survey transit agencies to collect data that will be used to assess equity issues.	FTA plans to use the information for performance planning and reporting and management decision-making.
FTA	Transit Asset Management Program	FTA has identified a broad portfolio of research questions related to the effectiveness of its Transit Asset Management program following the final rulemaking, including: • Has the rule changed asset management practices in the transit industry? • Has the rule contributed towards reducing the state of good repair backlog? Have the requirements for a TAM plan and performance targets led to improved outcomes in safety, service reliability, maintenance costs, and system performance?	Methodologies include transit agency interviews, focus groups, asset inventory analysis from transit agency reporting (institutional data), surveys of relevant FTA staff, and qualitative analysis of Agency narrative reports.	FTA will use the results to respond to audit recommendations and determine future program development.

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MARAD	Sealift Contested Environment Assessment	How can standardization and resiliency of the commercial fleet support operations in a contested environment, including approaches to educate and increase mariner skills and necessary tools and outfitting for U.S. companies, to compete in operations short of war in unstable international waters?	This study will focus on the skills needed in the workforce to recognize and counter activity meant to constrain the U.S. ability to deploy military forces and engage in maritime commerce. The full scope of the study will include analysis and update of previous training curriculum, instruction on new capabilities, tactics, and procedures, with an eye on safety.	Findings will inform development of functional training to provide mariners with an understanding of today's threats and vulnerabilities for sealift vessels, addressing Government Accountability Office and Inspector General reporting on the need for training mariners for contested environment operations. This effort can support improved efficiencies by identifying infrastructure and personnel requirements, while documenting how standardization and alignment efforts can improve overall program management for the most active fleet facilities and anchorages.
MARAD	National Defense Reserve Fleet Resiliency Evaluation	Are the three existing National Defense Reserve Fleet facilities and anchorages, and Ready Reserve Fleet (RRF) resources being utilized effectively?	This will assess the sufficiency and resiliency of infrastructure, personnel safety, and resourcing methods to guide investments, capital improvements or even guide reductions in capabilities, where demand has decreased over time. The study will include projections of future requirements for fleet and anchorage services over the next 25 years. Additionally, the assessment will look at resiliency measures to improve day-to-day readiness of the RRF and document sustainability initiatives for more effective utilization of resources.	All assessment data will be incorporated into the Geographical Information System platform utilized by the Agency and the Department. Performance measures will be developed to gauge effective resource utilization, to inform Agency strategic planning, and to provide Departmental reporting on effectiveness.
MARAD	Training Ship State of Michigan and Maritime Training Platform Requirements Assessment	What fleetwide upgrades and requirements are needed for the Training Ship State of Michigan (TSSOM) to prevent interruption of training cruises, including fleetwide upgrades necessary to improve reliability and safety of the fleet?	Assess the current material condition of TSSOM and look at the effects of casualties suffered over the last ten years onboard the vessel, and another vessel of the same class, TS General Rudder. Equipment and systems will be evaluated according to the hierarchy recorded in the fleetwide, Nautical Systems Enterprise application. Additionally, the assessment will document and record stakeholder concerns for platform or capability expansion and detail the scope of	Information will be used to project major repairs, modifications, and fleetwide upgrades needed in the next five years to improve reliability and safety. This assessment will also document baseline requirements for the maritime training platform needed at GLMA.

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			future changes in berthing arrangements, equipment integration, and operating procedures that would improve maritime training delivery or cadet throughput. This assessment will involve close engagement with stakeholders at Great Lakes Maritime Academy (GLMA) to identify maritime training platform requirements unique to vessels and mariner training on the U.S. Great Lakes.	
MARAD	Assessment of the Interrelationship Between the Maritime Industry and the Other Industries in the Supply Chain	• How can we quantify what benefits or impediments of current processes and infrastructure in the maritime industry have on the overall supply chain? • What effect do the benefits or impediments of other supply industries have on the maritime industry? (e.g., warehousing, manufacturing, rail, truck, ecommerce, etc.).	Leverage existing products and work in the area of freight fluidity to serve as a basis for measuring impacts. This would also incorporate work being conducted on data and information sharing within DOT and across Federal agencies.	The end product will be used as a basis for targeting support for infrastructure investment that supports resiliency and sustainability in the entire supply chain.
MARAD	Assessment of Equity Impacts Related to the Maritime Port Sector	• What are the advantages and disadvantages of ports to nearby communities? • What are the economic advantages by employing community members relative to the disadvantages caused by harmful emissions and light pollution? • How does this affect homebuyer rates/turnover and the local economy? • To what extent are benefits and negative impacts distributed	This assessment would look at existing mechanisms in the public and private sector for measuring carbon emissions and their impacts (e.g., healthcare costs, life-expectancy, etc.) can affect the well-being of a community across different demographic groups at ports in different regions. It will attempt to weigh imbalances in equity at ports in different regions recognizing that levels of inequity among different groups are not the same across all regions and ascertain whether a national-level metric could be established. It will also look into how these high traffic ports could create negative externalities to the community beyond health, such financial return on long term asset retention (e.g.,	This information will be used to develop a maritime related framework to measure equitable outcomes for communities affected by ports versus communities without nearby ports.

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		differently across different population groups? • How do we address differences in equity across different demographic groups and regions?	home owning in these communities). Additionally, it will take into consideration the possible economic benefits related to employment in local communities, and where coordination needs to be strengthened across equity hiring programs.	