National Transportation Safety Board

Fiscal Year 2024 Budget Request

National Transportation Safety Board

Office of the Chair

Washington, DC 20594

March 13, 2023

The Honorable Kamala D. Harris
President
United States Senate
Washington, DC 20510

The Honorable Kevin McCarthy
Speaker
United States House of Representatives
Washington, DC 20515

Dear President Harris and Speaker McCarthy:

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—highway, rail, marine, pipeline, and commercial space. We determine the probable cause of the events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research and special investigations, and coordinate the resources of the federal government and other organizations to assist victims and their family members who have been impacted by major transportation disasters. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and the United States Coast Guard and adjudicate appeals of civil penalty actions taken by the FAA.

The enclosed budget submission reflects the NTSB's request of $145 million for fiscal year (FY) 2024. This funding level is an increase of $15.7 million above the FY 2023 enacted appropriation of $129.3 million and funds 446 full-time equivalent positions.

The products and initiatives highlighted in this submission not only reflect our agency's accomplishments in the past year, but also outline initiatives that will enable us to continue to improve processes and products into the future. These efforts are made possible by the expertise, experience, and diligence of our highly skilled employees. Personnel compensation and benefits account for more than 70 percent of our expenses. Pay raises and increases in agency contributions to employee benefits, such as health benefits, have significantly driven up personnel expenses. This request allows us to meet these personnel needs as well as our operational needs. This increase will also support our continued success in improving the quality and quantity of investigation related data, refining processes for the implementation of safety

recommendations, and allowing administrative functions to fully support mission requirements, as well as other critical activities such as upgrading critical information technology systems and investing in new cybersecurity technologies.

As an agency, we are excited to invest our resources in people and processes that help make transportation safer for the public. Full funding at the requested level of $145 million provides sustained support of this mission.

Sincerely,

Jennifer Homendy
Chair

Enclosures

cc: The Honorable Tom Cole
Chair
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies
Committee on Appropriations
US House of Representatives

The Honorable Mike Quigley
Ranking Member
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies
Committee on Appropriations
US House of Representatives

The Honorable Brian Schatz
Chair
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies
Committee on Appropriations
US Senate

The Honorable Susan Collins
Ranking Member
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies
Committee on Appropriations
US Senate

National Transportation Safety Board

Fiscal Year 2024
Budget Request

National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington, DC 20594
www.ntsb.gov

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ABBREVIATIONS, ACRONYMS, AND INITIALISMS

AANAPSI	Asian American and Native American/Pacific Islander-Serving Institutions
ABA	American Bus Association
ADS-B	automatic dependent surveillance–broadcast
ALE	Alabama Export Railroad
BAC	blood alcohol concentration
BS	IMO ship registration code for the Bahamas
BZ	IMO ship registration code for Belize
CAROL	Case Analysis and Reporting Online
CDO	Chief Diversity Officer
CDOEC	Chief Diversity Officers Executive Council
CFR	*Code of Federal Regulations*
CFV	commercial fishing vessel
CH	IMO ship registration code for Switzerland
CIDER	Crash Investigation Data Extraction and Readout
CO	carbon monoxide
COMTO	Conference of Minority Transportation Officials
COVID-19	Coronavirus Disease 2019
CSX	CSX Transportation
CTAF	common traffic advisory frequency
CVR	cockpit voice recorder
CY	IMO ship registration code for Cyprus
d.b.a.	doing business as

DEIA	Diversity, Equity, Inclusion, and Accessibility
DevOps	software development and IT operations
DIAC	Diversity Inclusion Advisory Council
DOT	US Department of Transportation
DREAM	Data Recorders, Electronics, and Analysis Management tool
DUKW	"duck" boat; a large amphibious vehicle
EEO	Equal Employment Opportunity
EPIRB	Emergency position indicating radio beacon
Evidence Act	Evidence-Based Policymaking Act of 2018
FAA	Federal Aviation Administration
FEVS	Federal Employee Viewpoint Survey
FDR	flight data recorder
FISMA	Federal Information Security Management Act
FMCSA	Federal Motor Carrier Safety Administration
FOIA	Freedom of Information Act
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FTE	full-time equivalent
FY	fiscal year
GSA	General Services Administration
HBCU	Historically Black Colleges and Universities
HR	IMO ship registration code for Croatia
HSI	Hispanic-Serving Institutions
ICAO	International Civil Aviation Organization

IFSD	in-flight shutdown
IIC	investigator-in-charge
IMO	International Maritime Organization
IT	information technology
LGBTQI+	lesbian, gay, bisexual, transgender, queer or questioning, intersex, plus
MAIIF	Marine Accident Investigators' International Forum
MEDICS	Medical Information Catalog System
MH	IMO ship registration code for the Marshall Islands
mph	miles per hour
MSI	Minority-Serving Institutions
MWL	Most Wanted List of Transportation Safety Improvements
NHTSA	National Highway Transportation Safety Administration
NL	IMO ship registration code for the Netherlands
NO	IMO ship registration code for Norway
NTICC	National Transportation in Indian Country Conference
NTSB	National Transportation Safety Board
OMB	Office of Management and Budget
OPM	Office of Personnel Management
OSV	offshore service vessel
PA	IMO ship registration code for Panama
PHMSA	Pipeline and Hazardous Materials Safety Administration
PREVIEW	Protected Recording Viewer system

RLC	rotorcraft-load combination
SacRT	Sacramento Regional Transit District
SAFTI	System for Analysis of Federal Transportation Investigations
SEPTA	Southeastern Pennsylvania Transportation Authority
SES	Senior Executive Service
SIS	substantially interested State
SL	senior level
SLD	supercooled large droplet
SMS	safety management system
SSA	Safe Skies for Africa
sUAS	small unmanned aircraft systems
SUV	sport utility vehicle
ST	scientific and professional
TCU	Tribal Colleges and Universities
TRBCTT	Transportation Research Board's Committee on Tribal Transportation
TTSMSSC	Tribal Transportation Safety Conference Management Systems Steering Committee
UAS	unmanned aircraft systems (drones)
UMA	United Motorcoach Association
UP	Union Pacific Railroad
U.S.C.	*United States Code*
V2X	Vehicle to Everything
VC	IMO ship registration code for St. Vincent and the Grenadines

VFR	visual flight rules
VRU	vulnerable road user
WMATA	Washington (DC) Metropolitan Area Transit Authority

EXECUTIVE SUMMARY

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, highway, marine, pipeline, and commercial space. We determine the probable cause of the accidents and crashes we investigate, and issue safety recommendations aimed at preventing future occurrences of accidents. In addition, we conduct special studies concerning transportation safety and coordinate the resources of the federal government and other organizations to assist victims and their family members impacted by transportation disasters. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The enclosed budget submission reflects the president's request of **$145.0 million** for fiscal year (FY) 2024. This funding level is an increase of $15.7 million from the FY 2023 enacted appropriation level of $129.3 million and funds 446 full-time equivalent (FTE) positions.

We have seen tremendous growth and technological advancements in transportation over the last two decades that have increased the complexity of our investigations. This budget request ensures that we remain the world's preeminent transportation safety agency and can meet the challenges that come with the rapid changes and innovations in transportation. Requested resources are critical for the agency to respond to events without affecting our independence or the timeliness or quality of our investigations and reports. The request will allow us to hire professionals with the required skills to meet upcoming challenges, to purchase the tools necessary for those skilled professionals to do their jobs, and to invest in crucial staff training and development. Such resources would also allow us to address critical needs in information technology (IT) development and modernization to keep pace with continuing advances in technology, as well as to strengthen our data governance and cybersecurity efforts, including our ability to meet congressional mandates in these areas. We will continue to develop data analysis systems to further integrate them into our operations.

Investing in our Workforce: The NTSB's mission of improving transportation safety is dependent on a workforce of knowledgeable, experienced, and dedicated experts in their respective fields. People are our primary resource, and personnel and payroll costs consume most of our funding. The $15.7 million increase in funding is essential to the agency as we strive to achieve and sustain staffing levels that fully support our safety mission and

strategic goals and continue efforts to move the agency to data-based, evidence-driven operations. The requested funding increase will provide for progress toward achieving full staffing levels among investigators and support staff as well as allow us to fill new positions that address emerging technologies, data analysis, and process improvements.

Investing in Data and Technology: Accomplishing our mission also depends upon improving the quality, quantity, and usefulness of investigation-related data and ensuring our IT systems can securely and effectively address the demands of internal and external users. Without capable IT systems, we cannot meet our safety mission. Funding increases in recent years have enabled the agency to make considerable progress in improving the quality, quantity, and usefulness of investigation related data. This progress results, in part, from implementing and enhancing critical software systems, but we must continue to invest in both hardware and software to maintain our progress. Various systems, software, and tools are used across the modal offices and in the Office of Research and Engineering to enable investigative processes to be more effective, efficient, and data driven. Some examples include the System for Analysis of Federal Transportation Investigations (SAFTI) and Crash Investigation Data Extraction and Readout (CIDER) systems. The requested funding will also allow the agency to update and upgrade other critical systems such as the docket management system that stakeholders and the public use to obtain information about NTSB accident investigations, safety recommendations, and transportation safety issues. We also need to invest in new cybersecurity technologies to enable us to protect against, detect, identify, deter, and respond to persistent and increasingly sophisticated malicious cyber campaigns.

We are the world's preeminent transportation safety agency. This budget request highlights the FY 2022 accomplishments of all our offices in supporting the work of the agency. These accomplishments include the completion of accident investigation reports, our involvement in international investigations, and our efforts in advocating for the adoption of our recommendations. We are excited about these accomplishments and eager to meet the challenges ahead of us. Funding at the full request level of $145.0 million supports our important mission now and in the future.

MISSION AND ORGANIZATION OVERVIEW

Since its creation in 1967 as an accident investigation agency within the newly created US Department of Transportation (DOT), the NTSB's mission has been to determine the probable cause of transportation accidents and incidents and to formulate safety recommendations to improve transportation safety. Our authority currently extends to these types of accidents:

- All US civil aviation accidents and certain public aircraft accidents.
- Select highway crashes.
- Railroad accidents involving passenger trains and accidents involving freight trains that result in fatalities or significant property damage.
- Major marine accidents and any marine accident involving both a public and a nonpublic vessel.
- Pipeline accidents involving fatalities, substantial property damage, or significant environmental damage.
- Select accidents resulting in the release of hazardous materials in any mode of transportation.
- Select transportation accidents that involve problems of a recurring nature or that are catastrophic, including select commercial space transportation accidents.

In 1974, Congress passed the Independent Safety Board Act, which severed the NTSB's ties to the DOT and authorized the agency to take these additional actions:

- Evaluate the effectiveness of government agencies involved in transportation safety.
- Evaluate the safeguards used in the transportation of hazardous materials.
- Evaluate the effectiveness of emergency responses to hazardous material accidents.
- Conduct special studies on transportation safety problems.
- Maintain an official US census of aviation accidents and incidents.
- Review appeals from individuals and entities who have been assessed civil penalties by the FAA.
- Review appeals from airmen and merchant seamen whose certificates have been revoked or suspended by the FAA and the US Coast Guard, respectively.

The NTSB also leads US teams assisting in international aviation accident investigations conducted by foreign authorities under the provisions of International Civil Aviation Organization (ICAO) agreements. In 1996, the Aviation Disaster Family Assistance Act assigned the NTSB the additional responsibility of coordinating federal government resources to support local and state governments, disaster relief organizations, and transportation carriers to address the concerns of accident survivors and family members following air carrier accidents that have occurred in the United States or its territories resulting in a loss of life (Title 49 *United States Code* [*U.S.C.*] § 1136. The rail passenger disaster family assistance provisions of the Rail Safety Improvement Act of 2008 assigned the NTSB similar responsibilities for rail passenger disasters resulting in a loss of life (Title 49 *U.S.C.* § 1139). In 2018, our reauthorization expanded our family assistance responsibilities, obligating the agency, to the maximum extent practicable, to provide information regarding NTSB investigative processes and products to the families of individuals involved in any accidents we investigate before we provide this information to the media (Title 49 *U.S.C.* § 1140). Currently, the primary focus of agency efforts is to ensure compliance for accidents involving fatalities.

As of September 30, 2022, the NTSB has investigated more than 153,000 aviation accidents and thousands of surface transportation accidents. On call 24 hours a day, 365 days a year, our investigators have traveled throughout the United States and to every corner of the world to do their work. Because of this dedication, we are recognized as the world's leading accident investigation agency.

We have issued 15,343 safety recommendations derived from the findings of NTSB investigations to 2,478 recipients in all transportation modes. Since 1990, we have published the Most Wanted List (MWL) of Transportation Safety Improvements, highlighting safety-critical actions that the DOT modal administrations, the US Coast Guard, the states, and other entities should take to help prevent accidents, minimize injuries, and save lives. Additional information concerning the MWL is provided in Appendix C.

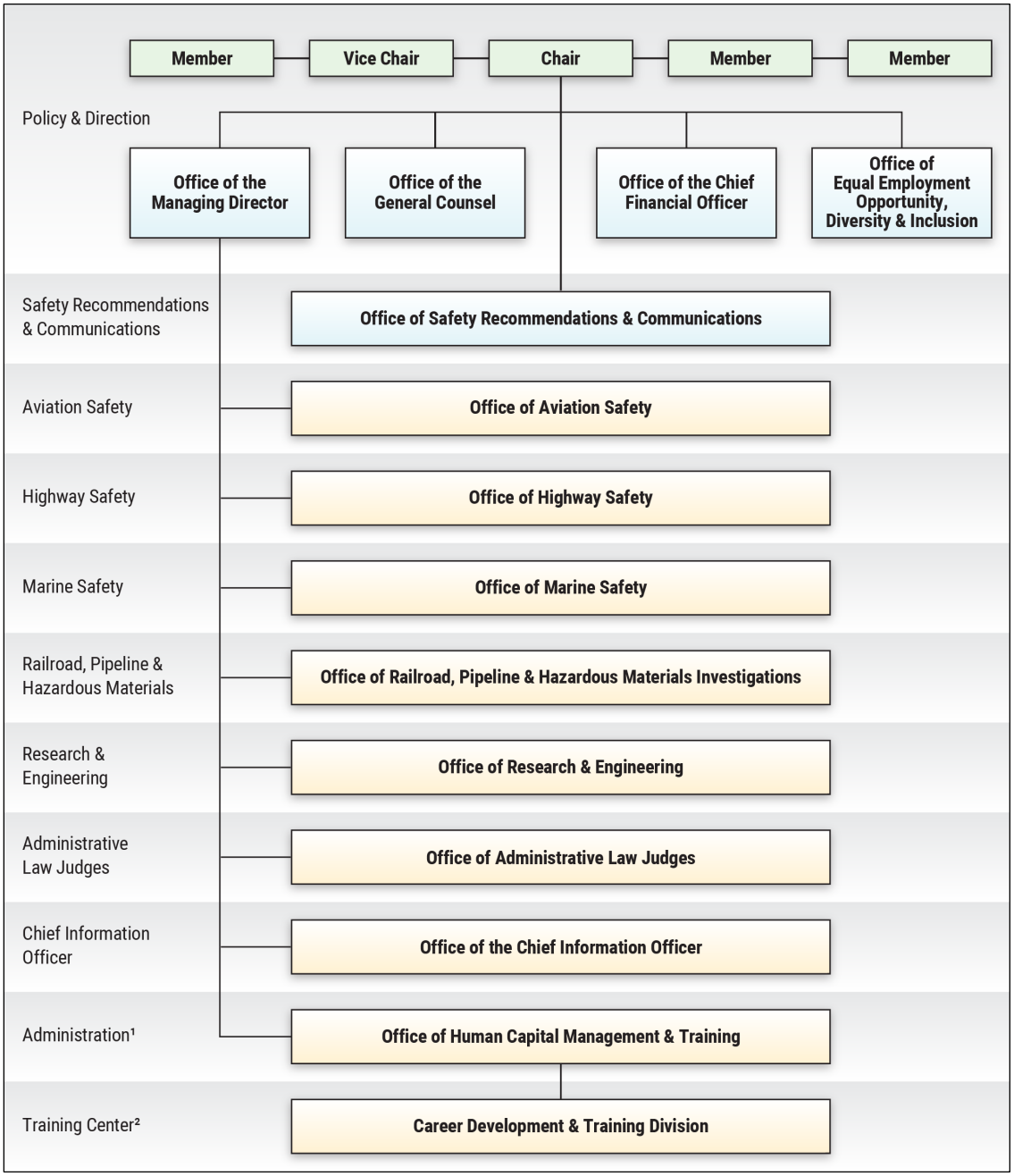
We are not authorized to regulate transportation equipment, personnel, or operations, or to initiate enforcement action. However, because of our reputation for objectivity and thoroughness, many safety features currently incorporated into airplanes, helicopters, automobiles, commercial motor vehicles, trains, pipelines, marine vessels, and space vehicles, in addition to numerous operational safety measures, had their genesis in NTSB safety recommendations. Additional information concerning the status of our safety recommendations is provided in Appendix D.

Our five-member Board comprises appointees nominated by the president and confirmed by the Senate. A chair (one of the five members,

nominated separately to this position by the president and confirmed separately by the Senate) serves as the chief executive officer and chief administrative officer of the NTSB. The president designates another of the members as vice chair.

The NTSB is headquartered in Washington, DC. We also have investigators stationed at offices in Denver, Colorado; Anchorage, Alaska; and Federal Way, Washington; as well as investigators located throughout the country who telework.

Program Activity and Organization Structure



1. The Office of Administration was renamed the Office of Human Capital Management and Training in FY 2022. Because during FY 2022 budget execution activity occurred within the former program activity title, we continue to refer to the program activity here by that name. The new title will be used in NTSB budgetary documents beginning in FY 2023.

2. The NTSB Training Center was renamed the Career Development and Training Division in FY 2022. Because during FY 2022 budget execution activity occurred within the former program activity title, we continue to refer to the program activity here by that name. The new title will be used in NTSB budgetary documents beginning in FY 2023.

RESOURCE REQUIREMENTS

Appropriations Language

Salaries and Expenses – 950310

"For necessary expenses of the National Transportation Safety Board, including hire of passenger motor vehicles and aircraft; services as authorized by 5 *U.S.C.* 3109, but at rates for individuals not to exceed the per diem rate equivalent to the rate for a GS-15; uniforms or allowances therefor, as authorized by law (5 *U.S.C.* 5901-5902), $145,000,000 of which not to exceed $2,000 may be used for official reception and representation expenses.

Emergency Fund – 950311

No new funding is being requested for the Emergency Fund in FY 2024.

NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Obligations by Program Activity ($000s)

Identification Code: 95-0310-0-1-407	FY2022	FY2023	FY2024
Policy and Direction	17,901	23,216	25,985
Safety Recommendations & Communications	8,292	8,932	9,987
Aviation Safety	34,712	37,093	41,180
Information Technology & Services	9,658	10,258	11,280
Research & Engineering	14,177	15,516	18,098
Training Center	1,156	0	0
Administrative Law Judges	2,558	2,718	3,047
Highway Safety	8,654	9,294	10,415
Marine Safety	5,708	6,109	6,866
Railroad, Pipeline & Hazardous Materials	9,634	10,354	11,574
Administration	7,948	5,810	6,568
Total	120,398	129,300	145,000

NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

FTE by Program Activity

Identification Code: 95-0310-0-1-407	FY 2022	FY 2023	FY 2024
Policy and Direction	**61**	**81**	**84**
Chair, Vice Chair, Board Members*	13	15	16
Office of the Managing Director	25	33	33
Office of the General Counsel	9	9	9
Office of the Chief Financial Officer	11	20	22
Office of Equal Employment Opportunity, Diversity & Inclusion	3	4	4
Safety Recommendations & Communications	**30**	**32**	**32**
Aviation Safety	**112**	**119**	**124**
Information Technology & Services	**28**	**30**	**31**
Research and Engineering	**47**	**47**	**48**
Training Center	**4**	**0**	**0**
Administrative Law Judges	**10**	**8**	**10**
Highway Safety	**30**	**32**	**34**
Marine Safety	**20**	**20**	**23**
Railroad, Pipeline & Hazardous Materials	**33**	**36**	**37**
Administration	**28**	**20**	**23**
Total	**403**	**425**	**446**

*FY 2023 and FY 2024 assume full Board staffing in the second half of FY 2023.

NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Obligations by Object Classification ($000s)

Identification Code: 95-0310-0-1-407		FY 2022	FY 2023	FY 2024
	Personnel Compensation & Benefits:			
11.1	Permanent Positions	57,038	62,035	68,138
11.3	Positions Other Than Permanent	2,206	3,063	3,676
11.5	Other Personnel Compensation	2,831	3,041	3,350
	Total Personnel Compensation	62,075	68,139	75,164
12.1	Personnel Benefits	22,216	24,403	26,849
	Subtotal, Personnel Compensation & Benefits	84,291	92,542	102,013
	Other Than Personnel Compensation & Benefits:			
21.0	Travel & Transportation of Persons	2,363	3,213	3,438
22.0	Transportation of Things	92	99	106
23.1	Rental Payments to General Services Administration	9,898	10,169	10,457
23.2	Rental Payments to Others	2,724	2,324	31
23.3	Communications, Utilities & Miscellaneous Charges	866	940	1006
24.0	Printing & Reproduction	100	113	121
25.0	Other Contractual Services	17,097	17,321	19,549
26.0	Supplies & Materials	1,157	1,239	1,326
31.0	Equipment	1,810	1,340	6,953
99.9	Total Obligations	120,398	129,300	145,000
	Personnel Summary:			
	FTE Employment	406	425	446

NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Analysis of Changes – FY 2023 to FY 2024 ($000s)

$ 5,768 Staffing Changes

The requested funding level provides for an FTE level of 446, which is 21 above the FTE level supported by the FY 2023 Budget Request.

$ 4,415 Pay Increase

Funds to cover the pro-rated impact of an FY 2024 5.2 percent pay raise effective January 1, 2024.

$ 118 Other Personnel Compensation Increase

Funds to cover other personnel-related compensation including the FY 2024 increase to employee health benefits contributions.

$ 474 Non-Pay Inflation

Inflation of 2.0 percent is used for non-pay inflation based on economic assumptions for discretionary programs.

$ 4,925 Program Investments & Operational Expenses

Increases in program investments, GSA lease expenses, and contractual services expenses, which are partially offset by a decrease in non-GSA lease expenses.

$ 15,700 Total

Summary of Changes

$ 129,300 FY 2023 level (supports 425 FTEs)

$ 15,700 Total Increase

$ 145,000 FY 2024 Level (supports 446 FTEs)

NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Non–SES/SL/ST Awards

The following information outlines estimated non-Senior Executive Service/senior level/scientific (non-SES/SL/ST) and professional awards spending as a percentage of non-SES/SL/ST salary spending for FY 2022, FY 2023, and FY 2024.

	Non–SES/SL/ST Salary Spending ($000s)	Awards %
FY 2022 Actual	$54,298	2.2%
FY 2023 Estimate	$59,850	2.2%
FY 2024 Request	$56,098	2.2%

POLICY AND DIRECTION

	($000s)	FTEs
FY 2023 Estimate	$23,216	81
FY 2024 Request	$25,985	84
Increase/Decrease	$2,769	3

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 5.2 percent projected for January 1, 2024, a 2.0 percent non-pay inflation factor, an increase in agency program investments, and an increase in the agency's contribution to employee health benefits. An increase of three FTEs is supported by this funding level.

Program Description

The policy and direction program resources fund the Offices of the Chair, Vice Chair, and Members of the Board, as well as the Offices of the Managing Director; General Counsel; Chief Financial Officer; and Equal Employment Opportunity, Diversity, and Inclusion. Collectively, these offices provide overall leadership, management, and direction for the NTSB.

Chair, Vice Chair, and Board Members

The chair serves as the chief executive officer and chief administrative officer for the agency. The chair, vice chair, and Board members preside at NTSB Board meetings; review and approve NTSB reports, safety studies, and safety recommendations; provide appellate review of FAA certificate and certain civil penalty actions, as well as US Coast Guard license actions; and act as spokespersons at accident scenes. They also advocate for specific safety recommendations with the transportation community, other federal agencies, state and local governments, and the public.

Office of the Managing Director

The Office of the Managing Director assists the NTSB chair in the discharge of the executive, investigative, and administrative functions of the agency. The office coordinates the activities of the entire staff, manages the day-to-day operation of the agency, develops policies, and recommends plans to achieve program objectives. The managing director is responsible for the overall leadership, direction, and performance of the agency. In this capacity, the managing director oversees two deputy managing directors, the senior

advisor for policy and strategic initiatives, the Occupational Safety and Health Division, and the chief data scientist.

The principal deputy managing director for management and operations has responsibility for the management and oversight of agency non-investigative operations and administrative programs including the Offices of the Chief Information Officer, Human Capital Management and Training (formerly the Office of Administration), Executive Secretariat, Administrative Operations and Security, and Transportation Disaster Assistance Divisions.

The deputy managing director for investigations oversees the agency's transportation investigations and functions. All modal investigative offices, the Office of Research and Engineering, and the Special Operations Division report to this deputy.

The senior advisor for policy and strategic initiatives provides executive-level advice to the managing director and NTSB staff on agency-level performance and operating plans, including initiatives and results to improve agency processes and accountability. The advisor leads the development and implementation of the agency's strategic plan and collaborates with other agency leaders to devise metrics for measuring the effectiveness, timeliness, and quality of agency initiatives to meet strategic goals. This executive also evaluates programs and makes recommendations to the managing director aimed at improving organizational efficiency, effectiveness, and policy compliance.

The Occupational Safety and Health Division is responsible for ensuring compliance with federal, state, and local statutory and regulatory mandates, guidelines, standards, and procedures, and for ensuring safe working conditions for NTSB employees (both in the office and at on-scene investigations). This includes planning, implementing, and evaluating the agency's occupational safety and health program to reduce the potential for human and economic losses associated with our work on-scene at incidents and accidents.

The chief data scientist supports the agency-wide effort to better utilize data for strategic decision-making; and is designated as the agency's chief data officer as required by the Foundations for Evidence-Based Policymaking Act of 2018 (Evidence Act). The chief data scientist also chairs the agency's Data Governance Body and is responsible for the application of machine learning and advanced data science methods and techniques to support agency investigations and research, analysis, and reporting of emerging transportation safety trends.

The Executive Secretariat Division is the focal point for the coordination of official written material sent to, or from, the agency. The division is responsible for managing Board voting processes in accordance with the Government in the Sunshine Act and agency directives; issuing *Federal Register* notices; overseeing the coordination of executive-level reviews of Board products, such as investigation reports and policy documents; controlling, monitoring, processing, and distributing all official agency correspondence; archiving official agency records related to Board actions; and standardizing and providing procedural guidance to Board members, the managing director, office directors, and their staffs. Division services also include writing and editing correspondence, agency-wide reports, and other documents for the chair, other Board members, the managing director, and agency offices and divisions without a writer-editor on staff.

The Administrative Operations and Security Division supports the NTSB's facilities and building management program, including security, property management, space management, facilities and equipment maintenance, mail services, and fleet vehicle transportation.[1]

The Transportation Disaster Assistance Division ensures that the agency meets its statutory obligations under Title 49 *U.S.C.* sections 1136, 1139, and 1140. These obligations include responding to all major aviation accidents and rail accidents investigated by the NTSB and coordinating federal government resources to support local and state governments, disaster relief organizations, and transportation carriers to address the concerns of survivors, families, and friends. The division also supports the agency's peer support and stress awareness programs as part of the employee assistance program. Additional information on division activities is provided in Appendix E.

The Special Operations Division coordinates the agency's involvement in special access programs and serves as the primary interagency liaison with the Federal Bureau of Investigation; federal, state, and local emergency response organizations; and other pertinent first responder agencies. This division also provides outreach to public safety agencies to assist them to better prepare their response to transportation disasters and oversees the Response Operations Center, which provides support 24 hours a day, 365 days a year for agency-wide operational requirements, including accident launches and the collection and dissemination of information related to transportation accidents and incidents. The division manages the agency's evidence management program and the UAS (unmanned aircraft systems, or drones) program to support the documentation of accident scenes.

[1] This division was moved from the Office of Administration to the Office of the Managing Director on August 1, 2022.

Office of the General Counsel

The Office of the General Counsel serves as the chief legal officer of the agency and ensures the proper implementation of the NTSB's statutory responsibilities relating to transportation safety. Specifically, the office advises NTSB officials on legal and policy issues arising under the NTSB's governing legislation and regulations, and on other administrative law matters. The office also provides objective review of airman appeals of certificate actions and certain civil penalties and seaman license actions, acting on behalf of the agency on particular procedural aspects of enforcement cases; administers the agency's ethics program; provides legal reviews of contracts and acquisition documents; makes release determinations of official information for use in litigation not involving the United States; ensures compliance with statutes concerning public access to information through publication of NTSB decisions and releases under the Freedom of Information Act (FOIA); drafts all rulemaking and interpretive guidance; represents the NTSB (or assists the Department of Justice) in administrative or judicial forums in personnel matters, in litigation arising from the agency's accident investigation responsibilities, and in other matters in which the agency has an interest; and provides internal legal assistance and guidance regarding all other aspects of NTSB accident and incident investigations, such as hearings, appearances as witnesses, the acquisition of evidence by subpoena and other means, and the taking of depositions.

Office of the Chief Financial Officer

The Office of the Chief Financial Officer manages NTSB financial resources, develops the agency's budget requests for submission to OMB and Congress, and executes the budget for resources appropriated to the NTSB by Congress. The office also prepares the agency's financial statements as required by the Accountability of Tax Dollars Act and oversees property and inventory control programs and the NTSB's travel and charge card programs. The office is responsible for agency accounting and financial policy and for overseeing internal controls to comply with the requirements of the Federal Managers' Financial Integrity Act. Additionally, the office manages the NTSB acquisition program, awards and administers contracts and agreements, manages the purchase card program, awards real property leases for both the NTSB headquarters and regional offices, and provides customers with acquisition guidance and training.

Office of Equal Employment Opportunity, Diversity, and Inclusion

The Office of Equal Employment Opportunity, Diversity, and Inclusion (EEODI) advises and assists the chair and NTSB office directors in carrying out

their responsibilities related to Title VII of the Civil Rights Act of 1964, as amended, and other laws, executive orders, and regulatory guidelines affecting diversity development and the processing of EEO complaints and reasonable accommodation requests. These services are provided to managers, employees, and job applicants through a combination of full-time staff, collateral-duty employees, and volunteer managers of our special emphasis programs. To maintain the integrity and impartiality of the agency's EEO complaints resolution program, external EEO counselors and investigators are contracted to help employees and job applicants who file formal or informal complaints of alleged discrimination. In addition, the office manages the agency's alternative dispute resolution and American Sign Language interpretation programs. Office services include providing required educational compliance training to NTSB staff; raising diversity, equity, inclusion, and accessibility awareness at the agency; engaging in targeted outreach; helping with internal recruitment initiatives; and providing career enhancement advisory services.

SAFETY RECOMMENDATIONS AND COMMUNICATIONS

	($000s)	FTEs
FY 2023 Estimate	$8,932	32
FY 2024 Request	$9,987	32
Increase/Decrease	$1,055	0

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 5.2 percent projected for January 1, 2024, a 2.0 percent non-pay inflation factor, an increase in agency program investments, and an increase in the agency's contribution to employee health benefits.

Program Description

The Office of Safety Recommendations and Communications comprises five divisions: Media Relations, Government and Industry Affairs, Safety Advocacy, Safety Recommendations, and Digital Services. The office ensures that information regarding NTSB investigations, activities, advocacy, and safety recommendations is accurately and effectively communicated to a range of stakeholders, including elected officials and their staffs at the federal, state, and local levels; industry representatives; media; and the public. The office's mission begins at the scene of an accident, continues through the NTSB accident investigation and the resulting issuance of one or more safety recommendations, and is maintained through advocacy efforts to secure favorable action on safety recommendations. The office uses various communication channels, such as print, television, digital, and social media to facilitate robust public and stakeholder engagement.

Media Relations Division

The Media Relations Division is responsible for–

- Serving as a national spokesperson for the NTSB.
- Serving as the primary point of contact for all press-related activities and disseminating information about NTSB operations to the public via mass media. This includes collaborating with other internal office divisions to ensure the integrated, coordinated, and synchronized release of information, including imagery, the division's products (such as news releases and feature releases), and social media

content, with the goal of building public understanding of, and support for, the agency's mission.

- Providing support for Board members and investigators, including developing key messages and supporting talking points, facilitating interviews, preparing personnel for media briefings, coordinating media briefings, and providing training.
- Identifying opportunities to engage the media in communicating key messages to identified audiences.
- Providing counsel to senior leadership regarding public and media perceptions of NTSB actions and policies.
- Creating and maintaining a library of public affairs guidance for issues of media interest to align messaging and promote unity of effort within the agency.
- Responding to media inquiries, including facilitating interviews with NTSB subject matter experts, developing responses to queries, and crafting key messages.
- Providing strategic and tactical support for forums, meetings, roundtables, and other special investigative events.
- Providing guidance and training to members of the transportation industry to align their communications with the NTSB party agreement for investigations.
- Supporting the Safety Advocacy Division and its programs.

Government and Industry Affairs Division

The Government and Industry Affairs Division is responsible for—

- Informing Congress, other federal agencies, and state and local governments about NTSB activities and advising the chair, vice chair, Board members, and staff on congressional and legislative matters.
- Coordinating responses to requests for information and assistance from Congress, the White House, the Government Accountability Office, other federal agencies, and state and local governments through correspondence and briefings.
- Supporting the chair, vice chair, Board members, and staff with legislative testimony.
- Providing accident launch support to the chair, vice chair, Board members, and investigators.

- Monitoring federal and state legislative activity related to NTSB safety recommendations.
- Coordinating the development of NTSB legislative proposals and providing technical assistance to Congress and states drafting legislation.
- Supporting modal offices in planning and executing forums and roundtables.
- Helping staff identify appropriate resources in state and local government to support investigations and other projects.
- Supporting the Safety Advocacy Division and its programs.

Safety Advocacy Division

The Safety Advocacy Division is responsible for–

- Producing the NTSB's MWL, the agency's primary advocacy tool that highlights the top safety improvements that can be made to prevent accidents, minimize injuries, and save lives. These are the safety improvements on which the Board will focus its advocacy efforts during each MWL cycle. Although the NTSB actively advocates for the implementation of all its safety recommendations, follow-up efforts are generally more intensive for recommendations related to MWL safety items.
- Developing the MWL advocacy strategy and working with Board members and NTSB staff to promote MWL issues.
- Developing and implementing the agency's advocacy program to highlight state-related safety recommendations.
- Collaborating with the Government and Industry Affairs Division to obtain support for programs and legislation at state and local levels consistent with NTSB safety recommendations.
- Disseminating safety information and increasing public awareness of NTSB activities in transportation safety through conference presentations, webinars, the "Safety Compass" blog, and social media.
- Developing and maintaining contact with safety advocacy organizations and providing information on NTSB activities and safety recommendations as part of the division's outreach efforts.

Safety Recommendations Division

The Safety Recommendations Division is responsible for–

- Evaluating responses from safety recommendation recipients and drafting classification response letters for Board member review and approval.
- Working with modal offices to develop safety recommendations that are actionable, effective, and measurable, based on the findings of accident investigations.
- Supporting and tracking the implementation of safety recommendations.
- Maintaining the safety recommendations database, which includes information on recommendation recipients, status, adoption, and implementation.
- Analyzing safety recommendation status and implementation and generating summary reports.
- Supporting the Safety Advocacy Division with its advocacy programs.

Digital Services Division

The Digital Services Division is responsible for–

- Engaging the public and stakeholders using digital media.
- Implementing digital strategies to highlight the NTSB's investigative and safety advocacy messages.
- Managing digital communications programs and platforms (website, social media, and visual media) to ensure consistent messaging across various digital channels and agency compliance with digital government policies and orders.
- Providing leadership and guidance regarding digital technology adoption for agency communications programs.
- Producing videos and animations, providing photography support, developing original graphics, and editing images in support of agency activities such as accident launches, investigative product development, and advocacy, among others.

Accomplishments and Ongoing Efforts

Media Relations Division

The Media Relations staff helped generate more than 175,000 print, online, and broadcast media mentions of the agency between October 1, 2021, and September 30, 2022. These mentions included information about the recovery of TransAir flight 810; virtual Board meetings on a runway overrun accident, a pipeline strike and fire aboard a dredging vessel, and a bus roadway departure and rollover; and such safety advocacy events as the Improve Fishing Vessel Safety Roundtable and the Safe System Approach Roundtable series, which highlighted critical highway issues.

A total of 447 unique hyperlinks were created and used in 82 news releases, 18 media advisories, and 716 tweets to drive web traffic to NTSB online products and information; those links received more than 139,500 clicks. The tweets were viewed more than 7.4 million times. Staff published 95 images to the NTSB Flickr account, earning a total of 184,000 views, demonstrating the value of providing compelling imagery for use in the agency's products.

The division's news releases and media advisories continued to earn an average open rate of 38 percent, above the 21 percent industry standard for government communications.

The division provided media relations training to NTSB staff and transportation industry communicators, instructing about 160 people in 5 sessions this year.

Government and Industry Affairs Division

The Government and Industry Affairs Division has initiated outreach to congressional, federal, state, and local officials who expressed an interest in improving transportation safety. It has arranged numerous briefings by Board members and investigators and has responded to requests for information regarding NTSB investigations and safety recommendations.

In FY 2022, the division supported development of the Board's legislative proposal to Congress to reauthorize the agency through FY 2027. Staff prepared Board members to testify at three congressional hearings regarding small marine passenger vessel safety, the NTSB's reauthorization, and freight rail safety. The division also supported Board member and staff testimony and legislative advocacy on occupant protection in Massachusetts; distracted driving in Kentucky, South Carolina, and Missouri; pedestrian safety in California and Maryland; and speeding in New York. The division supported major accident launches and general aviation regional investigations. As these

investigations continue, the division updates Congress, as well as state and local officials, and serves as the main point of contact for additional outreach and inquiries.

Safety Advocacy Division

From October 1, 2021, through September 30, 2022, the Safety Advocacy Division helped develop, execute, and promote more than 75 advocacy and outreach activities related to the 2021–2022 MWL and other critical safety recommendations. Major activities included the Safe Systems Roundtable Series; Improving Fishing Vessel Safety webinar; four-part Vehicle to Everything (V2X) video series; .05 BAC (blood alcohol concentration) webinar; and campaigns for National Distracted Driving Awareness Month and National Teen Driver Safety, National Child Passenger Safety, Rail Safety, and School Bus Safety Weeks. The division identified and promoted speaking opportunities for Board members and modal office staff at national conferences and industry meetings, including the 2022 National Lifesavers Conference, the National Black Caucus of State Legislators Annual Conference, and the 31st World Traffic Safety Symposium. Staff prepared legislative testimony related to MWL issue areas and briefed state representatives on highway safety issues.

April 6, 2022, marked the 1-year anniversary of the 2021–2022 MWL. To highlight the progress made, Safety Advocacy staff released a mid-cycle report, which included a blog, social media highlights, recommendation updates, and email messaging to stakeholders. We promoted the closing of eight safety recommendations associated with this list, and urged continued work on the 167 other key recommendations which, if implemented, would save lives and prevent injuries. Safety Advocacy Division staff also coordinated and released the NTSB's evaluation of the Department of Transportation's actions on the related MWL recommendations.

The division used its social and digital platforms to share information related to the NTSB's advocacy work, MWL-related activities, and investigative outcomes and lessons learned with stakeholders and agency staff. Staff sent two editions of the *Advocacy Spotlight* e-newsletter to more than 6,500 advocacy partners and stakeholders across all modes and 82 email notifications to more than 248,000 stakeholders. The division developed hundreds of social and digital media products promoting the agency's safety messages and increased followers across all platforms, reaching more than 1,000,000 people via Twitter, Facebook, LinkedIn, Instagram, YouTube, and Flickr. Staff wrote or coordinated the posting of 44 blogs and produced eight episodes of the "Behind-the-Scene @ NTSB" podcast, which highlighted agency activities, staff, and programs. The division also supported the

development of webinars on MWL topics specific to unique audiences and recommendation recipients, such as webinars on teen driving safety, collision avoidance technology, and motorcycle safety.

Safety Recommendations Division

From October 1, 2021, through September 30, 2022, the Safety Recommendations Division reviewed and analyzed 180 responses from recommendation recipients and developed recommendation classification responses for Board review and approval. Staff generated 180 follow-up letters for recommendation recipients who had not responded to NTSB safety recommendations and assisted the modal offices in developing and issuing 97 new safety recommendations based on 21 investigation reports and studies. In addition, the division developed numerous reports and data summaries on specific recommendation topics to support NTSB Board members and other agency staff. Division staff also developed reports and data summaries for the media and the public in response to requests for information.

The division continued a program to classify and follow up on actions states have taken in response to NTSB recommendations, including legislation that has been either introduced or enacted.

Outreach activities in FY 2022 included meetings to discuss open recommendations with numerous government and industry organizations, including these:

- Airlines for America
- BMW
- BNSF Railroad
- Commonwealth of Pennsylvania
- FAA
- Federal Railroad Administration (FRA)
- Federal Transit Administration (FTA)
- FIGG Bridge Engineering
- Furuno, Inc
- Independent Pilots Association
- Intelligent Transportation Systems (ITS) Joint Program Office, Office of the Secretary of Transportation
- International Code Council
- Metropolitan Transit Authority
- National Fire Protection Association
- Occupational Safety and Health Administration
- Pipeline and Hazardous Materials Safety Administration (PHMSA)

- Regional Airline Association
- Sheet Metal, Air, Rail, and Transportation Workers Union
- Southeast Pennsylvania Transportation Authority (SEPTA)
- UPS Airlines
- US Coast Guard
- Wage and Hour Division, US Department of Labor
- Washington Metrorail Safety Commission
- Washington Metropolitan Area Transit Authority (WMATA)

Digital Services Division

In FY 2022, the Digital Services Division supported one in-person and four virtual Board meetings, as well as five other NTSB-led events. Staff completed over 375 graphics and illustrations for use in reports and other products; managed seven print publication requests; produced more than 72 videos, podcasts, and live video streams; and fulfilled more than 700 website update requests.

The division implemented a digital asset management system to store, catalog, and tag SRC-generated imagery and graphics. This system will improve the office's ability to maintain digital files and allow for fast retrieval of materials based on categorization and keywords.

The division also launched updated NTSB branding and design standards, which provide uniform guidance on all agency product designs, update the NTSB visual design scheme, and bring all agency products into a consistent look and feel.

AVIATION SAFETY

	($000s)	FTEs
FY 2023 Estimate	$37,093	119
FY 2024 Request	$41,180	124
Increase/Decrease	$4,087	5

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 5.2 percent projected for January 1, 2024, a 2.0 percent non-pay inflation factor, an increase in agency program investments, and an increase in the agency's contribution to employee health benefits. An increase of five FTEs is supported by this funding level.

Program Description

The mission of the Office of Aviation Safety is to–

- Investigate all air carrier, commuter, and air taxi accidents and certain serious incidents; fatal and nonfatal general aviation accidents and serious incidents; UAS, advanced air mobility, and public aircraft accidents and serious incidents; and commercial space launch/reentry accidents.
- Participate in the investigation of aircraft accidents that occur in foreign countries involving US carriers, US-manufactured or -designed equipment, or US-registered aircraft, to fulfill US obligations under ICAO agreements.
- Investigate safety issues that extend beyond a single accident to examine specific aviation safety problems from a broader perspective.

The Office of Aviation Safety conducts investigative activities through five specialty divisions based in Washington, DC, and a regional investigation management structure comprising four regions. Investigators are located throughout the country. International aviation activities are coordinated from the Washington, DC, office.

Air Carrier and Space Investigations Division

The Air Carrier and Space Investigations Division performs these functions:

- Provides an investigator-in-charge (IIC) for air carrier domestic aircraft accident and incident investigations, certain public aircraft accidents and incidents, commercial space launch/reentry accidents, and UAS accident and incident investigations.
- Coordinates the preparation of comprehensive aviation accident and incident reports and manages aviation investigative hearings, forums, and conferences related to air carrier operations.
- Coordinates and supervises the efforts of NTSB group chairmen and external investigation participants provided by industry, other government agencies, and foreign authorities (for US investigations involving foreign-operated, -registered, -manufactured, or -designed aircraft).
- Provides accredited representatives to assist in the investigation of civil aviation accidents that occur in other countries. (The accredited representative informs domestic aviation interests of the progress of an investigation while providing needed technical expertise, as requested, to foreign accident investigation counterparts. The accredited representative also informs FAA and US industry representatives of issues that may affect US aviation safety, or the safety of aircraft or aircraft components manufactured in the United States.)
- Develops investigative techniques and strategies for emerging transportation industries to improve safety. Current areas of development include increasing proficiency in investigating accidents and incidents involving UAS operations, commercial space launch and reentry operations, and advanced air mobility vehicle operations in the US National Airspace System, as well as using small UAS (sUAS) technology to document accident scenes.

As applicable for domestic accident and incident investigations, a specialist in operational factors, aviation engineering, human performance, survival factors, or other organizational element may act as a group chair on a major investigation to examine issues in their specialty area. Group chairs lead their respective groups in the technical investigation of an accident under the direction of the IIC and produce a factual report that is placed in the agency's public docket. They also produce analytical reports that are used in developing the draft accident report and proposed safety recommendations. NTSB technical specialists may also provide specialized assistance through the US-accredited representative in foreign accident and incident investigations.

Operational Factors Division

The Operational Factors Division examines issues related to air traffic control, flight operations, and meteorology, such as–

- Air traffic control facilities, procedures, and flight handling, including developing flight histories and animations from air route traffic control centers and terminal facility radar records.
- Operations of the air carrier or the UAS operator; training, experience, and operational performance of flight crews or UAS and advanced air mobility pilots; and FAA surveillance of flight operations.
- Meteorological/environmental conditions that may have caused or contributed to an accident, and pertinent meteorological products, procedures, and services provided by government and industry.
- Commercial space crewmember training, experience, and operational performance.

Aviation Engineering Division

The Aviation Engineering Division examines issues related to powerplants (engines), structures, systems, system safety, and maintenance, such as–

- Powerplant components, including the airworthiness of aircraft engines and propellers.
- Integrity of aircraft structures and flight controls, including the adequacy of design and certification.
- Airworthiness of aircraft flight controls and electrical, pneumatic, hydraulic, and avionics systems.
- Hazards and associated safety risks introduced by aircraft equipment failures, including the adequacy of design and certification.
- Service history and maintenance of aircraft systems, structures, and powerplants.
- Airworthiness of helicopters, including powerplants, structures, and control systems.
- Commercial spacecraft engines, structure, and systems.

Human Performance and Survival Factors Division

Human performance specialists assess the knowledge, experience, training, and physical abilities of those whose actions may have caused or contributed to an accident or incident. They review the adequacy of established procedures, examine the work habit patterns and interrelationships among crewmembers and managers to assess organizational factors and safety culture, and investigate the ergonomics of equipment design and the potential effects of that design on operator performance. A human performance investigation may also include an assessment of sleep and rest cycles, the use of alcohol, and/or the use of other impairing drugs.

Survival factors specialists examine factors that affect the survival of those involved in accidents, including the causes of injuries sustained by occupants of the aircraft or by others. They also examine safety procedures, search-and-rescue operations, crashworthiness, equipment design, emergency response and escape, crewmember emergency procedures training, and airport operations and certification.

Writing and Editing Division

The staff of the Writing and Editing Division manage the development of, write, and edit aviation investigation reports. Staff also write, analyze, and edit safety alerts, responses to notices of proposed rulemaking, and general correspondence related to aviation. In addition, the division manages the NTSB's aviation accident database.

Regional Offices

Although regional accident/incident investigations may be smaller in scope than those led by IICs in the Air Carrier and Space Investigations Division, they are conducted in a similar manner. Often, a single aviation safety investigator conducts an investigation, gathering detailed information and working with party representatives to determine the probable cause of the accident. During each investigation, these investigators consider ways to prevent similar accidents from occurring in the future through a more immediate and informal solution (known as a safety accomplishment) or through the formal safety recommendation process. In addition, they often provide support to major accident investigations and may identify accidents that have broader safety issues to be addressed in a forum, at a Board meeting, or through a safety research report. In these cases, additional staff from headquarters are often assigned to assist regional investigators in gathering the facts, developing the analysis, and drafting the final report. A map showing the four regions is provided in Appendix F.

Administrative Support Division

The Administrative Support Division is responsible for processing budget, travel, payroll, personnel, timekeeping, procurement, contracting, and purchase card actions for the office.

Accomplishments and Ongoing Efforts

Office accomplishments include the issuance of products related to transportation safety arising from completed and ongoing investigations. Products completed between October 1, 2021, and September 30, 2022, are highlighted below, along with information about other efforts and focus areas important to our mission.

Investigation Reports

Investigation reports are issued for accident or incident investigations and may contain a determination of probable cause and/or safety recommendations, depending upon the scope of the investigation and the safety issues identified. For select, larger scale investigations, the office launches an investigation team and presents a comprehensive investigation report to the Board. Investigations that are limited in scope have the primary purpose of determining probable cause; the resultant report may be issued by the office director under delegated authority or may be adopted by the Board. A report containing only safety recommendations can be issued at any time during an investigation. If the Board determines that a recommended course of action requires immediate attention to avoid imminent loss of life from a similar accident, the safety recommendation is designated "urgent." From October 1, 2021, through September 30, 2022, the Office of Aviation Safety issued a total of 1,720 investigation reports that solely determined probable cause; six of these accidents involved safety issues that led to the issuance of 10 safety recommendations.

Below are summaries of a sampling of the aviation investigation reports completed between October 1, 2021, and September 30, 2022, arranged by report date.

Provide Graphical Forecast of Potential Supercooled Large Droplet Icing Conditions in Alaska

These recommendations address the need to provide pilots operating in Alaska with graphical forecasts of potential supercooled large droplet (SLD) icing areas to prevent flight into those areas. The recommendations derive from the NTSB's investigation of a Cessna 208B airplane that specifically encountered SLD icing conditions after takeoff from Fairbanks, Alaska, and

entered an uncommanded right bank followed by a nose-down spiraling descent, from which the pilot was able to recover.

According to FAA Advisory Circular 00-45H, "Aviation Weather Services," SLD icing conditions are outside the icing certification envelopes for many aircraft; therefore, such conditions could be hazardous to those aircraft. A graphical forecast depicting potential areas of SLD icing conditions in Alaska could help pilots avoid inadvertent flight into those hazardous conditions.

The NTSB issued new safety recommendations to the FAA and the National Weather Service.

Recommendations: 2 new
Report Date: May 24, 2022

Loss of Control In-flight
Lafayette, Louisiana
December 28, 2019

On December 28, 2019, about 9:21 a.m., a Piper PA-31T airplane impacted terrain shortly after takeoff from Lafayette Regional Airport/Paul Fournet Field, Lafayette, Louisiana. The commercial pilot and four passengers were fatally injured, and one passenger was seriously injured. One person in a nearby car sustained serious injuries, and two people in a nearby building sustained minor injuries. The airplane was destroyed by impact forces and a postimpact fire. The personal flight was conducted under the provisions of Title 14 *Code of Federal Regulations (CFR)* Part 91. Instrument meteorological conditions prevailed at the time of the accident.

The NTSB determined the probable cause of this accident was the pilot's loss of airplane control due to spatial disorientation during the initial climb in instrument meteorological conditions.

Recommendations: None
Report Date: May 17, 2022

Collision into Terrain, Safari Aviation Inc., Airbus AS350 B2, N985SA
Kekaha, Hawaii
December 26, 2019

On December 26, 2019, about 4:57 p.m., an Airbus AS350 B2 helicopter was destroyed when it collided into terrain in a remote, wooded area about 11 miles north of Kekaha, Hawaii, on the island of Kauai. The pilot and the six passengers were fatally injured. Safari Aviation, doing business as (d.b.a.) Safari

Helicopters, operated the flight as a Title 14 *CFR* Part 135 on-demand air tour under visual flight rules (VFR).

The NTSB determined that the probable cause of the accident was the pilot's decision to continue flight under VFR into instrument meteorological conditions (IMC), which resulted in the collision into terrain. Contributing to the accident was Safari Aviation's lack of safety management processes to identify hazards and mitigate the risks associated with factors that influence pilots to continue VFR flight into IMC. Also contributing to the accident was the FAA's delayed implementation of a Hawaii aviation weather camera program, its lack of leadership in the development of a cue-based weather training program for Hawaii air tour pilots, and its ineffective monitoring and oversight of Hawaii air tour operators' weather-related operating practices.

We identified the following safety issues during this investigation: (1) factors that may have influenced the pilot's decision to continue the VFR flight into reduced visibility weather conditions, including Safari's lack of safety management processes and effective cue-based weather training, (2) aviation safety infrastructure limitations, including the need for aviation weather cameras and increased radio communications and automatic dependent surveillance-broadcast (ADS-B) coverage, (3) the need for safety management systems (SMS), flight data monitoring programs, and the incorporation of onboard video and ADS-B data reviews into safety assurance processes, (4) the need for improved FAA oversight of air tour operations in Hawaii, (5) the need for crash-resistant flight recorder systems to prevent future accidents, and (6) the need to implement available helicopter safety technologies for preventing accidents resulting from inadvertent encounters with instrument meteorological conditions.

The NTSB issued new safety recommendations to the FAA, the Vertical Aviation Safety Team, and the Tour Operators Program of Safety and reiterated 11 previously issued recommendations to the FAA.

Recommendations: 10 new, 9 reiterated, 2 classified and reiterated
Report Date: May 10, 2022

Require Safeguards to Prevent Cessna 560XL Takeoff with Parking Brake Engaged

These recommendations were derived from two investigations involving Cessna 560XL airplanes in which parking brake pressure was not fully released before attempted takeoffs. This condition prevented the airplanes from rotating for takeoff. Once the airplanes reached this point in the takeoff sequence, they were beyond the point they could be stopped safely, leading to fatal or serious injuries.

We identified the following safety issues in this report: (1) the lack of a cockpit indication to alert pilots when the parking brakes are not fully released before takeoff on Cessna 560XL airplanes because the airplane was certified before the standard requiring such an indicator took effect, (2) the need for certification of, and subsequent derivative, aircraft to the same standard, and (3) the failure of Cessna 560XL checklists to direct pilots to fully release parking brakes before takeoff.

The NTSB issued new safety recommendations to the FAA.

Recommendations: 3 new
Report Date: May 4, 2022

Loss of Engine Power due to Excessive Fuel Flow in Cirrus SR22T Aircraft

The investigations of six accidents involving the Cirrus SR22T identified an issue in which excessive fuel introduced to the engine during takeoff climb led to engine power loss. While excessive fuel flow was determined to be the cause for the engine failures in all six investigations, the cause for the excessive fuel flow varied (and in three cases was not determined). Therefore, our examination of these investigations suggested a lack of system safety assessments to identify all potential causes of excessive fueling.

Until all potential causes and mitigating actions for a loss of engine power due to excessive fuel flow in the SR22T are identified, and until the FAA requires the implementation of appropriate mitigating actions, additional accidents may occur because of this hazard.

The NTSB issued new safety recommendations to the FAA and Cirrus Aircraft.

Recommendations: 2 new
Report Date: April 12, 2022

Require Common Traffic Advisory Frequency Areas in Alaska

These recommendations address concerns surrounding the lack of one common traffic advisory frequency (CTAF) in areas with multiple airports or scenic landmarks, and the resulting risk for midair collisions. They also address the lack of communication requirements for areas where one CTAF has been established. The recommendations derive from the NTSB's investigation a fatal midair collision involving a de Havilland DHC 2 (Beaver) airplane and a Piper PA-12 airplane that collided in uncontrolled airspace near Soldotna, Alaska. The pilots of both aircraft and the five passengers on the DHC-2 were fatally injured. The investigation determined there were 21 airports within a 30-mile

radius of the collision location, with five different charted communication frequencies, many of which overlapped.

The creation of additional dedicated CTAF areas in locations where the risk is high for midair collisions would allow pilots to become more aware of nearby traffic and communicate on a single frequency in one area, thereby helping to mitigate the risk for midair collisions. However, without a requirement that pilots report their positions on a designated CTAF frequency when operating in CTAF areas, pilots may remain unaware of the presence of other airplanes, even though a method of communications exists; therefore, the benefits of establishing CTAF areas are not fully recognized.

The NTSB issued new safety recommendations to the FAA.

Recommendations: 2 new
Report Date: February 22, 2022

Structural Failure of Piper Part Number 40622 Rudder Posts Made of 1025 Carbon Steel

This recommendation was issued as a result of two investigations involving airplanes, designed and built by Piper Aircraft, that experienced structural failures of their rudders in flight. Examination of the rudder posts revealed they likely had fractured due to fatigue and were susceptible to fatigue cracking under normal service conditions. In both accidents, the fractured rudder posts also led to diminished control of the airplane, demonstrating a compounding unacceptable flight risk.

The NTSB issued one new safety recommendation to the FAA.

Recommendations: 1 new
Report Date: January 10, 2022

Require Carbon Monoxide Detectors in Certain General Aviation Aircraft

These recommendations were derived from previous investigations and reports of aircraft accidents in which undetected carbon monoxide (CO) poisoning led to pilot impairment and subsequent fatal or serious injuries due to crashes. In each of these accidents, the pilot was not alerted to CO entering the cabin in enough time to counteract the effects of CO poisoning. The NTSB is concerned about the continued hazards resulting from such poisoning because the FAA does not require CO detectors on enclosed-cabin aircraft. As a result, the NTSB has concluded that use of a functional detector to alert a pilot through visual and auditory means to the presence of CO before the

pilot's judgment is impaired is necessary to the continued safe operation of the aircraft.

The NTSB issued new safety recommendations to the FAA, the Aircraft Owners and Pilots Association, and the Experimental Aircraft Association.

Recommendations: 2 new
Report Date: December 20, 2021

Require Fuel Minimums for Class C Rotorcraft External Load Operations

The investigations of five accidents involving helicopters conducting Class C rotorcraft-load combination (RLC) operations under Title 14 *CFR* Part 133, "Rotorcraft External Load Operations," indicated that, because of the high pitch and roll attitudes that can occur while maneuvering, Class C RLC operations are particularly vulnerable to fuel unporting. Unporting can occur when an aircraft is operated in certain flight profiles that result in fuel flowing away from ports and lines that deliver it to the engine. Fuel starvation can result if an adequate fuel level is not confirmed for helicopter attitudes unique to the RLC operation.

The FAA requires each operator applying for a Part 133 Rotorcraft External-Load Operator Certificate to create its own RLC flight manual and include certain performance data and operating limitations. However, there is no requirement that operators specify minimum fuel standards based on the class of RLC operation being flown. Therefore, Class C RLC operations are at risk of fuel starvation caused by unporting in nonstatic operations if sufficient fuel is not on board.

The NTSB issued one new safety recommendation to the FAA.

Recommendations: 1 new
Report Date: November 10, 2021

Runway Overrun During Landing, Peninsula Aviation Services Inc.
d.b.a. PenAir flight 3296, Saab 2000, N686PA
Unalaska, Alaska
October 17, 2019

On October 17, 2019, about 5:40 p.m., Peninsula Aviation Services, d.b.a. PenAir flight 3296, a Saab SA-2000, was landing at Unalaska Airport, Unalaska, Alaska, when the airplane overran the end of the runway, passed through the airport perimeter fence, crossed a road, and pitched down over shoreline rocks with its nosewheel coming to rest at the edge of Dutch Harbor. The captain, first officer, flight attendant, and 29 of the 39 passengers were not

injured. Of the remaining 10 passengers, 1 sustained fatal injuries, 1 sustained serious injuries, and 8 sustained minor injuries. The airplane, which was operating as a regularly scheduled passenger flight from Ted Stevens Anchorage International Airport, Anchorage, Alaska, under the provisions of 14 *CFR* Part 121, was substantially damaged. Visual meteorological conditions prevailed at the time of the accident.

The NTSB determined that the probable cause of the accident was the landing gear manufacturer's incorrect wiring of the wheel speed transducer harnesses on the left main landing gear during overhaul. The incorrect wiring prevented the antiskid system from functioning as intended, resulting in the failure of the left outboard tire and a significant loss of the airplane's braking ability, which led to the runway overrun. Contributing to the accident were (1) Saab's design of the wheel speed transducer wire harnesses, which did not consider and protect against human error during maintenance, (2) the FAA's lack of consideration of the runway safety area dimensions at Unalaska Airport during the authorization process that allowed the Saab 2000 to operate at the airport, and (3) the flight crewmembers' inappropriate decision, due to their plan continuation bias, to land on a runway with a reported tailwind that exceeded the airplane manufacturer's limit. The safety margin was further reduced because of PenAir's failure to correctly apply its company-designated pilot-in-command airport qualification policy, which allowed the accident captain to operate at one of the most challenging airports in PenAir's route system with limited experience at the airport and in the Saab 2000 airplane.

We identified the following safety issues during this investigation: (1) the potential for cross-wiring of airplane antiskid brake systems, (2) insufficient FAA guidance to identify safety risks for air carriers experiencing significant organizational changes, including bankruptcy, acquisition, and merger, and (3) the lack of FAA consideration of runway safety area dimensions during the process of authorizing an air carrier to operate its aircraft at a specific Title 14 *CFR* Part 139 certificated airport.

The NTSB issued new safety recommendations to the FAA, the European Union Aviation Safety Agency, and the Saab Group.

Recommendations: 10 new
Report Date: November 2, 2021

Domestic Investigative Workload Summarized by State

The NTSB carefully considers the level of detail necessary for each investigation with the aim of concentrating resources on investigations that are most likely to enhance aviation safety while fulfilling our mandate to investigate all civil aviation accidents. Because many accidents have similar causes and

may not provide new information that would result in further safety action, investigating these in detail may not be justified, given the agency's limited resources. Therefore, the investigation depth and final report for each event (accident or incident) is stratified into one of four classes.

The following table summarizes statistical information on domestic accident and incident investigations initiated between October 1, 2021, and September 30, 2022, by class and state, territory, or major body of water (Note that the NTSB did not initiate any new class 1 investigations during FY 2022. There have been no class 1 or major investigations in 2 of the last 5 years). Investigation classes are defined below the table.

State	Class 2	Class 3	Class 4	Total
Alabama		9	7	16
Alaska		20	67	87
Arizona		23	23	46
Arkansas		12	9	21
California		69	52	121
Colorado		24	11	35
Connecticut		1	5	6
Delaware			1	1
Florida	1	45	44	90
Georgia		25	14	39
Hawaii		4	3	7
Idaho		14	19	33
Illinois		11	18	29
Indiana		5	15	20
Iowa		4	6	10
Kansas		7	5	12
Kentucky		5	8	13
Louisiana		10	5	15
Maine		1	4	5
Maryland		3	12	15
Massachusetts		3	6	9
Michigan		12	7	19
Minnesota		5	14	19
Mississippi		6	4	10
Missouri		8	14	22
Montana		7	7	14
Nebraska		9	6	15
Nevada		11	8	19
New Hampshire		2	1	3
New Jersey		10	10	20

State	Class 2	Class 3	Class 4	Total
New Mexico		6	13	19
New York		15	15	30
North Carolina		15	15	30
North Dakota		4	4	8
Ohio		16	11	27
Oklahoma		12	10	22
Oregon		12	21	33
Pennsylvania		16	23	39
Puerto Rico		1	1	2
Rhode Island			1	1
South Carolina		15	11	26
South Dakota		4	2	6
Tennessee		14	9	23
Texas	1	59	61	121
Utah		10	14	24
Vermont			1	1
Virginia		6	14	20
Washington	1	15	17	33
West Virginia	1	1	1	3
Wisconsin		13	12	25
Wyoming		4	6	10
Total	**4**	**603**	**667**	**1,274**

Class 1: This category of NTSB investigation is reserved for very significant accidents and is likely to involve significant NTSB and external resources. These investigations generally involve transport-category aircraft and commercial operations, as well as loss of life, multiple injuries, considerable property damage, a new aircraft design, or significant public interest. Investigation updates or interim reports may be released during the investigation. The Board will deliberate the findings, probable cause, and recommendations accompanying the final report at a public "sunshine" meeting.

Class 2: Class 2 investigations generally have a broad scope and involve both a significant effort collecting evidence across several investigative areas and a substantial investment of resources. Investigator(s) launch to the scene of Class 2 investigations. These investigations may involve very complex systems and/or processes, multiple organizations, or poor risk controls implemented by the operator, manufacturer, maintainer, and regulator. Class 2 investigations may have a response similar to that of a class 1 investigation but, upon further examination, the safety issues may be more limited, specific to a certain airplane type or operation. A final comprehensive report will be made available

to the public. The Board members may deliberate the findings, probable cause, and recommendations accompanying the report.

Class 3: Class 3 investigations seek to identify safety issues that reveal underlying cause(s) of the accident. The investigation is led by an IIC, who may be assisted by other NTSB subject-matter experts if the investigation requires an in-depth focus on a specific area. The investigative team may travel to the scene of the accident or to other follow-up activities, or the entirety of the investigation may be conducted remotely. A final report will be made available to the public, identifying the probable cause(s) of the accident and factors that contributed to the outcome of the accident, if any. Findings from these investigations may be used to support recommendations, or the investigative team may work with industry stakeholders directly to resolve safety issues identified during the investigation. Accidents that involve recurring safety issues may be accompanied by a safety message that includes practical strategies to avoid future accidents.

Class 4: Class 4 investigations, which are led by an IIC, seek to identify the cause of the accident. In some cases, the IIC may travel to the scene of the accident, but class 4 investigations are generally conducted remotely. The report examines only the actions and conditions directly relating to the accident, and the documented sequence of events and probable cause reached is simple and straightforward. The IIC may work with industry stakeholders to develop solutions to safety issues identified during the investigation. Investigations that involve well-known circumstances may be accompanied by a safety message that includes practical strategies to avoid potential future recurrence. Class 4 investigations must be completed within 90 days.

International Investigations

The United States is a signatory to the Chicago Convention on International Civil Aviation, which is administered by ICAO. The NTSB is charged with fulfilling the US obligation for accident and incident investigations in accordance with Annex 13 of this agreement in full coordination with the US Department of State.

The international investigative process is critical to maintaining aviation safety in the United States and throughout the world. When an aircraft operated by—or designed, manufactured, or registered to—a US company has been involved in an accident in a foreign state, NTSB participation in that investigation enables the United States to ensure the airworthiness and operation of its aircraft operated here and overseas. ICAO Annex 13 protocols also define the agency's engagement with international authorities whose products or operations are involved in accidents within the United States. This

international process of collaboration plays an important role in enabling us to identify safety concerns and issue appropriate recommendations. We have issued numerous safety recommendations that have resulted in safety improvements worldwide as a direct result of our participation in these foreign investigations.

Between October 1, 2021, and September 30, 2022, the Office of Aviation Safety was notified of 402 international investigations. Of these, investigators launched or traveled in support of seven investigations. The following investigations required significant US involvement.

DHL Boeing 757 Runway Excursion
Costa Rica
April 7, 2022

On April 7, 2022, a Boeing 757 operated by DHL overran the runway during landing at Juan Santamaria International Airport, Alajuela, Costa Rica. A postcrash fire ensued and the airplane sustained substantial damage. The flight crew was not injured. The accident is being investigated by the Costa Rica General Directorate of Civil Aviation. The NTSB appointed a US-accredited representative and technical advisors in accordance with ICAO Annex 13 because the United States is the state of manufacture and design of the airplane.

China Eastern Boeing 737 Impact with Terrain
Near Wuzhou, China
March 21, 2022

On March 21, 2022, China Eastern flight 5735, a Boeing 737-800, crashed into hillside near Wuzhou, China; there were 132 fatalities. The accident is being investigated by the Civil Aviation Administration of China. The NTSB appointed a US-accredited representative in accordance with ICAO Annex 13 because the United States is the state of manufacture and design of the airplane and engines.

Boeing 737-2X6C Collision During Takeoff
Puerto Carreño, Colombia
February 3, 2022

On February 3, 2022, a Boeing 737-2X6C airplane collided with trees upon departure from Puerto Carreño Airport. The airplane returned to the airport, where it landed without further incident; there were no injuries. The event is being investigated by the Colombia Accident Investigation Authority. The NTSB appointed a US-accredited representative in accordance with ICAO

Annex 13 because the United States is the state of manufacture and design of the airplane.

US Comments on Foreign Accident Reports

The NTSB completed comments on behalf of the United States on several international investigations in which the United States had significant involvement under Annex 13, including these:

Boeing 787-9, Dabolim, India
Goa International Airport
October 31, 2021

On October 31, 2021, El Al flight LY082, a Boeing 787-9, experienced a shutdown of its left engine about 2.5 hours into the flight. The flight crew diverted to India's Goa Airport rather than continue to the intended destination of Tel Aviv International Airport, Tel Aviv, Israel. There were 257 passengers and 19 crew members on board. India's investigative authority delegated the serious incident to the State of the Operator, Israel, and it was investigated by the Ministry of Transport and Road Safety Aviation Accidents and Incidents Investigation. The NTSB US-accredited representative and our technical advisors provided comments on the draft final report in April 2022. The final report was published in June 2022.

Boeing 737-500, Jakarta, Indonesia
Soekarno-Hatta International Airport
January 9, 2021

On January 9, 2021, Sriwijaya Air flight 182, a Boeing 737-500, crashed into the Java Sea after takeoff from Jakarta's Soekarno-Hatta International Airport, Pontianak-Borneo Island, Indonesia; there were 62 fatalities. The accident was investigated by Indonesia's National Transportation Safety Committee. The NTSB US-accredited representative and our technical advisors provided comments on the draft final report in August 2022. As of the end of FY 2022, the final report was pending.

Boeing 737-800, Istanbul, Turkey
Sabiha Gökçen Airport
February 5, 2020

On February 5, 2020, Pegasus Airlines flight PC2193, a Boeing 737-800, experienced a runway excursion shortly after landing at Sabiha Gökçen Airport, Istanbul, Turkey. Of the 175 passengers, 2 infants, and 6 crew members on board, 3 passengers were fatally injured, and 4 others were seriously injured. The accident was investigated by the Republic of Turkey

Ministry of Transport and Infrastructure Transport Safety Investigation Center. The NTSB US-accredited representative and our technical advisors provided comments on the draft final report in early February 2022. The final report was completed in late February 2022.

Boeing 787-9, Hong Kong
Course Deviation at Waypoint River of Hong Kong
October 18, 2019

On October 18, 2019, a Virgin Atlantic Airways Boeing 787-9 deviated from the localizer course while conducting an instrument landing system (ILS) approach to Hong Kong International Airport, diverging toward rising terrain. The pilot flying assumed manual control of the airplane and reestablished it on the ILS heading approximately 12 nautical miles from the runway threshold and landed uneventfully. No injuries were report to the 258 passengers or 13 crew members on board. The accident was investigated by the Hong Kong Air Accident Investigation Authority. The NTSB US-accredited representative and our technical advisors provided comments on the draft final report in September 2022. As of the end of FY 2022, the final report was pending.

Boeing 737 MAX, Addis Ababa, Ethiopia
Addis Ababa Bole International Airport
March 10, 2019

On March 10, 2019, Ethiopian Airlines flight 302, a Boeing 737 MAX, crashed shortly after takeoff from Addis Ababa Bole International Airport. All 157 passengers and crew on board were fatally injured. The accident is being investigated by the Ethiopian Civil Aviation Authority. The NTSB US-accredited representative and our technical advisors provided a third set of comments on the draft final report in May 2022. The final report will be published in the first half of FY 2023.

Other Efforts and Focus Areas

Aviation Report Timeliness Project - Report Review Process

From February to April 2022, key staff in the Office of Aviation Safety participated in the second stage of the office's Aviation Report Timeliness Project, establishing a plan to improve the report review process within the office to further improve timeliness and quality. We are developing guidance for the new report review process; will provide training on it to investigators, analysts, and their chiefs; and plan to implement the changes in early 2023.

Project Status Dashboard Created for Tracking and Managing Investigations

The office created a project status dashboard that allows its management team to monitor ongoing aviation investigations through SAFTI. First-line supervisors and IICs update the status of investigations on a regular basis to accurately track deliverables, which are displayed on the dashboard. This visibility allows for immediate status updates and evaluation of whether additional resources are required to meet scheduled milestones.

Cascade Project

Reducing and eliminating the number of investigations over 2 years old is a top priority for the office. In February 2022, we established the Cascade Project, a focused plan to address this backlog. We hired two retired annuitants to address a reduced staffing of report analysts, identified investigations that were nearing completion of investigative tasks and prioritized their completion, and triaged investigation reports that were already in review, quickly completing those that met quality standards. Finally, employee performance standards were revised to improve focus on quality and timely investigations.

New Positions Established

The office established the following new positions between October 1, 2021, and September 30, 2022:

- **Chief Technical Advisor (Space and Advanced Aerospace Transportation Investigations).** This employee advises leadership on agency policy in the planning, coordination, oversight, and management of space transportation and advanced aerospace technologies accident investigation, which may include UAS, fully autonomous air vehicles, or other nascent and complex experimental aircraft designs. The chief technical advisor works with agency leadership and the Office of General Counsel to negotiate, implement, and revise interagency agreements and memorandums of understanding to facilitate the agency's conduct of accident and mishap investigations involving FAA-licensed space launches; NASA-contracted, commercially conducted space launch operations; and other operations. They also facilitate the delivery of investigative training to industry stakeholders and other agencies to accomplish the accident investigation and safety improvement mission.

- **Business Process Manager.** This employee leads and manages the office's efforts to achieve and improve operational performance through the design, implementation, execution, and control of office processes.

They evaluate processes and their integration throughout the organization and identify priorities and strategies for process reengineering and improvement initiatives.

Ongoing Significant Aviation Accident and Incident Investigations

Location	Date	Description	Fatalities
Freeland, Washington	9/4/2022	DHC-3 loss of control and water impact	10
Amherstdale, West Virginia	6/22/2022	Bell UH-1B collision with terrain	6
Miami, Florida	6/21/2022	MD-80 landing gear collapse	0
Kalea, Hawaii	6/8/2022	Separation of helicopter tail boom during air tour flight	0
Jolon, California	2/16/2022	Failure of Joby Aviation JAS4-2 experimental aircraft component during developmental flight test.	0
Brookshire, Texas	10/19/2021	Runway excursion of DC-9-87.	0
Farmington, Connecticut	9/2/2021	Collision of Citation XL with obstacles shortly after takeoff.	6
Ketchikan, Alaska	8/5/2021	Controlled flight into terrain of DHC-2.	4
Honolulu, Hawaii	7/2/2021	Partial loss of power in both engines of Boeing 737.	0

Note: We are devoting significant resources to the investigations listed and anticipate producing a report upon the completion of each investigation.

HIGHWAY SAFETY

	($000s)	FTEs
FY 2023 Estimate	$9,294	32
FY 2024 Request	$10,415	34
Increase/Decrease	$1,121	2

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 5.2 percent projected for January 1, 2024, a 2.0 percent non-pay inflation factor, an increase in agency program investments, and an increase in the agency's contribution to employee health benefits. An increase of two FTEs is supported by this funding level.

Program Description

The Office of Highway Safety investigates crashes that have significant safety implications nationwide, highlight national safety issues, involve the loss of numerous lives, or generate high interest because of emerging technologies or the circumstance of the crash. Such investigations may focus on collapses of bridges spanning roadways or tunnel structures, mass casualties and injuries on public transportation vehicles (such as motorcoaches and school buses), or collisions at highway–railroad grade crossings. This office also investigates crashes that involve new safety issues or technologies (such as automated vehicles and alternatively fueled vehicles) and develops reports based on trends emerging from NTSB investigations and from research and data that identify common risks or underlying causes of crashes, injuries, and fatalities.

The NTSB is the only US organization that performs independent, comprehensive, and transparent multidisciplinary investigations to determine the probable causes of highway crashes, with the goal of making recommendations to prevent similar events and to reduce injuries and fatalities. Our investigations result in recommendations that provide policymakers with unbiased analysis and that, if implemented, would reduce or eliminate the safety risks identified in the investigations.

The Office of Highway Safety comprises the Investigations Division and the Report Development Division.

Investigations Division

The Investigations Division manages the multidisciplinary go-teams launched to crash sites to collect the factual and develop the analytical information for investigations. Currently, the division is separated into two branches: multi-disciplinary investigations and special investigations. The multi-disciplinary investigation branch conducts major highway investigations through teams comprising an IIC and five other investigators with expertise in vehicle, highway, human performance, survival, and motor carrier factors. The special investigations branch performs focused investigations by specific subject matter experts on targeted safety issues. All investigations are supported by two crash reconstruction experts and a national resource specialist. To enhance geographic coverage and reduce response time, team members are located throughout the country, including in California, Colorado, Tennessee, Texas, Washington, Wyoming, and Washington, DC.

Report Development Division

The Report Development Division manages the development of investigation reports. Project managers and technical writer-editors review the contents of the docket provided by the investigators for accuracy and completeness; research, analyze, and develop national highway safety issues based on this investigative information; and write and edit reports. This division is also responsible for managing investigative hearings and forums on national highway safety issues.

Accomplishments and Ongoing Efforts

Office accomplishments include the issuance of products related to transportation safety arising from completed and ongoing investigations. Products completed between October 1, 2021, and September 30, 2022, are highlighted below, along with information about other efforts and focus areas important to our mission.

Investigation Reports

Investigation reports are issued for highway crash investigations and may contain a determination of probable cause and/or safety recommendations, depending upon the scope of the investigation and the safety issues identified. For select investigations, the office launches an investigation team and presents a comprehensive investigation report to the Board. Investigations that are limited in scope have the primary purpose of determining probable cause; the resultant report may be issued by the office director under delegated authority or may be adopted by the Board. A report

containing only safety recommendations can be issued at any time during an investigation. If the Board determines that a recommended course of action requires immediate attention to avoid imminent loss of life from a similar accident, the safety recommendation is designated "urgent."

Below are summaries of the highway investigation reports completed between October 1, 2021, and September 30, 2022, arranged by report date.

Sport Utility Vehicle Centerline Crossover Collision with Pickup Truck on State Route 33 Avenal, California
January 1, 2021

On January 1, 2021, about 8:00 p.m., a sport utility vehicle (SUV), occupied by only the driver, was traveling south on State Route 33 near Avenal, California. The SUV driver had just left a New Year's Day gathering where he had consumed alcohol and was driving at a speed between 88 and 98 miles per hour (mph) on the two-lane roadway, which had one lane in each direction and a posted speed limit of 55 mph. When the SUV partially departed from the paved roadway onto a dirt and gravel shoulder area to the right, the driver suddenly steered left, causing the vehicle to go out of control. The SUV crossed the highway centerline and intruded into the northbound lane, directly in front of a northbound pickup truck, occupied by an adult driver and seven passengers ranging in age from 6 to 15 years old and traveling between 64 and 70 mph. The SUV and pickup truck collided head-on. The pickup truck immediately caught on fire, and other drivers who stopped at the scene had insufficient time to rescue any occupants before fire engulfed the truck. The SUV driver and all eight pickup truck occupants died.

The NTSB determined that the probable cause of the Avenal, California, crash was the failure of the SUV driver to control his vehicle due to a high level of alcohol impairment. Contributing to the severity of the crash was the SUV driver's excessive speed.

We identified the following safety issues during this investigation: (1) driver impairment and the need for technology to prevent alcohol-impaired driving crashes, (2) the need for technology to prevent speeding-related crashes, and (3) the need to implement a uniform standard for drug toxicology testing.

The NTSB issued new safety recommendations to the National Highway Transportation Safety Administration (NHTSA), the State of California, and the

Alliance for Automotive Innovation. We reiterated two recommendations to NHTSA.

Recommendations: 3 new, 2 reiterated
Report Date: August 22, 2022

Multivehicle Crash on the Don N. Holt Bridge, Interstate 526
North Charleston, South Carolina
July 1, 2020

On July 1, 2020, about 9:50 a.m., a 2018 Ford F350 pickup truck with an attached unladen trailer was traveling west in the right lane of Interstate 526 on the Don N. Holt Bridge in North Charleston, South Carolina. The pickup truck collided with the rear of a parked patrol car, which was stopped behind a disabled SUV, causing the SUV to collide with a tow truck parked in front of it. A sheriff's deputy and a tow truck operator were also struck; the tow truck operator was fatally injured, and the sheriff's deputy was seriously injured.

The NTSB determined that the probable cause of the North Charleston, South Carolina, crash was the pickup truck driver's inattention to the driving task, likely due to fatigue, which resulted in his failure to respond to stopped vehicles in his travel lane.

We identified the following safety issues during this investigation: (1) inattention of the driver, (2) inadequate emergency responder safety, and (3) the need for implementation of collision avoidance technology.

Recommendations: None
Report Date: May 31, 2022

Multivehicle Crash
Near the Township of Arlington, Wisconsin
June 12, 2020

On June 12, 2020, near the Township of Arlington, Wisconsin, a queue of slowed and stopped traffic formed on Interstate 39 because of two previous traffic collisions. About 6:45 a.m., a 2013 Freightliner truck-tractor in combination with a 2017 Utility semitrailer struck the end vehicle in the queue, causing a crash involving eight vehicles. Four vehicle occupants died and three were seriously injured.

The NTSB determined that the probable cause of the crash was the truck driver's failure to respond to slow-moving traffic due to fatigue. Contributing to the fatigue was his undiagnosed obstructive sleep apnea.

We identified the following safety issue during this investigation: the need to identify commercial motor vehicle drivers at high risk for obstructive sleep apnea and to ensure appropriate evaluation of these drivers and treatment for affected drivers before they are granted unrestricted medical certification.

Recommendations: None
Report Date: May 25, 2022

Bus Roadway Departure and Rollover
Pala Mesa, California
February 22, 2020

On February 22, 2020, about 10:23 a.m., during a moderate rainfall, a 30-passenger bus left the southbound lanes of Interstate 15 just past a bridge over the San Luis Rey River and overturned in Pala Mesa, California, coming to rest on its roof. The posted speed limit was 70 mph; the bus, operated by Executive Lines and occupied by a 52-year-old driver and 20 passengers, was traveling about 74 mph despite the wet roadway. As a result of the crash, 3 passengers died, 12 passengers sustained serious injuries, and 5 passengers and the driver received minor injuries.

The NTSB determined that the probable cause of the Pala Mesa, California, bus crash was the loss of vehicle control due to the combination of the low and substandard tread depth of the rear axle tires, the excessive speed for the wet roadway and vehicle conditions, and the driver's inappropriate inputs before and during the loss-of-control event. Contributing to the crash was Executive Lines' inadequate vehicle inspection process, which permitted the bus to operate in passenger service despite having two tires with treads below the minimum required depth. Contributing to the severity of the injuries were NHTSA's failure to require roof strength standards for buses, Executive Lines' failure to follow California's requirement to inform passengers about the state's mandatory seat belt use law, and the passengers' limited use of the available lap/shoulder belts.

We identified the following safety issues during this investigation: (1) the need to decrease driving speed when traveling on wet roadways, (2) the need to ensure the adequacy of tire tread depth standard for commercial vehicles, (3) the need to maintain safe tire tread depths on commercial vehicles, (4) the lack of roof strength standards for certain buses, and (5) inadequate seat belt usage on buses.

The NTSB issued new safety recommendations to NHTSA, the Federal Motor Carrier Safety Administration (FMCSA), the State of California, the California Highway Patrol, the American Bus Association (ABA), and the United

Motorcoach Association (UMA) and reiterated one previously issued recommendation to NHTSA.

Recommendations: 10 new, 1 reiterated
Report Date: April 19, 2022

Multivehicle Crash
Near Mt. Pleasant Township, Pennsylvania
January 5, 2020

On January 5, 2020, about 3:30 a.m., on the westbound Pennsylvania Turnpike near Mt. Pleasant Township, Pennsylvania, a motorcoach carrying 59 passengers ran off the road and overturned, blocking all westbound lanes. The motorcoach was rounding a curve at night and in light snow. Within seconds, two trucks towing semitrailers that had been following the motorcoach hit it. A westbound car and a third truck drove off the road to avoid the wreckage. The motorcoach driver, two passengers, and both occupants of the second truck died in the crash; 49 of the motorcoach passengers and the codriver of the first truck were injured. The driver of the first truck, the occupants of the third truck, and the occupants of the car were uninjured.

The NTSB determined that the probable cause of the crash was the motorcoach driver's loss of control due to the motorcoach's unsafe speed on the wet curve and the driver's likely excessive steering inputs. Contributing to the severity of the crash was the high initial and impact speed of the second truck.

We identified the following safety issues during this investigation: (1) excessive speed for wet road conditions for the motorcoach and the two trucks, (2) a lack of standards for commercial vehicle collision avoidance and mitigation systems to enhance safety, and (3) a lack of onboard video event recorder systems on commercial motor vehicles.

The NTSB issued new safety recommendations to the US DOT, the Federal Highway Administration, NHTSA, the FMCSA, the Federal Communications Commission, the Commonwealth of Pennsylvania, the Pennsylvania Turnpike Commission, the American Trucking Associations, the Owner-Operator Independent Drivers Association, the Commercial Vehicle Safety Alliance, ABA, UMA, the Transport Workers Union of America, the Amalgamated Transit Union, the International Brotherhood of Teamsters, FedEx Ground Package System, and United Parcel Service of America. We also

reiterated previously issued recommendations to NHTSA, the Commonwealth of Pennsylvania, ABA, and UMA.

Recommendations: 11 new, 7 reiterated
Report Date: February 8, 2022

Collision between Sport Utility Vehicle and Medium-Size Bus Transporting Adult Passengers with Disabilities and Special Needs
Belton, South Carolina
December 17, 2019

On December 17, 2019, about 3:30 p.m., an SUV was traveling east on US Highway 76 in Belton, South Carolina, where the posted speed limit was 45 mph. Meanwhile, a medium-size bus—occupied by a driver and 7 passengers, including 2 in wheelchairs—was traveling west on US-76 about 45 mph. Shortly before the crash, the SUV accelerated to a speed of about 75 mph and, about 1–2 seconds before impact, crossed the center line; it subsequently collided with the left side of the bus, intruding just behind the driver. The unbelted SUV driver was ejected and fatally injured. A lap-belted bus passenger seated in the intrusion area was also fatally injured. The remaining bus occupants sustained minor to serious injuries.

The NTSB determined that the probable cause of the Belton, South Carolina, crash was the SUV driver's loss of control of her vehicle because of distraction from cell phone use, resulting in the SUV's crossing into the opposite travel lane and colliding with the medium-size bus. Contributing to the severity of the crash was the excessive speed of the SUV.

We identified the following safety issues during this investigation: (1) driver distraction due to cell phone use while driving and (2) the need for improvements to wheelchair securement training.

The NTSB issued new safety recommendations to the National Association of State Directors of Developmental Disabilities Services and reiterated two previously issued recommendations to the 50 states and the District of Columbia, and the manufacturers of portable electronic devices (Apple, Google, HTC, Lenovo, LG, Motorola, Nokia, Samsun, and Sony).

Recommendations: 1 new, 2 reiterated
Report Date: November 17, 2021

Other Efforts and Focus Areas

Automated Vehicle Webpage

Since the first fatal crash in the United States in 2016 that involved a vehicle operating in partial automation mode at the time of the collision, the NTSB has investigated numerous crashes of vehicles equipped with various automation capabilities. This new Safety Topics webpage serves as a collection of NTSB highway investigations, lessons learned from the investigative outcomes, and a resource for various material characterizing the agency's position regarding vehicle automation and related topics.

Teen Driver Safety Virtual Roundtable Series, Parts 1 & 2

October 17-23, 2021, was National Teen Driver Safety Week, a week dedicated to raising awareness and seeking solutions to prevent teen injuries and deaths on the road. In this roundtable, representatives of the NTSB talked to experts in teen safety programming and related research about the state of teen driver safety in the United States and how the nation can achieve zero traffic deaths involving teen drivers. The discussion focused on the risks impacting these drivers—such as distraction, fatigue, and impairment—and highlighted actions that can reduce teen driving crashes. NTSB Board member Thomas Chapman provided opening remarks.

Safe System Approach Roundtable Series
A Safe System: Post-Crash Care
February 2022

In 2021 and 2022, the Office of Highway Safety supported the Office of the Chair and the Office of Safety Recommendations and Communications in launching a Safe System approach roundtable series. The main objectives for the series were (1) to better understand the Safe System approach, its benefits, and ways that it differs from the current approach to road safety in the United States, (2) to explore the current state of the Safe System approach in the United States and to learn from international partners and from cities across the nation that have moved toward such an approach, and (3) to identify what actions need to be taken to move toward this approach nationwide. The series concluded with a roundtable on post-crash care that featured presentations from two NTSB staff members and six outside experts on the topic.

Most Wanted List

In 2021 and 2022, the Office of Highway Safety developed and advocated for five MWL issue areas to address the most needed areas in highway safety. These included (1) Implement a Comprehensive Strategy to

Eliminate Speeding-Related Crashes, (2) Protect Vulnerable Road Users (VRU) through a Safe System Approach, (3) Prevent Alcohol- and Other Drug-Impaired Driving, (4) Require Collision Avoidance and Connected-Vehicle Technologies on all Vehicles, and (5) Eliminate Distracted Driving. The Office of Highway Safety continues to work with the Office of Safety Recommendations and Communications and stakeholders to address these key challenges.

MWL Video Series – V2X: Preserving the Future of Connected Vehicle Technology
January 19, 2022

In our four-part MWL interview video series, Board Member Michael Graham talked with experts from government, industry, and academia about the safety benefits and the maturity level of V2X technology, the reasons for its scarce deployment, and the impact of the Federal Communications Commission's recent actions to limit the spectrum available for transportation safety.

MWL Webinar: Collision-Avoidance Technologies and Teen Driver Safety
March 23, 2022

During this webinar, hosted by Board Member Michael Graham, participants discussed the role of vehicle technology—specifically, collision avoidance technologies (such as automatic emergency braking and collision warning)—in reducing teen traffic crashes and fatalities. The webinar addressed the Insurance Institute for Highway Safety's recent research on collision avoidance technology and teen driver safety, explored perspectives from educators and the automotive industry, and addressed how vehicle technology, if made standard in all vehicles, can contribute toward equitable and accessible safe transportation for all.

MWL Webinar: A Safe System Approach to Motorcycle Safety
May 11, 2022

During this webinar, hosted by Board Member Tom Chapman, participants discussed the role of motorcycle safety through the lens of the Safe System approach, a safety improvement included on the NTSB's MWL. The webinar evaluated NTSB crash investigations and safety recommendations, the role of vehicle design and technology for both motorcycles and passenger vehicles, infrastructure needs, driver training, required protective gear, and safe driving and riding practices. Participants examined ways to improve safety for motorcycle riders, one group of VRUs.

Significant Correspondence

- Response to the FMCSA's request for comment on the *Medical Examiners Handbook* and medical advisory criteria.
- Letter to the FCC regarding waivers on ITS operations 5.9GHz band.
- Response to NHTSA's notice of proposed rulemaking on event data recorders.
- Response to the FMCSA's advanced notice of supplemental rulemaking for speed-limiting devices on commercial motor vehicles.
- Response to NHTSA's request for comments about its new car assessment program.
- Response to the FMCSA's advanced notice of supplemental proposed rulemaking on parts and accessories necessary for safe operations; speed-limiting devices.

Ongoing Significant Highway Accident Investigations

Location	Date	Description	Fatalities
Hamden, Connecticut	7/23/2022	Battery electric bus fire	0
Dermott, Arkansas	6/6/2022	Crash between a medium-size bus and a combination vehicle	5
Clarendon Hills, Illinois	5/11/2022	Crash at grade crossing.	1
Tishomingo, Oklahoma	3/22/2022	Crash between a passenger car and a combination vehicle at intersection.	6
Andrews, Texas	3/15/2022	Head-on crash between a pickup truck and a transit van.	9
North Las Vegas, Nevada	1/29/2022	Multivehicle collision at a signalized intersection.	9
Pittsburgh, Pennsylvania	1/28/2022	Collapse of the Fern Hollow Bridge.	0
Monaville, Texas	12/17/2021	Loss of control and rollover crash of a school bus.	1
Big Spring, Texas	11/19/2021	Frontal collision of a wrong-way driver and a motorcoach.	3
Greenville, Alabama	6/19/2021	Multivehicle crash in wet weather conditions.	10
Phoenix, Arizona	6/9/2021	Multivehicle crash involving a traffic queue resulting from previous lane closures.	4

Location	Date	Description	Fatalities
Fort Worth, Texas	2/11/2021	Multivehicle crash in winter weather conditions (our focus is on the pretreatment of the roadway).	6

Note: We are devoting significant resources to the investigations listed and anticipate producing a report upon the completion of each investigation.

MARINE SAFETY

	($000s)	FTEs
FY 2023 Estimate	$6,109	20
FY 2024 Request	$6,866	23
Increase/Decrease	$757	3

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 5.2 percent projected for January 1, 2024, a 2.0 percent non-pay inflation factor, an increase in agency program investments, and an increase in the agency's contribution to employee health benefits. An increase of three FTEs is supported by this funding level.

Program Description

The Office of Marine Safety investigates and determines the probable cause of major marine casualties in US territorial waters, major marine casualties involving US-flagged vessels worldwide, and accidents involving both US public (federal) and nonpublic vessels in the same casualty. In addition, the office investigates select catastrophic marine accidents and those of a recurring nature.

The US Coast Guard conducts preliminary investigations of all marine accidents and notifies the NTSB when an accident qualifies as a major marine casualty, which includes any one of the following:

- The loss of six or more lives.
- The loss of a mechanically propelled vessel of 100 or more gross tons.
- Property damage initially estimated to be $500,000 or more.
- A serious threat, as determined by the commandant of the US Coast Guard with the concurrence of the NTSB chair, to life, property, or the environment by hazardous materials.

The office is also responsible for the overall management of the NTSB's international marine safety program, under which the office investigates major marine casualties involving foreign-flagged vessels in US territorial waters and those involving US-flagged vessels anywhere in the world. Accidents involving foreign-flagged vessels accounted for 29 percent of NTSB marine casualty investigations over the past 5 years. Under the International Maritime

Organization (IMO) *Code of International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident*, the office also participates with the US Coast Guard as a substantially interested State (SIS) in investigations of serious marine casualties involving foreign-flagged vessels in international waters. The international program involves reviewing US administration position papers related to marine accident investigations and participating in select IMO sub-committee meetings.

As part of the international program, the office coordinates with other US and foreign agencies to ensure consistency with IMO conventions. We also cooperate with other accident investigation organizations worldwide at annual meetings held both virtually and in person, such as the Marine Accident Investigators' International Forum (MAIIF), which has status as a nongovernmental organization with IMO, Europe MAIIF, and MAIIF Americas, which track developments related to marine casualty investigations and prevention.

The NTSB is the only federal organization that performs independent, comprehensive, and transparent multidisciplinary investigations to determine the probable cause of marine accidents, with the goal of making safety recommendations to prevent similar events from occurring in the future. The thoroughness and independence of these investigations maintain public confidence in marine transportation systems and provide policymakers with unbiased analysis.

The Office of Marine Safety comprises the Marine Investigations Division and the Product Development Division.

Marine Investigations Division

The Marine Investigations Division manages the multidisciplinary go-teams that launch to accident sites, collect information, and analyze collected information to determine probable cause. Currently, major casualty investigations are conducted by one of two teams with either five or six investigators on each team, led by an IIC and including subject-matter experts in nautical operations, marine engineering and naval architecture, survival factors, human performance, and, when needed, a subject-matter expert from the Office of Research and Engineering.

Product Development Division

The Product Development Division produces all marine reports and administers the investigative quality management program. The division consists of technical writer-editors who are also responsible for drafting and

editing the annual *Safer Seas Digest* publication, responses to notices of proposed rulemaking, and general office correspondence.

Accomplishments and Ongoing Efforts

Office accomplishments include the issuance of products related to transportation safety arising from completed and ongoing investigations. Products completed between October 1, 2021, and September 30, 2022, are highlighted below, along with information about other efforts and focus areas important to our mission.

Investigation Reports

Investigation reports are issued for accident or incident investigations and may contain a determination of probable cause and/or safety recommendations, depending upon the scope of the investigation and the safety issues identified. For select major marine casualties, the office launches a full investigation team and presents a comprehensive investigation report to the Board. Investigations that are limited in scope have the primary purpose of determining probable cause; the resultant report may be issued by the office director under delegated authority or may be adopted by the Board. A report containing only safety recommendations can be issued at any time during an investigation. If the Board determines that a recommended course of action requires immediate attention to avoid imminent loss of life from a similar accident, the safety recommendation is designated "urgent."

Below are summaries of a sampling of the marine investigation reports completed between October 1, 2021, and September 30, 2022, arranged by report date.

Contact of Bulk Carrier *Jalma Topic* with Floating Office Structure
Mile 93.5 LMR, New Orleans, Louisiana
July 12, 2021

On July 12, 2021, about 3:23 a.m., the bulk carrier *Jalma Topic* was transiting upriver on the Lower Mississippi River near New Orleans, Louisiana, (mile 93.5), when it lost steering and struck a barge with an office accommodation structure on the bank. None of the 3 persons on the office barge or 20 persons (19 crew and a pilot) on the *Jalma Topic* were injured. Damage to the office barge and moorings were estimated at $6 million and to the bow of the *Jalma Topic,* $215,000. No pollution or injuries were reported.

The NTSB determined that the probable cause of the contact of the *Jalma Topic* with the office barge was a loss of steering due to the failure of an electrical solid-state relay on the servo control board of the operating

control system to the steering gear. Contributing was the lack of specific procedures available to the bridge team to respond to a failure of the steering control system.

Failures in steering control systems can result in damaging consequences. In channels or during maneuvering, where immediate hazards (grounding, traffic, objects) are in proximity and therefore response time is critical to avoiding a casualty, steering system failure contingencies require immediate crew response.

Recommendations: None
Report Date: September 13, 2022

Collision between *Baxter Southern* Tow and BNSF Coal Train
Montrose, Iowa
November 13, 2021

On November 13, 2021, about 11:43 p.m., the towing vessel (TV) *Baxter Southern* had pushed its tow of four empty barges against the shoreline of the Upper Mississippi River at mile 372 near Galland, Iowa, when a BNSF coal train transiting the track along the shoreline struck the bow rake of a forward barge that was overhanging the railroad track. Two locomotives and ten hopper cars (loaded with coal) derailed, and six of the derailed hopper cars entered the river. A sheen was observed in the river following the derailment. The two train personnel sustained minor injuries. Damages for the locomotive and freight cars were estimated to be $1.9 million. The barge sustained minor scrapes.

The NTSB determined that the probable cause of the collision between the *Baxter Southern* tow and BNSF coal train was the tow's pilot and captain not correctly identifying a caution area on the electronic chart before deciding, due to the high wind's effect on the tow's empty barges, to push the tow up against the riverbank alongside a railroad track.

Recommendations: None
Report Date: August 25, 2022

Fire aboard Fishing Vessel *Blue Dragon*
350 miles offshore of Monterey, California
November 10, 2021

On November 10, 2021, about 00:15 a.m., the fishing vessel *Blue Dragon* was under way in the North Pacific Ocean, 350 miles offshore of Monterey, California, engaged in longline fishing operations, when

the vessel caught fire. The *Blue Dragon's* six crewmembers and a National Marine Fisheries Service observer attempted to fight the fire but were unsuccessful. They abandoned the *Blue Dragon* and were rescued by a Good Samaritan vessel. The *Blue Dragon* was later towed to San Pedro, California. No pollution or injuries were reported. Damages were estimated to be over $500,000.

The NTSB determined that the probable cause of the fire aboard the fishing vessel *Blue Dragon* was from an unknown source, likely electrical in nature, which ignited the wooden wheelhouse console. Contributing to the extent of the fire damage was the substantial use of combustible materials in the joinery, outfitting, and furnishings in the wheelhouse and accommodation spaces.

Recommendations: None
Report Date: August 23, 2022

Sinking of Commercial Fishing Vessel *Emmy Rose*
About 27 miles off the coast of Provincetown, Massachusetts
November 23, 2020

On November 17, 2020, after departing Portland, Maine, the four crewmembers aboard the 82-foot-long commercial fishing vessel *Emmy Rose* fished for 5 days in the Gulf of Maine. On November 22, the captain notified a seafood distribution facility in Gloucester, Massachusetts, that they had about 45,000 pounds of assorted fish to offload and expected to arrive at 6:00 a.m. the following morning. The crew fished for another 4 hours, departing about 6:30 p.m. for Gloucester.

At 1:29 a.m. on November 23, the US Coast Guard in Boston, Massachusetts, received a distress signal from the emergency position indicating radio beacon (EPIRB) registered to the *Emmy Rose*; no distress calls had been made before that. Over the 7 hours since it had departed the fishing grounds, the vessel had traveled about 45 miles to the west. Weather conditions recorded by a nearby buoy (about 21 miles from the sinking site) at the time of the EPIRB signal were winds from the east-southeast at 17 knots, gusting to 21 knots, and the sea state was 5.6 feet observed, with an easterly sea swell of 5-6 feet.

US Coast Guard search and rescue personnel were deployed to the area of the signal, about 27 miles from Provincetown, Massachusetts. Although search and rescue efforts continued for 38 hours and covered over 2,200 square miles, searchers recovered only the EPIRB, the life raft, one life ring, and two wooden fish hold hatch covers from the *Emmy Rose*. None of the

crewmembers were ever located, and they are presumed dead. The vessel, which sank in 794 feet of water, was not recovered. Its estimated value was $325,000.

The NTSB determined that the probable cause of the sinking of the fishing vessel *Emmy Rose* was a sudden loss of stability (capsizing) caused by water collecting on the aft deck and subsequent flooding through deck hatches, which were not watertight or weathertight because the hatch covers had no securing mechanisms, contrary to the vessel's stability instructions and commercial fishing vessel regulations.

We identified the following safety issues in this investigation: (1) a lack of sufficient vessel stability to meet regulatory criteria, (2) ineffective freeing port cover design, (3) a lack of securing mechanisms for deck hatches to maintain the vessel's watertight integrity, and (4) a need for personal locator beacons to enhance search and rescue efforts.

The NTSB issued two new safety recommendations and reiterated one recommendation to the US Coast Guard.

Recommendations: 2 new; 1 reiterated
Report Date: August 23, 2022

Engine Room Fire Aboard Bulk Carrier *Roger Blough*
Sturgeon Bay, Wisconsin
February 1, 2021

On February 1, 2021, about 1:31 a.m., a fire started in the engine room on the *Roger Blough* during the dry bulk carrier's winter layup at the Fincantieri Bay Shipbuilding facility on Sturgeon Bay, Wisconsin. The cargo-unloading conveyor belts subsequently ignited, causing extensive damage throughout the aft section of the vessel. The shipkeeper on board departed the vessel without injury. Firefighters extinguished the fire later that afternoon. No pollution was reported. Damage to the *Roger Blough* exceeded $100 million.

We determined that the probable cause of the engine room fire aboard the bulk carrier *Roger Blough* was likely the repeated removal and reinstallation of the furnace's burner that led to the failure of its mounting coupling, resulting in the operating burner's dropping to the bottom of its enclosure and fracturing its fuel supply line, which allowed diesel fuel to ignite. Contributing to the casualty was the absence of a fire-activated automatic fuel oil shutoff valve on the fuel oil inlet piping before the burner, which would have stopped the fuel feeding the fire shortly after it started and limited the spread of the fire.

We identified the following safety issues in this investigation: (1) the lack of a fire-activated valve on the fuel oil piping to the burner on the furnace in the engine room, (2) the lack of regulations governing furnace installation and operation on board certain vessels, and (3) inadequate notification to onboard personnel of a fire.

The NTSB issued safety recommendations to the US Coast Guard, the American Bureau of Shipping, and Key Lakes Inc.

Recommendations: 3 new
Report Date: August 17, 2022

Contact of Bulk Carrier *Ocean Princess* with Oil and Gas Production Platform SP-83A Southwest Pass Fairway Anchorage, Gulf of Mexico, 24 miles south of Pilottown, Louisiana
January 7, 2021

On January 7, 2021, at 1:22 a.m., the bulk carrier *Ocean Princess*, with a crew of 24, struck the uncrewed/out-of-service oil and gas production platform SP-83A while operating in the Gulf of Mexico, 24 miles south of Pilottown, Louisiana. No pollution or injuries were reported. Damage to the vessel and platform was estimated at $1.5 million.

The NTSB determined that the probable cause of the contact of the dry bulk carrier *Ocean Princess* with the oil and gas production platform SP-83A was poor bridge resource management, which resulted in the bridge team not identifying the platform and recognizing the risk it posed to their safe navigation even though they saw its lights about 10 minutes before the casualty. Contributing was platform SP-83A not being shown on the vessel's electronic chart display and information system due to a charting error.

Recommendations: None
Report Date: August 9, 2022

Diesel Generator Engine Failure Aboard Ferry *Wenatchee*
Puget Sound near Seattle, Washington
April 22, 2021

On April 22, 2021, about 1:30 p.m., the no. 3 main engine aboard the passenger and car ferry *Wenatchee* (US) suffered a mechanical failure during a sea trial in Puget Sound near Bainbridge Island, Washington. The failure led to the ejection of components from the engine and resulted in a fire in the no. 2 engine room. The crew isolated the space, and the fire self-extinguished before it could spread throughout the vessel. There were 13 crewmembers aboard

and no passengers. No injuries or pollution were reported. Damage to the Wenatchee was estimated at $3,790,000.

The NTSB determined that the probable cause of the mechanical failure of the engine aboard the *Wenatchee* was a connecting rod assembly that came loose and separated from the crankshaft due to insufficient tightening (torquing) of a lower basket bolt during the recent engine overhaul.

Recommendations: None
Report Date: March 2, 2022

Collision Between Offshore Supply Vessel *Cheramie Bo-Truc No. 33* and US Coast Guard Cutter *Harry Claiborne*
Sabine Pass, Port Arthur, Texas
October 11, 2020

On October 11, 2020, at 3:44 p.m., offshore supply vessel (OSV) *Cheramie Bo Truc No. 33* (US) was traveling with a crew of five bound for sea in Sabine Pass when it collided with the US Coast Guard cutter *Harry Claiborne*, which was servicing a buoy near Texas Point, Texas. The OSV subsequently ran aground. The crew attempted to refloat the vessel, but it broke free, and the current sent it into the stationary cutter, resulting in a second collision. Three of the 24 crewmembers aboard the *Harry Claiborne* suffered minor injuries; none of the *OSV* crewmembers were injured. No pollution was reported. Total damage of the two collisions was estimated at $505,951: for the *Cheramie Bo-Truc No. 33,* $65,072, and for the *Harry Claiborne,* $440,879.

The NTSB determined that the probable cause of the initial collision between the *Cheramie Bo-Truc No. 33* and the *Harry Claiborne* was the OSV captain's assumption of the cutter's position, which led to his decision to pass the vessel outside the channel, resulting in a late maneuver toward the cutter to avoid running aground. Contributing to the collision was the cutter crew's failure to question the passing arrangement proposed by the OSV's captain. Causing a second collision was the lack of coordination and communication between the two vessel operators when the OSV refloated their vessel.

Recommendations: None
Report Date: February 16, 2022

Hazardous Liquid Pipeline Strike and Subsequent Explosion and Fire Aboard Dredging Vessel *Waymon Boyd* (US)
EPIC Marine Terminal, Corpus Christi Ship Channel, Corpus Christi, Texas
August 21, 2020

On August 21, 2020, about 8:02 p.m., the US-flagged dredge *Waymon Boyd* struck a submerged 16-inch liquid propane pipeline during dredging operations in Corpus Christi, Texas. A geyser of propane gas and water erupted adjacent to the vessel, propane gas engulfed the vessel, and an explosion occurred. Three crewmembers aboard the *Waymon Boyd* and one on an adjacent anchor barge died in the explosion and fire. Six crewmembers aboard the dredge were injured, one of whom later died from his injuries. The *Waymon Boyd*, valued at $9.48 million, was a total loss. The cost of pipeline damage was $2.09 million. The cost of physical damage to the EPIC marine terminal nearby was $120,000.

The NTSB determined that the probable cause of the hazardous liquid pipeline breach, propane release, and subsequent explosion and fire aboard the dredging vessel was Orion Marine Group's inadequate planning and risk management processes, which failed to identify the proximity of their dredging operation to Enterprise Products' pipeline TX219 and resulted in the absence of effective controls to prevent the dredge's cutterhead from striking the pipeline. Contributing to the accident were deficient dredging plans provided by Schneider Engineering and Consulting, which resulted in incomplete and inaccurate information communicated to Enterprise Products by Orion Marine Group during the one-call process, which resulted in insufficient measures to protect the pipeline from excavation damage.

We identified the following safety issues during this investigation: (1) inadequate project planning and risk assessment, (2) ineffective pipeline damage prevention, and (3) a lack of hazard training.

The NTSB made recommendations to PHMSA, Coastal and Marine Operators, the Council for Dredging and Marine Construction Safety, Orion Group Holdings, and Enterprise Products.

Recommendations: 10 new
Report Date: December 7, 2021

Fire Aboard Roll-on/Roll-off Vehicle Carrier *Höegh Xiamen* (NO)
Pier 20, Blount Island, Jacksonville, Florida
June 4, 2020

On June 4, 2020, about 3:30 p.m., the crew of the 600-foot-long, Norwegian-flagged, roll-on/roll-off vehicle carrier *Höegh Xiamen* were

preparing to depart the Blount Island Horizon Terminal in Jacksonville, Florida, when they saw smoke coming from a ventilation housing for one of the exhaust trunks that ran from deck 12 (the weather deck) to one of the cargo decks. Crewmembers discovered a fire on deck 8, which had been loaded with used vehicles. Shoreside fire department teams arrived to relieve the crew, which had been repelled by heavy smoke. The captain had carbon dioxide from the vessel's fixed fire-extinguishing system released into decks 7 and 8, then the crew evacuated from the vessel.

Nine of the local firefighters were subsequently injured, five of them seriously, in an explosion. The fire was not extinguished until over a week later, on June 12. The *Höegh Xiamen* and its cargo were declared a total loss, valued at $40 million.

The NTSB determined that the probable cause of the fire was Grimaldi's and SSA Atlantic's ineffective oversight of longshoremen, which had not identified that Grimaldi's vehicle battery securement procedures were not being followed, resulting in an electrical fault from an improperly disconnected battery in a used vehicle on cargo deck 8. Contributing to the delay in the detection of the fire was the crew's not immediately reactivating the vessel's fire detection system after the completion of loading. Contributing to the extent of the fire was the master's decision to delay the release of the carbon dioxide fixed fire-extinguishing system.

We identified the following safety issues during this investigation: (1) a lack of training for vehicle battery securement, (2) ineffective oversight of vehicle securement, (3) regulatory exceptions for used and damaged flammable-liquid powered vehicles, (4) fire detection system deactivation during cargo operations, and (5) ineffective emergency distress calls.

The NTSB issued recommendations to PHMSA, the US Coast Guard, the National Maritime Safety Association, Grimaldi Deep Sea, and Höegh Technical Management.

Recommendations: 8 new
Report Date: December 1, 2021

Support to Foreign Accident Investigations

Between October 1, 2021, and September 30, 2022, the Office of Marine Safety participated with the US Coast Guard as an SIS in two ongoing investigations of serious marine casualties involving foreign-flagged vessels in international waters:

Location	Date	Description	Fatalities
Bahamas	05/26/2022	*Carnival Freedom* (BA), SIS, fire/explosion	0
Puerto Plata, Dominican Republic	3/14/2022	*Norwegian Escape* (BA), SIS investigation; contact (grounding)	0

Other Efforts and Focus Areas

Fishing Vessel Safety Roundtable

On October 14, 2021, the Office of Marine Safety held a virtual roundtable, hosted by Chair Jennifer Homendy, to discuss new solutions aimed at improving commercial fishing vessel safety. More than a dozen experts and safety advocates from government and industry participated in this discussion, which was webcast through the NTSB website and viewed by more than 2,000 viewers worldwide. More than 800 fatalities have occurred on fishing vessels in the last two decades, and fishing consistently tops the list of most deadly occupations, due in large part to challenging work environments, such as poor weather and rough waters. These conditions threaten vessel stability and integrity—issues we have seen in our investigations and that we have highlighted on the NTSB's current MWL.

Seafloor Investigative Workshop – Surveys and Other Related Activities

The NTSB Seafloor Workshop was developed to help retain expertise learned from NTSB investigations at the seafloor, such as the 2015–2016 search for the *El Faro*. The ongoing project shared lessons from current aviation and marine investigations with interested stakeholders who may need to plan future operations.

The Office of Marine Safety used the information developed from the Seafloor Workshop to provide technical assistance to the Office of Aviation Safety in its underwater sonar and video hull survey and recovery of a 737 aircraft wreckage off Honolulu in October 2021.

In November 2021, a representative of the Office of Marine Safety presented information on the Seafloor Workshop to MAIIF. MAIIF requested that the NTSB create a new section for the MAIIF manual to address best practices in seafloor investigations for organizations to use; the office plans to develop an outline for the revised manual in FY2023, to be followed by another virtual workshop.

NTSB – US Coast Guard Investigators' Roundtable

The Investigators' Roundtable was held on September 20-21, 2022, in New Orleans Louisiana. Meeting attendees included personnel from the US Coast Guard Office of Investigations and Casualty Analysis, representatives of the US Coast Guard National Center of Expertise for Investigations, NTSB managers, investigators, and writers from the Office of Marine Safety, and staff from the NTSB Media Relations Division and ROC. The meeting provided an opportunity for NTSB and US Coast Guard personnel to discuss current practices for coordinating and conducting accident investigations and review the memorandum of agreement between the two agencies in detail. The NTSB shared information on the status of current projects, and both agencies discussed common emerging marine issues and ways that our agencies might cooperate to ensure proper coverage during investigations. The roundtable was very successful, and we anticipate holding more of these meetings in the future.

Ongoing Significant Marine Accident Investigations

Location	Date	Description	Fatalities
Cooper River, near Naval Weapons Station, Charleston, South Carolina	9/5/2022	Contact MV *Bow Triumph* (US)	0
Sabine Outer Channel, Texas	8/20/2022	Collision MV *Damgracht* (NL) / MV *AP Revelin* (HR)	0
Houston, Texas	8/12/2022	Fire/explosion TV *Crosby Enterprise* (US)	0
Columbia River entrance, Pacific Ocean	8/11/2022	Machinery damage *Maunalie*	0
4 nm north of Vega Baja, Puerto Rico	8/8/2022	Collision US Coast Guard cutter *Winslow* Griesser/21-ft fishing boat	1
Ingleside, Texas	8/7/2022	Grounding/stranding TV/barge *CC Portland* (US)*/LNG Fukurokuji* (BS)	0
Nunez, Alaska	8/2/2022	Capsizing/listing CFV *Hotspur* (US)	0
Seattle, Washington	7/28/2022	Contact small passenger vessel (SPV) *Cathlamet* (US)	0
Houston, Texas	7/26/2022	Ship/equipment/cargo damage MV *Thocro Basilisk* (CH)	0
Port Fourchon, Louisiana	7/23/2022	*Collision Bunum Queen* (LR)*/OSV Thunder (US)*	0
Gig Harbor, Washington	7/15/2022	Fire/explosion of yacht *Pegasus* (US)	0
Gloucester, Massachusetts	7/8/2022	Flooding/hull failure CFV *Grace Marie* (US)	0
Freeport, Texas	6/27/2022	Fire/explosion TV *Mary Dupre* (US)	0
New Castle, New Hampshire	6/18/2022	Fire/explosion of yacht *Too Elusive* (US)	0

Location	Date	Description	Fatalities
Hampton Roads, Virginia	6/15/2022	Loss of crane from barge *Ambition* (US)	0
Hampton Roads, Virginia	6/7/2022	Fire aboard SPV *Spirit of Norfolk* (US)	0
Shilshole Bay, Seattle, Washington	5/27/2022	Fire/explosion aboard OSV *Ocean Guardian* (US)	0
Near Miah Maul Shoal L/H, Delaware Bay, Bowers Beach, Delaware	5/23/2022	Fire aboard unmanned scrap barge TV *Daisy Mae* (US)	0
Sitka Sound, Alaska	5/9/2022	Contact of *Radiance of the Seas* (BS) with cruise terminal	0
Industrial Canal, New Orleans, Louisiana	5/3/2022	Fire/explosion aboard paddle wheeler *Natchez* (US)	0
Raritan Bay, New York City, New York	4/29/2022	Fire/explosion aboard *Endo Breeze* (MT)	0
Barbours Cut, Galveston Bay, Texas	4/4/2022	Contact of *MSC Aquarius* (CY) and tug *George M* (US)	0
Pascagoula, Mississippi	3/12/2022	Contact of *Valaris DS-16* (MH) and M/V *Akti* (MH)	0
Old Bahama Channel, Atlantic Ocean	3/8/2022	Flooding/hull failure of *Carib Trader II* (VC)	0
GICW mile 56, Houma, Louisiana	3/8/2022	Contact of TV *Robert Cenac* (US) with CSX railway bridge	0
Hampton Roads, Virginia	2/8/2022	Loss of mobile crane on board barge *Carolyn Skaves* (US)	0
15 miles NW of New Providence, Bahamas, Atlantic Ocean	12/24/2021	Collision of *Utopia IV* (US) & tanker *Tropic Breeze* (BZ)	0
Amelia, Louisiana	12/23/2021	Contact of TV *Miss Mollye D* (US) with Bayou Ramos Bridge	0
Port Neches, Texas	11/25/2021	Contact of *Gas Aries* (PA), *Sabine* (US), and *Florida* (US)	0
Mile 538 LMR, near Vicksburg, Mississippi	11/21/2021	Grounding of integrated TS *Marquette Warrior* (US)	0
Newport Beach, California	10/1/2021	Pipeline fracture and oil spill, offshore oil platform Elly (US)	0
90 nm WSW Grand Isle, Louisiana, Gulf of Mexico	6/25/2021	Contact of OSV *Elliot Cheramie* (US) with oil platform	0
East River-Brooklyn, New York	6/5/2021	Grounding of passenger vessel *Seastreak Commodore* (US)	0
Off the coast of Port Fourchon, Louisiana	4/13/2021	Capsizing of OSV *Seacor Power* (US)	13

Note: We are devoting significant resources to the investigations listed and anticipate producing a report upon the completion of each investigation.

RAILROAD, PIPELINE AND HAZARDOUS MATERIALS

	($000s)	FTEs
FY 2023 Estimate	$10,354	36
FY 2024 Request	$11,574	37
Increase/Decrease	$1,220	1

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 5.2 percent projected for January 1, 2024, a 2.0 percent non-pay inflation factor, an increase in agency program investments, and an increase in the agency's contribution to employee health benefits. An increase of one FTE is supported by this funding level.

Program Description

The Office of Railroad, Pipeline and Hazardous Materials Investigations comprises four divisions: Railroad; Pipeline and Hazardous Materials; System Safety; and Report Development. The office investigates accidents involving railroads, pipelines, and hazardous materials, and evaluates the associated emergency response. Based on the findings of these investigations, the NTSB may issue safety recommendations to federal and state regulatory agencies; unions, industry, and safety standards organizations; carriers and pipeline operators; equipment and container manufacturers; producers and shippers of hazardous materials; and emergency response organizations. The office may also issue safety alerts to industry.

Railroad Division

Staff investigate accidents and incidents involving passenger and freight railroads, commuter rail transit systems, and other fixed guideway systems. Accidents are typically collisions or derailments, some of which involve fatalities, severe injuries, release of hazardous materials, or evacuation of residences.

The division does not investigate every railroad accident reported to the FRA or every rail transit accident reported to the FTA. To use NTSB resources most efficiently and effectively, criteria have been established to help identify for investigation those accidents that pose significant safety risks. The division also assesses selected railroad safety issues, often based on a set of accident investigations with similar safety issues. In other cases, staff may focus on

analyses of regulations, railroad safety programs or procedures, or audit reviews of management and operations practices.

Pipeline and Hazardous Materials Division

Staff in the Pipeline and Hazardous Materials Division investigate accidents occurring during the transport of natural gas or other hazardous liquids, such as gasoline or propane, through underground pipeline systems, as well as accidents that threaten public safety by the release of hazardous substances. Pipeline investigations focus on accidents that involve fatalities or result in substantial property or environmental damage.

The division also investigates accidents involving the release of hazardous materials in all modes of transportation, including aviation, highway, railroad, and marine. The division may also investigate select hazardous materials accidents that highlight safety issues of national importance or involve a specific accident prevention issue. An investigation may include analysis of the performance of hazardous materials containers, such as rail tank cars, highway cargo tanks, or smaller non-bulk packaging. In addition, the division investigates environmental response issues in all modes, including pipeline.

System Safety Division

System Safety Division staff support the investigations led by the Railroad Division and the Pipeline and Hazardous Materials Division. The division investigates the role of system safety management in the regulated transportation modes, as well as the role of individual, workgroup, and organizational factors in an accident scenario. Staff also examine the role of regulatory, industry, and company practices in the accidents under investigation. The division maintains oversight of emerging safety regulations, methods, and data related to the railroad, pipeline, and hazardous materials areas.

Staff typically lead inquiries that extend well beyond the debris field of an accident site. Failures of operational systems rarely are isolated to the last component to break or malfunction. Rather, the reasons for system failures often are traceable back to management decisions and corporate cultural influences. Once these systemic failures are identified and understood, staff work to develop corresponding safety recommendations. Specific topics evaluated include drug and alcohol usage, work-rest cycles and human fatigue, individual and team training, organizational safety culture, safety management, and public awareness.

Report Development Division

The Report Development Division is responsible for drafting and editing railroad, pipeline, and hazardous materials investigation reports to ensure that they are logical and well-organized. They also write and edit responses to notices of proposed rulemaking, papers; congressional testimony; speeches on matters pertaining to railroad, pipeline, and hazardous materials safety; and replies to safety inquiries from Congress, other federal agencies, state and local agencies, industry, and the public. The division is also responsible for the effective implementation of the agency's guidance, protocols, and applicable portions of NTSB Board orders and operations bulletins related to product standardization and development.

Accomplishments and Ongoing Efforts

Office accomplishments include the issuance of products related to transportation safety arising from completed and ongoing investigations. Products completed between October 1, 2021, and September 30, 2022, are highlighted below, along with information about other efforts and focus areas important to our mission.

Investigation Reports

Investigation reports are issued for accident or incident investigations and may contain a determination of probable cause and/or safety recommendations, depending upon the scope of the investigation and the safety issues identified. For select major accidents, the office launches a full investigation team and presents a comprehensive investigation report to the Board. Investigations that are limited in scope have the primary purpose of determining probable cause; the resultant report may be issued by the office director under delegated authority or may be adopted by the Board. A report containing only safety recommendations can be issued at any time during an investigation. If the Board determines that a recommended course of action requires immediate attention to avoid imminent loss of life from a similar accident, the safety recommendation is designated "urgent."

Below are summaries of a sampling of the investigation reports completed between October 1, 2021, and September 30, 2022, arranged by report date.

Enbridge Inc. Natural Gas Pipeline Rupture
Danville, Kentucky
August 1, 2019

On August 1, 2019, at 1:23 a.m. local time, an Enbridge Inc. 30-inch natural gas transmission pipeline ruptured in Danville, Kentucky, releasing about 101.5 million cubic feet of natural gas that ignited. The accident resulted in 1 fatality, 6 injuries, and the evacuation of over 75 people. Five residences were destroyed by resulting structure fires, and an additional 14 were damaged. A nearby railroad track was also damaged, and over 30 acres of land were burned.

We determined that the probable cause of the August 1, 2019, Enbridge pipeline rupture and resulting fire was the combination of a preexisting hard spot (a manufacturing defect), degraded coating, and ineffective cathodic protection applied following a 2014 gas flow reversal project, which resulted in hydrogen-induced cracking at the outer surface of Line 15 and the subsequent failure of the pipeline. Contributing to the accident was the 2014 gas flow reversal project that increased external corrosion and hydrogen evolution. Also contributing to this accident was Enbridge's integrity management program, which did not accurately assess the integrity of the pipeline or estimate the risk from interacting threats.

We identified the following safety issues in this investigation: (1) nonconservative assumptions used to calculate potential impact radius, (2) incomplete evaluation of the risks caused by a change of gas flow direction, (3) limitations in data analysis related to the 2011 in-line inspection, (4) operators' potential for incomplete assessment of threats and threat interactions, and (5) missed opportunities in training and requalification practices at Enbridge.

The NTSB issued safety recommendations to PHMSA and Enbridge Inc.

Recommendations: 6 new
Report Date: August 15, 2022

Enbridge Inc. Natural Gas Pipeline Rupture
Hillsboro, Kentucky
May 4, 2020

On May 4, 2020, about 4:36 p.m., a 30-inch-diameter interstate natural gas transmission pipeline owned and operated by Enbridge ruptured about 3 miles east–northeast of Hillsboro, Kentucky, resulting in a fire. The rupture occurred at a girth weld on a hillside previously identified by Enbridge for geotechnical monitoring because of an active landslide. At the time of the

rupture, the line's operating pressure was about 674 pounds per square inch, gauge. There were no fatalities or injuries, and Enbridge estimated the cost of property damage and emergency response at $11.7 million.

The NTSB determined that the probable cause of the pipeline rupture was Enbridge's analysis of an active landslide that did not fully address uncertainties associated with pipeline defects, landslide movement, and corresponding pipeline response.

As a result of the accident, Enbridge issued new procedures for estimating tensile strain capacity, conducting multidisciplinary reviews, and determining appropriate response actions. Enbridge reported that the new procedures would result in a reduced tensile strain capacity threshold.[2] PHMSA took enforcement action against Enbridge and issued an advisory bulletin on damage to pipeline facilities from earth movement in rugged, steep terrain, citing the Hillsboro accident among recent land movement events.

Recommendations: None
Report Date: May 31, 2022

Union Pacific Railroad Employee Fatality
Vail, Arizona
January 31, 2021

On January 31, 2021, about 12:40 p.m., a Union Pacific Railroad (UP) employee was struck by a railbound track maintenance tamper on a main track near Vail, Arizona. The employee was airlifted to a hospital, where he later died from his injuries. The employee was part of a tie gang comprising about 50 people using 23 pieces of equipment to renew crossties and track surfacing.

The NTSB determined that the probable cause of the accident was the operator's failure to stop the track maintenance tamper's forward movement before striking the ground worker due to the operator's panicked state.

In response to the accident, UP initiated an operational testing plan focused on additional stop-distance testing of equipment operators. This increased testing occurred in March through May 2021, each month emphasizing a different aspect of equipment operational safety. On February 8, 2022, UP representatives informed the NTSB that they had found

[2] "Tensile strain" is defined as the deformation or elongation of a solid body due to the application of a tensile force or stress. In other words, tensile strain is produced when a body increases in length as applied forces try to "stretch" it.

the increased testing beneficial and that they plan to continue testing activities in 2022.

Recommendations: None
Report Date: April 24, 2022

Sacramento Regional Transit District Collision Between Light Rail Vehicles
Sacramento, California
August 22, 2019

On August 22, 2019, at 9:38 p.m., northbound Sacramento Regional Transit District (SacRT) passenger train 9 traveling at 32 mph collided head-on with a stopped southbound non-revenue test train on the blue line in Sacramento, California. Train 9 had one operator and 27 passengers on board. The test train had one operator and two contractors on board. Thirteen people were transported to area hospitals with non-life-threatening injuries. Neither train derailed, and both trains experienced minimal structural damage. SacRT estimated total damages to be $242,450.

The NTSB determined that the probable cause of the collision was SacRT's weak administrative controls that allowed the transportation supervisor to authorize a high-speed test train to enter the mainline without knowing the location of passenger train 9 on the same track. Contributing to the collision was senior management's failure to assess the transportation supervisor's competency in the combined role of both controller and dispatcher on the evening shift.

We identified the following safety issues in this investigation: (1) performance deficiencies of the transportation supervisor as a controller, (2) SacRT's failure to monitor the transportation supervisor's performance to ensure competency, (3) irregular reporting of train delays by the train operator to Metro Control, (4) SacRT's undefined testing practices on the mainline tracks, (5) the impact of CPUC's instruction to test vehicles during nonrevenue hours, and (6) a lack of TBTC use on SacRT train lines.

The NTSB issued new safety recommendations to the California Public Utilities Commission and SacRT. We also reiterated one previously issued recommendation.

Recommendations: 5 new, 1 reiterated
Report Date: April 14, 2022

Norfolk Southern Corporation Conductor Fatality
Baltimore, Maryland
February 7, 2019

On February 7, 2019, about 7:00 a.m., a Norfolk Southern Corporation railroad conductor was fatally injured while performing switching operations at the President Street intermodal tracks section of the Bayview Yard of the Baltimore Consolidated Terminal, Baltimore, Maryland. The conductor was riding on the side of the leading railcar of train 38A during a reverse movement when he was pinned between the railcar he was riding and a stationary railcar on an adjacent track.

The NTSB determined that the probable cause of the fatality was the conductor's riding on the side of a railcar for unknown reasons as the moving train approached stored railcars on an adjacent track, which resulted in decreased clearance, in a section of the Bayview Yard where Norfolk Southern Corporation's terminal instructions and operating rules specifically prohibited riding railcars in the close-clearance restriction areas.

We identified the following safety issues in this investigation: (1) poorly written terminal instructions and (2) training and testing gaps on close-clearance areas and location-specific hazards.

The NTSB issued new safety recommendations to the Norfolk Southern Corporation.

Recommendations: 2 new
Report Date: April 8, 2022

Alabama Export Railroad Fatal Collision with Maintenance-of-Way Equipment
Prichard, Alabama
November 17, 2020

On November 17, 2020, about 2:26 p.m., Canadian National train A-48871-16, operated by an Alabama Export Railroad (ALE) engineer, collided with on-track maintenance equipment belonging to a Continental Rail maintenance-of-way work group on the Beauregard track in Prichard, Alabama. ALE had contracted Continental Rail to install railroad ties for ALE. The on-track maintenance equipment included a full-sized, heavy-duty flatbed truck equipped with a telescopic crane and a backhoe designed to operate on the rails. As a result of the collision, one contractor was killed and three were injured. Material damages were estimated to be $52,000.

The NTSB determined that the probable cause of the collision was the failure of the engineer to operate his train in accordance with restricted speed

requirements and to stop before colliding with the equipment because he was engaged in the prohibited use of a personal electronic device. Contributing to the collision was ALE track protection, which did not meet the minimum safety standards specified in Title 49 *CFR* Part 214. Also contributing to the collision was the Continental Rail Incorporated roadway work group's removal of portable derails used for on-track safety protection before they cleared the track.

In response to this collision, ALE implemented over 25 managerial and operational changes, including updating and implementing safety plans that corrected issues related to on-track safety, operational communication, and internal oversight for electronic device usage and train operations. ALE decided it would no longer use contractors for track maintenance, and it decertified and terminated the ALE employee who had operated the train.

Recommendations: None
Report Date: April 4, 2022

Southeastern Pennsylvania Transportation Authority Light Rail Vehicle Collision
Upper Darby, Pennsylvania
August 22, 2017

On August 22, 2017, about 12:11 a.m., southbound SEPTA single light-rail passenger car 155 carrying 42 passengers on the Norristown High Speed Line collided with SEPTA single light-rail passenger car 148, which was unoccupied and stopped at passenger platform 1 of the 69th Street Transportation Center station in Upper Darby, Pennsylvania. The 43 persons on board car 155, including the operator, suffered non-life-threatening injuries, and were transported to local medical facilities. Both cars remained on the rails and upright. SEPTA estimated the damage to the equipment to be $331,680.

The NTSB determined that the probable cause of this accident was an intermittent anomaly in the braking system of car 155 that degraded its stopping performance on approach to the 69th Street Transportation Center station, resulting in the collision with car 148.

As a result of the accident, SEPTA implemented several procedures and proposed various changes for improving operational safety on the high-speed line, in a plan called the "Operational Safety Improvement Program Summary." SEPTA grouped these efforts into three categories: technology, rules and procedures, and training enhancements.

Recommendations: None
Report Date: November 10, 2021

Railroad Safety Alert

A safety alert is a short informational bulletin, usually only a page long, that pinpoints a particular safety issue. It contains information based on the findings of one or more NTSB investigations and enhances the dissemination of safety information to the traveling public.

Passenger Car Wheelset Alert

This safety alert calls on rail transit agencies and commuter railroads across the nation to assess their fleets for wheelsets that do not meet gage specifications and to take immediate action to correct the problem. Wheelset movement on transit railcars and commuter railroads is a serious problem that has the potential to create a catastrophic event. An out-of-specification wheelset is not easily identifiable with a routine visual inspection; consequently, the condition could exist on wheel and axle assemblies of other transit or commuter railcars.

The wheelset movement issue was identified during the NTSB's ongoing investigation of the October 12, 2021, derailment of a WMATA train traveling southbound on Metro's Blue line between the Rosslyn and Arlington Cemetery stations in Arlington, Virginia. One of the 187 passengers on board was transported to the hospital for treatment.

Issue Date: December 1, 2021

Other Efforts and Focus Areas

FRA Track & Railroad Workplace Safety Symposium
April 5-7, 2022

The FRA hosted a collaborative safety event tailored to the industry's track maintenance and construction groups. The free, 3-day event included hundreds of industry experts gathered to share information through breakout sessions on track safety and roadway workplace safety.

Board Member Thomas Chapman gave one of the keynote speeches, and he and office staff gave presentations on NTSB's MWL safety issue on rail worker safety. In addition, staff presented information on what to expect from an NTSB investigation.

Ongoing Significant Railroad, Pipeline, and Hazardous Materials Accident Investigations

Location	Date	Description	Fatalities
Boston, Massachusetts	4/10/2022	Dragging of Massachusetts Bay Transportation Authority passenger who had arm caught in door.	1
Edwardsville, Illinois	3/11/2022	Rupture of hazardous liquid pipeline, resulting in spill of crude oil.	0
San Bruno, California	3/10/2022	Striking of on-track work trucks by CalTrain passenger train.	0
Denver, Colorado	2/9/2022	Fatality of BNSF remote control locomotive operator employee.	1
Westerly, Rhode Island	1/15/2022	Fatality of Amtrak conductor.	1
Oklaunion, Texas	1/8/2022	Derailment of 31 BNSF rail cars; train carrying denatured ethanol; fire ensued. Cause of derailment unknown.	
Darby, Pennsylvania	12/9/2021	Striking of SEPTA trolley by CSX freight train, resulting in injuries to seven.	0
Arlington, Virginia	10/12/2021	Derailment of WMATA passenger train and evacuation of passengers.	0
Joplin, Montana	9/25/2021	Derailment of Amtrak passenger train, with injuries and fatalities.	3
Coolidge, Arizona	8/15/2021	Rupture of natural gas transmission pipeline, gas release, and subsequent fire, which impacted residential structure nearby.	2
Farmersville, Texas	6/28/2021	Explosion that occurred when Atmos contractors were loading a pig into the pipeline; four people injured.	2

Note: We are devoting significant resources to the investigations listed and anticipate producing a report upon the completion of each investigation.

RESEARCH AND ENGINEERING

	($000s)	FTEs
FY 2023 Estimate	$15,516	47
FY 2024 Request	$18,098	48
Increase/Decrease	$2,582	1

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 5.2 percent projected for January 1, 2024, a 2.0 percent non-pay inflation factor, an increase in agency program investments, and an increase in the agency's contribution to employee health benefits. An increase of one FTE is supported by this funding level.

Program Description

The Office of Research and Engineering is an investigative office providing scientific and technical expertise for NTSB accident investigations in all modes of transportation. The office, which includes four divisions and one program area, also conducts safety research, generates periodic statistical reviews of aviation accidents, and provides medical and toxicology expertise for investigations in all modes.

Safety Research Division

The Safety Research Division examines transportation accidents, accident trends, and technological changes to identify problems and associated remedial actions that will reduce risk and improve the safety of the transportation system. Division staff comprises transportation safety researchers, data analysts, and statisticians who conduct systematic examinations of (1) risks or hazards in the transportation environment that may influence accidents or injury; (2) the techniques and methods of accident investigation; and (3) the effectiveness of various safety countermeasures, such as policies, programs, or technologies. The division also provides data science, data visualization, and statistical expertise to support accident launches and investigations agencywide, assist in the development of safety recommendations, and publish annual statistical reviews for the NTSB, Congress, and the public.

Materials Laboratory Division

The Materials Laboratory Division performs expert multidisciplinary engineering and scientific analyses to determine whether the performance of materials and structures is related to the cause or severity of an accident. Engineers also analyze wreckage to determine the causes of fires and explosions. The division provides chemical and forensic science expertise, as well as technical advice and resources for experimental testing and research in the physical sciences.

Vehicle Recorder Division

The Vehicle Recorder Division extracts, formats, and analyzes data from aircraft flight data recorders (FDR) and cockpit voice recorders (CVR) and from recorders installed in locomotives, large ships, and some highway vehicles. Engineers also examine recorded electronic audio and video information captured by aircraft, ship, train, and support communication systems; provide electronic engineering expertise for all accident investigation modes in examining communication and control systems; provide time synchronization to correlate voice, data, and video recorder outputs; use advanced digital and analog filtering and signal representation techniques to extract critical recorder information; and perform forensic examinations of personal electronic devices and other computer hardware.

Vehicle Performance Division

The Vehicle Performance Division provides specialized aeronautical, mechanical, structural, and biomechanical engineering expertise; three-dimensional laser scanning and accident reconstruction; photogrammetry and video analysis; and animation and graphics development for all modes. Engineers use computational and visualization technology to provide accurate time-motion histories of the sequence of events and evaluate data from multiple sources to determine vehicle and occupant motion and the underlying causes of that motion. Engineers also develop video animations of accident scenarios, evaluate occupant injury mechanisms, and participate in and direct research into special projects as required.

Program Area – Medical Investigations

The medical officers evaluate the medical aspects of investigations, including medical fitness, pathology, toxicology, injury causation, and biomechanics. Examples of medical issues addressed include operator incapacitation, injury prevention, night vision, hypoxia, substance impairment,

obstructive sleep apnea, and use of prescription and over-the-counter medications as well as that of illicit substances.

Accomplishments and Ongoing Efforts

Safety Research Division

From October 1, 2021, through September 30, 2022, the Safety Research Division responded to 249 requests for data analysis and statistical information from other NTSB offices, Board members, Congress, and the public. In addition, division staff researched and evaluated safety issues for multiple accident investigations, published two annual statistical reviews of aviation accidents, developed a general aviation accidents online dashboard, and submitted a draft research study on micromobility safety data for Board approval, and a draft of a research study with safety recommendations for reducing alcohol and polydrug use among drivers in the United States.

Materials Laboratory Division

Materials Laboratory engineers examine parts and wreckage from more than 150 accidents in a typical year from all transportation modes and document their findings through formal factual reports, study reports, analytical reports, and safety recommendations.

Vehicle Recorder Division

In a typical year, the Vehicle Recorder laboratories process about 400 recording devices and complete essential readouts, transcripts, and studies for aviation, rail, marine, and highway investigations.

Vehicle Performance Division

In a typical year, Vehicle Performance staff produce more than 50 study reports and animations, launch to accident sites to acquire evidence for performance reports, and participate in the development of safety recommendations and modal accident reports.

Medical Investigations

NTSB medical officers participate in numerous NTSB accident investigations in all transportation modes each year, evaluating and addressing medical issues through formal factual and analytical reports, safety recommendations, coordination with other agencies, and formal presentations to the agency and to external audiences. Our medical officers participate in

more than 130 accident investigations annually and complete more than 200 reports for these cases.

Below are examples of the work performed by each of our divisions.

Sport Utility Vehicle Centerline Crossover Collision with Pickup Truck on State Route 33
Avenal, California
January 1, 2021

A 2013 Dodge Journey SUV was traveling south on State Route 33 in Fresno County, near Avenal, California, when the vehicle veered onto the right shoulder and overcorrected, entering the northbound lane and striking a pickup truck containing an adult driver and seven children. As a result of the crash, the driver of the SUV and all eight occupants in the pickup truck died. For this investigation, Safety Research Division staff provided a geospatial accident route map and conducted research on in-vehicle technology to prevent alcohol and drug-impaired driving, in-vehicle driver monitoring systems, and existing safety recommendations on these technologies. One of the medical officers investigated the medical conditions and toxicological status of the two drivers.

Report Date: August 22, 2022

Track Work Fatality involving Alabama Export Railroad Train
Prichard, Alabama
November 17, 2020

A Continental Rail Incorporated maintenance-of-way contractor working for Alabama Export Railroad near Prichard, Alabama, was killed, and three others were injured while performing track maintenance. Vehicle Recorder Division staff analyzed inward and outward-facing video from the locomotive involved in the accident.

Report Date: April 4, 2022

Multivehicle Crash
Mt. Pleasant Township, Pennsylvania
January 5, 2020

A multivehicle crash occurred in the westbound lanes of Interstate 70 when a motorcoach veered across the travel lanes, collided with a steep embankment on the right, and rolled onto its passenger side. The motorcoach driver, 2 motorcoach passengers, and the driver and co-driver of one of the other vehicles involved died, and 49 motorcoach passengers were injured.

Safety Research Division staff reviewed work schedule data for the four commercial drivers to assess the potential effects of their schedules on driver sleep opportunities. Staff also provided subject matter expertise on shiftwork, sleep, and fatigue management, and researched scientific literature on those topics in support of the investigation. Vehicle Recorder Division staff analyzed parametric data and video from a semi-truck involved in the crash. Vehicle Performance Division staff performed computer simulations to understand the motion of the motorcoach in the accident. Staff also evaluated video from inside the cab of one of the combination vehicles involved to determine the speed of the motorcoach when it passed the vehicle. One of the medical officers investigated the medical conditions and toxicological status of the four commercial drivers.

Report Date: February 8, 2022

Hazardous Liquid Pipeline Strike and Subsequent Explosion and Fire Aboard Dredging Vessel *Waymon Boyd* (US)
Epic Marine Terminal, Corpus Christi Ship Channel, Corpus Christi, Texas
August 21, 2020

The dredge vessel *Waymon L. Boyd* struck a natural gas pipeline near the Epic Dock near the Inner Harbor of Corpus Christi, Texas. Safety Research Division staff completed multiple geospatial studies, including a time-series visualization of the ship channel's features, utilities, and pipelines using historic photographs and construction plans from 1968 to the present, to assist investigators with their analysis. Materials Laboratory Division staff performed metallurgical consulting on retrieval of the evidence and performed a metallurgical analysis of the pipe damage including documentation of the mode of rupture.

Report Date: December 7, 2021

Runway Overrun During Landing, Peninsula Aviation Services Inc., d.b.a. PenAir Flight 3296, Saab 2000, N686PA
Unalaska, Alaska
October 17, 2019

PenAir flight 3296, a Saab 2000, overran the runway while landing at the Thomas Madsen Airport in Unalaska, Alaska. The airplane passed through the airport perimeter fence, crossed a road, and came to rest on shoreline rocks. Of the 42 passengers and crewmembers on board, 1 passenger was fatally injured, and several other passengers sustained serious or minor injuries. Safety Research Division staff completed a retrospective data summary and statistics for evaluating past accident investigations with findings citing aircraft braking assembly, maintenance, and performance issues. Vehicle Recorder

Division staff downloaded the FDR and CVR from the aircraft. Staff analyzed the FDR data and led a transcription group of the CVR audio. Vehicle Performance Division staff used data from the flight recorders and physical evidence to evaluate the aircraft braking performance during the runway overrun.

Report Date: November 2, 2021

2020 US Civil Aviation Accident Rates
2019 US Civil Aviation Accident Summary
Annual Reports

Safety Research Division staff compiled, organized, and published the agency's *2001-2020 US Civil Aviation Accident Rates* on October 26, 2021, and the *Calendar Year 2019 Summary of US Civil Aviation Accidents* on December 20, 2021. They wrote structured query language scripts to extract, clean, and compile these data and their associated graphs and charts for the online publications. Staff also developed and published an interactive map of US civil aviation accidents by flight operation for 2019.

Micromobility: Data Challenges Associated with Assessing the Prevalence and Risk of Electric Scooter and Electric Bicycle Fatalities and Injuries
Safety Research Report

Protecting VRUs, such as pedestrians, motorcyclists, and bicyclists, is a priority for the NTSB. Recently, emergent transportation modes in the form of electric micromobility devices have expanded the list of people considered to be VRUs, specifically electric scooter (e-scooter) and electric bicycle (e-bike) riders. The Safety Research Division evaluated available e-scooter and e-bike trip, crash, and injury data used to assess the safety of these devices, including the prevalence and risk of fatalities. The research goals are to (1) describe the prevalence and characteristics of fatal and nonfatal crashes involving e-scooters and e-bikes; (2) evaluate issues related to the analysis of available safety data, and (3) make recommendations to standardize and analyze trip, crash, fatality, and injury data for e-scooter and e-bike riders.

Research in Process as of September 30, 2022

Alcohol, Other Drug, and Multiple Drug Use Among Drivers
Safety Research Report

Impairment from alcohol and other drugs is a major transportation safety issue. The NTSB's concern about this issue has increased over the past decade, particularly among operators of motor vehicles. The Safety Research Division has documented substance impairment in numerous highway crash

investigations, many of which involved a driver's use of more than one drug. This safety research examines alcohol, other drug, and polydrug use problems and develop safety recommendations to help reduce highway accidents and injuries. Specifically, the research goals are to (1) better understand the prevalence of potentially impairing drug use among drivers; (2) summarize what is known about how different drugs, including alcohol, and drug combinations may affect driving safety; and (3) recommend measures to reduce the likelihood of drug-impaired driving and to improve our ability to track its prevalence.

Research in Process as of September 30, 2022

DHC-3 Turbine Otter (N725TH) crash
Mutiny Bay, WA
September 4, 2022

A de Havilland DHC-3 was substantially damaged when it impacted Mutiny Bay near Freeland, Washington, and sank. The pilot and nine passengers were fatally injured. A water recovery of the wreckage was required. The Materials Laboratory Division conducted a metallurgical evaluation of the horizontal stabilizer actuator and lock rings and supported the development of a safety recommendation letter.

Investigation in Process as of September 30, 2022

Cirrus Design Corp SR22
Tomball, TX
September 1, 2022

A newly manufactured Cirrus Aircraft SR22 airplane was substantially damaged when it was involved in an accident near Tomball, Texas. The flight instructor was fatally injured; the pilot and passenger sustained serious injuries. The Materials Laboratory Division conducted a metallurgical evaluation of a separated 90° elbow fitting for the fuel system.

Investigation in Process as of September 30, 2022

Marathon Pipe Line LLC Hazardous Liquids Pipeline Release
Edwardsville, Illinois
March 11, 2022

A 22-inch-diameter hazardous liquids pipeline operated by Marathon Pipe Line, ruptured and resulted in the release of about 3,900 barrels of crude

oil, some of which entered Cahokia Creek, a tributary of the Mississippi River. The Materials Laboratory Division supported the metallurgical evaluation of the rupture and the characterization of the mechanical properties of the pipe steel.

Investigation in Process as of September 30, 2022

Collapse of the Fern Hollow Bridge
Pittsburgh, Pennsylvania
January 28, 2022

A 447-foot-long bridge fell approximately 100 feet into the park below. At the time of the collapse, a 2013 New Flyer articulated bus, operated by the Port Authority of Allegheny County, and four passenger vehicles were on the bridge. A fifth passenger vehicle drove off the east bridge abutment following the collapse and came to rest on its roof on the exposed ground below. As a result of the bridge collapse, 10 vehicle occupants sustained injuries. The Materials Laboratory Division staff launched to the site, performed a visual inspection of the wreckage as portions were removed to reveal the support structure, and documented corrosion of the structural members.

Investigation in Process as of September 30, 2022

Crash of a Bell 407 Helicopter
Houma, Louisiana
January 14, 2022

A Bell 407 helicopter operated under Part 135 was destroyed when the on-demand passenger flight departed controlled flight during cruise and impacted terrain during an uncontrolled descent. The commercial pilot and passenger were fatally injured. One of the medical officers investigated the medical conditions and toxicological status of the commercial pilot.

Investigation in Process as of September 30, 2022

Derailment of DOT-117J Tank Cars
Oaklaunion, Texas
January 8, 2022

An eastbound BNSF Railway Company denatured ethanol high-hazard flammable train, U-JOENYF7-07A, derailed 31 DOT-117J100W tank cars at milepost 156.2 on the BNSF Red River Division in Oklaunion, Texas. BNSF estimates 601,819 gallons of denatured ethanol was released from 28 of the 31 derailed tank cars. The ethanol ignited and burned uncontrolled for about

3 hours. The Materials Laboratory Division supported the evaluation of tank car stub sill and head pad welds and evaluated manway gaskets.

Investigation in Process as of September 30, 2022

Amplify Energy San Pedro Bay Pipeline Rupture
Newport Beach, CA
October 1, 2021

The offshore oil platform ELLY, located 9.75 nautical miles southwest of Newport Beach, suffered a pipeline leak. US Coast Guard Sector Los Angeles / Long Beach initiated a Critical Incident Communication (CIC) for a sheen in vicinity of Newport Beach, California. Assessment of the pipeline indicated that it was 150 feet off station with an identified rupture in the line. It was determined that the pipeline damage was indicative of an anchor strike. The Materials Laboratory Division staff supported the recovery and evaluation of evidence from the accident site and, upon recovery, conducted a metallurgical evaluation of the leak in the pipeline.

Investigation in Process as of September 30, 2022

National Railroad Passenger Corporation Derailment with Passenger Fatalities
Joplin, Montana
September 25, 2021

A westbound Amtrak train carrying 154 people derailed in a right-hand curve on the BNSF Railway Hi Line Subdivision near Joplin, Montana. As a result of the derailment, 3 passengers died, and 44 passengers and crew were transported to local hospitals with injuries. Vehicle Performance Division staff are analyzing the forward-looking head-end video to evaluate track alignment in the area of the derailment and assisting with evaluating train-dynamics simulations. Staff are also developing an animation to aid in communicating the sequence of events in the accident.

Investigation in Progress as of September 30, 2022

Electric Vehicle Run-off-Road Crash and Postcrash Fire
Coral Gables, Florida
September 13, 2021

A 2021 Tesla Model 3 electric passenger car occupied by a 20-year-old driver and a 19-year-old passenger crashed near an intersection in Coral Gables, Florida. A postcrash fire ensued that fully engulfed the vehicle. Both occupants were fatally injured. Vehicle Recorder Division staff documented forward-facing dashcam footage that was provided to the NTSB

from the vehicle traveling behind the Model 3. Staff also extracted data from the severely fire-damaged restraint control module recovered from the wreckage of the vehicle, giving investigators vital information about vehicle speed and status in the seconds leading up to the crash.

Investigation in Process as of September 30, 2022

Kinder Morgan Inc. Natural Gas-Fueled Explosion and Fire
Coolidge, Arizona
August 15, 2021

A 30-inch-diameter natural gas transmission pipeline (Line 2000) owned and operated by Kinder Morgan ruptured in a rural area in Coolidge, Arizona. The rupture resulted in an explosion, fire, and ejection of a 46-foot section of the pipeline. A home near the pipeline was destroyed by the explosion and subsequent fire, which resulted in two fatalities and one injury. Materials Laboratory Division staff launched to the site of the explosion and performed a visual examination of the ejected section of Line 2000 along the length of the fracture to determine the fracture origin area and to develop a plan for evidence retrieval. Staff also performed a metallurgical evaluation of the fracture in the laboratory to determine the cause of the rupture.

Investigation in Process as of September 30, 2022

Crash of a Bombardier CL-600-2B16
Truckee, California
July 26, 2021

A Bombardier CL-600-2B16 airplane operated as a Part 91 flight was destroyed when it crashed during the approach to Truckee-Tahoe Airport, in Truckee, California. The pilot, copilot, and four passengers died. Vehicle Performance Division staff are evaluating surveillance video of the end of the flight and using ADS-B data obtained from the FAA to understand the sequence of events.

Investigation in Process as of September 30, 2022

Crash Between a Combination Vehicle and Multiple Vehicles at the end of a Traffic Queue
Phoenix, Arizona
June 9, 2021

A multivehicle crash occurred in the eastbound lanes of State Route Loop 202 in Phoenix, Arizona. A 2016 Freightliner Cascadia truck-tractor combined with a fully loaded 2015 Walker stainless equipment tank trailer

struck multiple vehicles, and a postcrash fire ensued. A total of eight vehicles were involved in the collision, in which four persons were fatally injured. Ten persons were transported to the hospital. Vehicle Performance Division staff are using simulations to evaluate the potential for different automatic emergency braking systems and/or vehicle-to-vehicle communication systems to have altered the crash sequence. A staff member is also developing an animation to aid in communicating the sequence of events in the crash.

Investigation in Progress as of September 30, 2022

Crash of a Cessna 501 Citation
Smyrna, Tennessee
May 29, 2021

A Cessna 501 Citation operated as a Part 91 flight was destroyed when it crashed shortly after takeoff from the Smyrna Airport, in Smyrna, Tennessee. The pilot and six passengers were fatally injured. Vehicle Performance Division staff are using ADS-B data obtained from the FAA along with computer simulations to understand the sequence of events.

Investigation in Process as of September 30, 2022

Electric Vehicle Run-off-Road Crash and Postcrash Fire
Spring, Texas
April 17, 2021

A 2019 Tesla Model S P100D electric car crashed and caught fire on a residential, two-lane concrete road with one westbound and one eastbound lane and mountable concrete curbs on either side. At the crash location, the roadway was level, with a curve to the south. The maximum speed limit for the road was 30 mph.

Materials Laboratory Division staff conducted a metallurgical examination of the steering wheel to determine the nature of the deformation. Vehicle Recorder Division staff performed a chip-level recovery of the burned restraint control module and successfully retrieved crash-related data. One of the medical officers investigated the medical condition and toxicological status of the driver.

Investigation in Process as of September 30, 2022

Summary of Research and Engineering Systems

The Office of Research and Engineering is dedicated to developing innovative systems that make our work more efficient and accurate. Due to

rapidly changing technology, these systems require annual updating and maintenance. They include the following:

System	Description	RE Division
DREAM	The Data Recorders, Electronics, and Analysis Management (DREAM) system is an internal workflow tool, integrated with SAFTI, used by recorder specialists to track devices sent in by field investigators. Specialists use the database to record the entire lifecycle of a device in the lab, from when it arrives from the field to when it is eventually returned to its owner. Intermediate steps of download, recovery, audition (when applicable), and product development are also tracked.	Vehicle Recorder Division
CIDER	The CIDER system is a client/server application used for processing parametric recorder data. Recorder Specialists use CIDER to recover data from tape-based FDRs; convert data from raw binary formats into engineering units for analysis; analyze and validate the data; and generate plots, tabular data files, and other products for other investigative teams and reports. CIDER also provides capabilities for managing investigation recorder data and documentation of recorder conversion libraries.	Vehicle Recorder Division
MEDICS	The Medical Information Catalog System (MEDICS) is a web-based application used to store medical records from NTSB investigations. NTSB medical officers use MEDICS as a case management tool for their reviews across all modal offices. The MEDICS software automatically enforces the security, storage, transmission, and access control requirements for medical records. MEDICS also connects to the SAFTI database used to manage investigation data, which allows investigators to access records, receive autopsy and toxicology reports, request subpoenas for medical records, and request medical officer reviews. Only those employees with a need to access this health information may use MEDICS.	Medical Investigations

System	Description	RE Division
PREVIEW	The Protected Recording Viewer (PREVIEW) system is a web-based application to allow access to protected content products (such as audio and video transcripts) and recordings normally stored on non-networked secure servers within the laboratory at NTSB headquarters for authorized NTSB employees working remotely. The application automatically enforces the security requirements for storage, transmission, and access control to prevent inadvertent public release of the products and recordings in accordance with statutory requirements and NTSB policy for protecting the content.	Vehicle Recorder Division
RAPT-R	The Rome Audio Processing Tool - Revision (RAPT-R) is a software tool developed by the Air Force Research Laboratory that enables multitrack audio playback, video playback, and transcription. It is the NTSB's primary tool for analyzing CVR content.	Vehicle Recorder Division
Reveal	Reveal is a digital data recovery and analysis tool for visualizing, exploring, and extracting binary data files. It allows users to mine unstructured binary data for useful data parameters either through manual inspection or by using scripted routines.	Vehicle Recorder Division

ADMINISTRATIVE LAW JUDGES

	($000s)	FTEs
FY 2023 Estimate	$2,718	8
FY 2024 Request	$3,047	10
Increase/Decrease	$329	2

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 5.2 percent projected for January 1, 2024, a 2.0 percent non-pay inflation factor, an increase in agency program investments, and an increase in the agency's contribution to employee health benefits. An increase of two FTEs is supported by this funding level.

Program Description

The NTSB serves as the court of appeals for airmen, aircraft mechanics, air traffic controllers, air carriers, repair facilities, and any other individual or entity against whom the FAA has taken a certificate action, and for mariners against whom the US Coast Guard has taken a certificate action. The agency's administrative law judges hear, consider, and issue initial decisions on administrative appeals regarding FAA aviation enforcement actions. Included are appeals of–

- Orders issued by the FAA Administrator amending, modifying, suspending, or revoking, in whole or in part, certificates of airmen, air agencies, and air carriers for alleged violations of the *Federal Aviation Regulations* or for lack of qualifications.
- FAA actions denying applications for the issuance or renewal of airman certificates, including airman medical certificates.
- Certain FAA civil penalty orders issued against individuals, pilots, flight engineers, mechanics, or repairmen where the amount in dispute is less than $50,000.

The judges also adjudicate claims under the Equal Access to Justice Act for fees and expenses stemming from FAA certificate and civil penalty actions.

An administrative law judge must issue an Oral Initial Decision regarding the appeal of an emergency order or an immediately effective order within 30 days of receipt. If the law judge's decision is appealed to the full Board, an Opinion and Order must be issued within 60 days of the appeal's initial receipt.

Marine certificate actions are heard first by the US Coast Guard administrative law judges and may be appealed to the vice commandant of the US Coast Guard. The ruling of the vice commandant may then be appealed to the NTSB's full Board.

As of the end of the FY, the NTSB had four judges, two of whom were hired in 2021. Two judges are stationed in Washington, DC, one to the circuit that includes Denver, Colorado, and one to the circuit that includes San Antonio, Texas.

Accomplishments and Ongoing Efforts

The Office of Administrative Law Judges completed these actions from October 1, 2021, through September 30, 2022:

- Emergency order appeals filed: 118
- Emergency order appeals closed: 93
- Emergency order appeal hearings held: 12
- Cases in which respondents waived the emergency procedures: 78
- Petitions challenging the FAA's determination to bring the case as an emergency processed: 13
- New cases filed:247 (127 of which were enforcement cases; 120 of which were certificate denials, mainly medical certificate denials)
- Cases closed: 302 cases
- Hearings held: 19
- Appeals of decisions made by NTSB administrative law judges sent to the Board members: 17 (2 of which were procedural dismissals)

INFORMATION TECHNOLOGY AND SERVICES

	($000s)	FTEs
FY 2023 Estimate	$10,258	30
FY 2024 Request	$11,280	31
Increase/Decrease	$1,022	1

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 5.2 percent projected for January 1, 2024, a 2.0 percent non-pay inflation factor, an increase in agency program investments, and an increase in the agency's contribution to employee health benefits. An increase of one FTE is supported by this funding level.

Program Description

The Office of the Chief Information Officer provides strategic direction and operational support for NTSB information systems and develops and distributes programs and products for use by the agency and the public. The office comprises four divisions and two program areas, described below.

Computer Services Division

The Computer Services Division provides computer and network services for headquarters and regional offices, including internet access, web services, e-mail, backup, continuity of operations infrastructure, and disaster recovery. The division is responsible for securing the network and defending against outside threats. Help desk staff perform a wide range of tasks, including desktop/laptop setup, repair, and replacement; network connectivity; and software installation and upgrades. In short, the division is responsible for deploying and maintaining essential systems and services that range from desktop telephones to enterprise storage systems, cell phones, and tablets.

Systems Support Division

The Systems Support Division develops, distributes, and maintains agency-specific applications, provides web design and content management, and provides database administration services. Applications support accident data collection, storage, analysis, and dissemination for all modes, as well as management of systems for accident records, safety recommendations, correspondence, FOIA requests, and general administration. The division also

develops office-centric applications for the business functions of modal and support offices.

Records Management Division

The Records Management Division maintains accident investigation files, NTSB reports, and other agency records in accordance with applicable law. It is responsible for fulfilling public requests for information, including FOIA requests, and for providing training on the docket management system and guidance on redaction policies and techniques. The division is also responsible for monitoring the privacy and confidentiality of data and information; in addition, it provides records management services that enable NTSB staff to locate and use investigative records to respond to media and public requests for accident safety data and records more efficiently and effectively.

Enterprise Architect Division

The Enterprise Architect Division provides a logical business and technological blueprint for how the NTSB operates today, plans to operate in the future, and intends to invest in technology. The division understands the business needs and defines the processes and information necessary to operate the business-support technologies and transitional processes required to implement new technologies in response to changing business needs.

Chief Technology Officer Program

The chief technology officer outlines the office's technological vision, researching new technologies for potential benefits, implementing technology strategies, and ensuring that the technological resources are aligned with the agency's mission needs and goals.

Information Technology Security Program

The chief information security officer protects the availability, confidentiality, and integrity of IT resources through the application of requirements specified in OMB Circular A-130, the Federal Information Security Management Act (FISMA), and various US Department of Commerce National Institute of Standards and Technology publications. The IT security program uses a risk-based, cost-effective approach to secure information and systems, identify and resolve current IT security weaknesses and risks, and protect the NTSB's networked capabilities against future vulnerabilities and threats.

Accomplishments and Ongoing Efforts

Computer Services Division

The Computer Services Division resolved more than 3,909 service desk requests for the agency's distributed locations (headquarters, regional offices, and teleworkers) from October 1, 2021, through September 30, 2022. The division's IT specialists continued to support the agency's mission by launching on major accident investigations to assist Board members and staff on-scene. Additionally, the division provided both front- and back-end computing services to the agency with minimal downtime from unplanned outages as well as continued to meet many challenges related to the global pandemic and returning to the office in 2022. This latter effort entailed updating equipment in each office to provide new monitors, desk phones, headsets, ethernet adapters, port replicators, and other equipment, as well as assessing all agency meeting room equipment. The assessment included testing new video-conferencing solutions and recommending standards for upgrading most of the meeting rooms. Another initiative that was completed during FY 2022 was the activation of the agency's Vulnerability Disclosure Policy program.

The division performed regular monthly maintenance activities for all agency IT systems, taking these systems off-line and updating them to protect against known vulnerabilities. Additionally, the division completed the necessary steps to comply with the Federal Continuous Diagnostics and Monitoring program, including installing Cybersecurity and Infrastructure Security Agency scanning software on every agency endpoint to provide the required oversight capabilities.

In conjunction with the Systems Support Division, the Computer Services Division completed the migration of systems to the agency's cloud, which eliminated the dependency on the agency's headquarters location for IT operations. The final piece in this migration was to create a failover solution for Department of Interior–shared services that are accessible over a dedicated connection. The network staff completed a lifecycle refresh of pertinent network equipment.

Systems Support Division

In FY 2022, the Systems Support Division minimized security vulnerabilities and performance instability throughout the agency by enhancing outdated applications and migrating them to newer technology (for example, cloud services). The outdated applications posed a significant security and instability risk, as they were not built to withstand emerging

security threats and were not supported by the latest versions of the Windows operating systems. The cloud governance and policies will reduce security risks and increase efficiency in the management of the cloud resources.

Working with the Computer Services Division, the Systems Support Division migrated the service desk application from an older Windows' server to the NTSB's cloud platform (Azure), further increasing security and stability, while reducing costs associated with on-premises hardware and physical space. Staff also initiated and completed the SharePoint health assessment, reviewing its current architecture and potentials for improvements. As a result, the division facilitated the upgrades to the new inside web portal (InsideNTSB), making this portal the main internal gateway for the agency. The division will continue to upgrade aged applications and decommission out-of-support Windows operating systems throughout FY 2022 and 2023.

During FY 2022, the division made several enhancements to its suite of in-house applications that support various agency program offices and activities, including the Product Management Application, the Case Appeals Filing System, MEDICS, SAFTI, Case Analysis and Reporting Online (CAROL), DREAM, PREVIEW, and the Office of Government Ethics (OGE) 450 electronic filing. Division staff worked closely with other offices and teams as described below to help successfully launch their projects:

- Upgraded the help desk ticketing system.
- Implemented the new electronic version of OGE-450 filing system, eliminating paper filing.
- Migrated data from legacy applications, ensuring transparency of investigative data availability to the public.
- Secured FAA Airmen Crew Cert File Transfer Protocol (FTP) to Secure FTP.
- Developed a site to host TWA 800 3D images.
- Upgraded FOIAXpress and implemented the interface to the FOIA National Portal.
- Retired legacy systems.

Records Management Division

The Records Management Division posted 1,719 accident dockets through September 30, 2022, and the FOIA office received 518 new FOIA requests and closed 500 of them. The office continues to monitor new technologies to assist with processing requests and providing information to the public.

The division worked with the chief privacy officer to implement the Controlled Unclassified Information program and reviewed privacy impact assessments and system of records notices for the agency. Staff completed

agency-wide records and information management training. The division revamped the records management program and closed all National Archives and Record Administration recommendations. The division is now in the second phase of the records management improvement plan, which includes a full inventory of the agency's records and an evaluation of records schedules. As of September 30, 2022, microfiche from 1978 through 1996 are being prepared for transfer to the Federal Records Center, as are Civil Aeronautics Board Reports from 1934 through1967. During FY 2022, the division acquired additional resources, hired a government information specialist, and contracted assistance in the FOIA and record's management program. Division staff continued to assist the public in obtaining accident information from NTSB website investigative search/query tools and docket management systems.

Enterprise Architect Division

In FY 2022, the Enterprise Architect Division continued to standardize business processes. Staff analyzed and visualized NTSB data to identify and comprehend trends and patterns. The division's support enabled all the agency's data users to make better-informed decisions based on visualized data.

The division worked to implement an agency-wide data analytics program to develop processes, infrastructure, human capital, and training, using internal and external data to improve predictions and enable informed decision-making in support of the agency's 5-year strategic plan. The program also supports analysis of investigative and operational data.

As part of this effort, the division led the implementation of a pilot data analytics program, laying the foundations for implementing a secure and governed, cloud-based enterprise data analytics infrastructure. The pilot project validated the technology platform to be used for analytics infrastructure and produced a valid business case curated dataset to be used for analysis. The division will continue to build and secure the infrastructure to support analytics and data governance for the agency.

The division launched additional initiatives as well, including the implementation of software development and IT operations (DevOps) to enable the removal of process silos. This initiative will help consolidate IT operations, quality engineering, and security to produce better, more reliable products. The division is working to define DevOps procedures and processes for the application development lifecycle and is expected to complete the implementation of DevOps for major applications by the end of FY 2024. The division also initiated an effort to document and revise the NTSB's enterprise

architect transition plan to streamline, identify, and document all business and operational processes.

The division continues to provide technical direction to the post-implementation enhancement requests and data integration for CAROL and SAFTI applications, which enable modal offices to standardize the accident investigation process, resulting in structured data. Staff also provide guidance, design oversight, and technical advice in all NTSB software development efforts to all NTSB offices and divisions to support various IT initiatives.

The division also started work on establishing a repeatable capital planning and investment control process for selecting, controlling, and evaluating the status of major IT investments. The effort includes revision of the existing policy and protocol for setting IT priorities and making appropriate IT resource shifts thus providing transparency on IT investments. The work is expected to be completed by the end of FY 2024.

Chief Technology Officer Program

The chief technology officer outlines the office's technological vision, which incorporates the activities of two major initiatives: digital transformation, and meeting the goals identified in the Presidential Executive Order on Strengthening the Cybersecurity of Federal Networks and Critical Infrastructure. These two initiatives focus on the need to deliver services and products efficiently and effectively on a more secure and reliable technical platform, while reevaluating agency processes, procedures, technologies, and data analytics in meeting mission objectives in delivery of services and products to the public.

During FY 2022, the chief technology officer led divisions in the migration of all NTSB enterprise applications from on-premises to the Microsoft Azure Federal Risk and Authorization Management Program cloud. All agency's systems and data are highly secured, resilient, scalable, and available anytime, from anywhere. The officer also ensured that NTSB application developments were standardized in the Microsoft Azure DevOps environment to be more responsive to agency needs, to increase collaboration for the development of better products, and to increase productivity.

The chief technology officer submitted the NTSB's Zero Trust Implementation Plan to DHS and OMB and completed phase 1 of the Zero Trust Implementation Plan with focus on Endpoint Detection and Response and refined the network infrastructure to support the next two phases of the Zero Trust implementation effort. Priorities for FY 2023 and into the future include implementing phases 2 and 3 of the Zero Trust Implementation Plan per OMB and White House mandates, continuing to convert the agency's

network from Internet Protocol version (Ipv)4 to Ipv6, replacing legacy applications, developing enterprise data analytic capabilities, building the continuity of operations program in Dallas, Texas, and enhancing the agency's cybersecurity program.

IT Security Program

During FY 2022, the IT security program continued to advise the chief information officer regarding FISMA compliance requirements and advocated the expanded use of such external cybersecurity enhancement services as conducting third party cyber security assessments and weekly Cyber Hygiene Assessment reports. The IT security program coordinated with our external cybersecurity oversight agencies and provided responses to several ongoing reporting directives, cybersecurity incident reports, and the FISMA report. The agency is working towards remediating known vulnerabilities and closing out open auditor findings to further improve IT security.

ADMINISTRATION

	($000s)	FTEs
FY 2023 Estimate	$5,810	20
FY 2024 Request	$6,568	23
Increase/Decrease	$758	3

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 5.2 percent projected for January 1, 2024, a 2.0 percent non-pay inflation factor, an increase in agency program investments, and an increase in the agency's contribution to employee health benefits. An increase of three FTEs is supported by this funding level.

Program Description

The Office of Administration, which provides administrative support to NTSB programs, was renamed the Office of Human Capital Management and Training in FY 2022. The office is led by the chief human capital officer (CHCO), who is responsible for setting the NTSB's workforce development strategy and aligning human resources policies with the agency's mission, strategic goals, training, and performance outcomes. Two divisions carry out the office's work: Human Resources and Career Development and Training.

Human Resources Division

The Human Resources Division is responsible for human capital planning and management, policy and program development and administration, and recruitment and hiring. The division also administers the following human resources programs: labor and employee relations, benefits, pay and leave, performance management and awards, the telework program, and the employee assistance program.

Career Development and Training Division

During FY 2022, the NTSB Training Center was renamed the Career Development and Training Division and was realigned from the Office of the Managing Director to the Office of Human Capital Management and Training. The division is responsible for overseeing the development and implementation of workforce development programs, and technical training curriculum for the NTSB workforce. The division provides agency employees

with course selections and training opportunities to ensure that they are equipped for the transportation and leadership challenges of the future.

Accomplishments and Ongoing Efforts

Human Resources Division

In keeping with the chair's vision to right-size the agency, the Human Resources Division prioritized actions to recruit and fill vacant positions and to bring new staff on board. As a result, the agency hired 57 new employees for mission-critical and mission-support positions and provided opportunities to 15 current employees, through internal career promotions or reassignments to new positions.

Additionally, the division coordinated with the modal offices to restructure large divisions into branches; as of September 30, 2022, one modal office implemented this structure with two branches, and announcements were planned for the other offices. This initiative will help to address succession planning and employee development, and provide a more efficient workflow for the office.

With the increased demand for information-sharing and the use of data to improve decision-making, the division collaborated with the Office of the Chief Information Officer to develop a SharePoint site for displaying the status of each recruitment action. Subsequently, the chief data scientist developed a dashboard to display the full life cycle of the recruitment process, which allowed the agency to more accurately track each hiring action as it progressed. This expanded data-sharing improved agency executives' understanding of the hiring process and knowledge of the status of specific hiring actions and enabled better planning for future vacancy announcements. The agency will continue to improve the availability of data, which will better inform decision-making for staffing levels and process improvements.

The division continued to work with the Office of Personnel Management (OPM) to administer the Federal Employee Viewpoint Survey (FEVS). NTSB employees responded at a rate of 72.5 percent to the 2022 FEVS survey, far exceeding the government-wide response rate of 35.3 percent. Additionally, NTSB employees rated global satisfaction at 70 percent, employee engagement at 72 percent, and performance confidence at 89 percent, which exceeded the government-wide results in these major indices. These responses demonstrate employees' willingness to engage in the process to continuously improve agency performance and employee satisfaction.

Recognizing the need for supervisory training on hiring, the Human Resources Division worked with the Career Development and Training

Division to identify training opportunities for supervisors on writing position descriptions, conducting interviews and reference checks, and managing employee performance sessions.

The division supported the extension of the percentage-based performance and incentive awards program pilot started in FY 2021. The program gives supervisors and senior leadership flexibility to decide the amount of individual employee awards and to provide incentives based on distinctions in performance or contributions related to the accomplishment of office goals. In the 2021 FEVS, 62 percent of respondents strongly agreed that performance awards are the most meaningful form of recognition.

The division collaborated with offices across the agency to administer the agency's major awards selection process and presentation. The annual major awards ceremony, held virtually, included recognition of 62 employees representing a diversity of agency mission functions from both regional and headquarters locations. In keeping with the agency's initiatives to support diversity, equity, inclusion, and accessibility, an EEO award was presented to an employee who consistently engaged our workforce through innovative methods to create an understanding of diversity and inclusion.

As the pandemic continued into FY 2022, division staff participated with the agency-level task force to address the challenge of completing mission-critical work and addressing the safety, physical health, and mental health of employees. The agency amended policies and developed solutions using the flexibilities provided for work schedules, leave, and telework. Collaborating with program office leaders across the agency, the division helped shape a measured and safe return to the office as public health conditions and statistics improved over time. Division staff provided advice and guidance to address the COVID-19 vaccine mandate and other pandemic-related issues. The division launched an information and education campaign via email and internal postings, assessed the status of employee vaccinations, established procedures for visitors, and updated job opportunity announcements. In addition, representatives of the division participated in a work group to prepare for the associated reasonable accommodation process, where needed.

Although staff had onboarded many employees virtually over the past 2 years, the division led efforts to reintroduce in-person swearing in with the NTSB chair for new employees, while adhering to safety protocols.

In FY 2022, the agency received full certification from OPM for the performance management system for senior-level employees, allowing the agency to attract the most talented candidates for senior positions with a competitive compensation package and improving the agency's ability to

retain senior-level employees with the critical skills needed to address the agency's mission requirements.

Career Development and Training Division

The Career Development and Training Division continued to evaluate its courses, further refine offerings, and improve instruction in all areas of technical, investigative, supervisory, and leadership development, as well as other aspects of mission support. It offered course content in investigative skills that targeted processes, procedures, and technical issues critical to the agency's mission of accident investigation and added new courses and initiatives in response to senior leadership strategic priorities for the agency's workforce.

Full-time training officers and advisers coordinated the development of group training by regularly conducting needs analyses and assessments and by focusing on all-hands and long-term training requirements. All accident investigation and workforce development course offerings undergo continuous evaluation and improvement to adapt to the NTSB's changing needs and priorities. The skills developed and enhanced by accident investigation and general workforce development training are highly transferable and added significant value to the investigative and mission support functions.

These are some of the key initiatives of the division during FY 2022:

- ***Integrating virtual delivery with next-generation training methods***

Since the outset of the pandemic, over 90 percent of course offerings have moved to a virtual platform. Although not all courses or course content are compatible with virtual delivery, this method of delivery enables the agency to better meet the needs of the over 25 percent of NTSB employees who live outside the Washington, DC, metropolitan area, and whose training opportunities have often been impacted by the unavailability of funds for travel.

In preparation for the closure of the Ashburn training facility, the TWA Flight 800 reconstructed wreckage, previously used as a training tool for NTSB staff and outside parties, will be dismantled. Accordingly, the division began exploring innovative and engaging alternatives for teaching cutting-edge investigative techniques using virtual and augmented reality, animation, and other training technologies. These alternative teaching methods will assist in providing an interactive training experience for all future attendees.

- ***Expanding workforce development for all NTSB staff***

The division continued to expand the course offerings for NTSB career professionals through an innovative curation strategy that maximizes the number and variety of courses available. The division continued to participate in the Federal Small Agency Council's training cooperative, which shares available courses among member agencies; the division also extended interagency agreements with the US Department of Interior University and the Treasury Executive Institute to provide essential training in acquisitions, federal supervision, project management, leadership and managerial development for staff, supervisors, senior executives, and aspiring leaders. Expanded offerings included new courses through private sector training sources, as well as one-on-one executive coaching, both of which have yielded targeted career development support tailored to individual needs.

The workforce development curriculum is designed to address important cross-functional technical, administrative, and leadership competencies at the agency. During FY 2022, the division collected and evaluated utilization data on various offerings and is exploring ways to begin collecting trainee satisfaction data to ensure all curated programs meet the needs of the NTSB workforce, while helping to prioritize programs as the division explores new innovative options.

- ***Strongly emphasizing technical training for NTSB investigators***

The division continues to help investigators upgrade and refine their skills by creating and redesigning courses in our foundational and specialized accident investigation curricula, which aim to provide both new and experienced NTSB investigators across all modes of transportation with a common framework and understanding of the newly adopted Accident Investigation Manual, and strategies for addressing the challenges of investigating accidents involving new technologies. For example, UASs have been identified as an emerging transportation technology, impacting both the investigative toolbox and the types of accidents and incidents the agency investigates. This has led to a four-pronged training goal: (1) to provide initial and (2) refresher training for the UAS pilots who support the NTSB's UAS program, (3) to provide training for all NTSB investigators across all modes on the appropriate uses of UASs as a scene documentation and investigative tool and instruction in how to request UAS support for their investigations, and (4) to prepare investigators who may be called upon to investigate UAS accidents or incidents under the NTSB's authority, ensuring thorough investigations that promotes the future safety of this new transportation domain and its interaction with traditional aviation.

FY 2022 Activities

Courses with External Enrollment

Technical Courses at the Training Center (in-person and virtual):	**Students**
Aircraft Accident Investigation Orientation for Aviation Professionals	15
Accident Investigation Orientation for Railroad Professionals	19
Cognitive Interviewing	38
Family Assistance (offered twice)	94
Foundations of Multimodal Accident Investigation (New)	19
Aviation Accident Investigation (New)	13
Effective Writing for NTSB Accident Investigators (New)	15
Attendance Subtotal – Courses at Training Center	**213**
Contract Courses for Industry/Gov't Professionals (in-person and virtual):	**Students**
Managing Communications During a Major Transportation Accident – INGAA	99
Managing Communications During a Major Transportation Accident – Alaska Air	45
Marine Mishap Analysis and Reporting Course–US Coast Guard (offered three times)	168
Aviation Mishap Analysis and Reporting Course–US Coast Guard	59
Attendance Subtotal – Contract Courses	**371**
Total Attendance	**584**

Workforce Development Courses Offered Exclusively for NTSB Employees (virtual)

Course Category:	**Attendees**
Government Compliance & Administration	2,256
Information Technology/Computer Skills	43
Diversity, Equity, Inclusion & Accessibility	122
Writing & Communications	96
Project Management, Job-Specific, and General Skills	66
Leadership & Supervision	176
Mission	231
Retirement	170
Safety & Health	901
Total Attendance	**4,061**

APPENDIX A: FEDERAL DATA STRATEGY

Significant Activities in FY 2022

The NTSB is committed to implementing the Evidence Act and achieving the data management objectives defined by the Federal Data Strategy and Annual Action Plans. One of our strategic plan goals is to improve agency products and processes through data analysis. Further, we are developing metrics that will support Evidence Act requirements for all agencies to invest in and that focus on the management and use of data and evidence linking spending to program outputs, executing mission, better managing enterprise risks, and promoting civic engagement and transparency. We are prioritizing data as a strategic asset and taking significant actions to support data governance processes, establish plans for data assets and infrastructure, and expand public access to agency data. Some notable actions during FY 2022 included these:

- The chief data officer and the NTSB Data Governance Body completed a comprehensive, agency-wide data maturity assessment. The results of the assessment identified priority goals for the current and upcoming years of the agency data strategy, including staffing and training, infrastructure planning, and improved data management and access.

- Based on the results of the initial assessment, we are developing an agency data strategy plan that will be published in FY 2023. The managing director, chief data officer, and chief information officer have briefed all agency staff and produced a video and articles for the agency intranet site to introduce staff to the agency data strategy.

- The NTSB Career Development and Training Division added data skills training options for managers and staff on the agency's Career Development Roadmap.

- During FY 2022, we continued to enhance and expand the capabilities of our multimodal investigation management database, SAFTI, and investigation query tool CAROL. We formed a user group to solicit feedback from internal and external users to help guide future developments of the CAROL tool to enhance public access to and usage of our data.

- We continued to build our data analytics library of dashboards for monitoring investigation tasks, staff workload, and performance metrics. In addition to investigation data, we expanded our analytics to include

tracking staffing, hiring process, and budgeting information and initiated a data review in support of the agency telework program.

- We created interactive dashboards of aviation investigation information for the agency website, NTSB.gov, that allow users to select and explore accident types and investigation findings. This functionality will be available to users in FY 2023.

- We completed a data analytics infrastructure pilot project to implement and test enterprise technology and procedures to combine data from disparate sources into a managed NTSB data repository. The repository incorporates data governance tools and processes, ensuring the security, accuracy, and availability of agency data while expanding accessibility for analysis by internal and external users of NTSB data.

APPENDIX B: DIVERSITY, EQUITY, INCLUSION AND ACCESSIBILITY

Significant FY 2022 Activities in Support of Presidential Executive Orders 14035, 13985, and 13988

Executive Order 14035: Diversity, Equity, Inclusion, and Accessibility (DEIA) in the Federal Workforce

- **Developed NTSB's DEIA Strategic Plan:** Chair Homendy signed NTSB's DEIA Strategic Plan on Oct. 24, 2021, to support advancement toward DEIA goals and objectives in the agency's strategic plan, and established core DEIA working groups.

- **Issued a New DEIA Policy Statement:** Chair Homendy issued the "Diversity, Equity, Inclusion and Accessibility" policy statement on Dec. 27, 2021, which reiterated the agency's commitment to DEIA and defined what these terms mean in the workplace.

- **Hired CHCO:** The highest priority in the NTSB's FY2022-2026 DEIA Strategic Plan was to hire a CHCO. NTSB accomplished this goal in the fourth quarter of FY2022. The CHCO has been charged with assisting the NTSB in meeting the Executive Order 14035 mandate to attract, develop, and retain a diverse and inclusive workforce that reflects the communities we serve.

- **Hired a DEIA Program Manager:** The NTSB has made DEIA an agency priority by establishing a DEIA program manager within the Office of EEODI. This critical position is charged with managing the implementation of the 2022 DEIA Strategic Plan and Equity Action Plan throughout the agency. The DEIA program manager will help enhance DEIA objectives and more robustly implement the agency's equal employment opportunity responsibilities, specifically the Affirmative Employment and Disability Employment Programs.

- **Appointed a Chief Diversity Officer (CDO):** Chair Homendy appointed the agency's first CDO, who has the expertise and authority to effectively work with the head of the agency and the EEODI director to guide the agency toward a uniform approach to the systemic implementation of DEIA across the NTSB.

- **Participated in the Chief Diversity Officers Executive Council (CDOEC):** Two NTSB employees attended the OPM-led September 29, 2022, inaugural meeting of the CDOEC, which marks a major milestone in this Administration's work to build and model a federal workforce that draws from the full diversity of the American people.

- **Completed a Barrier Analysis Study:** To support the release of the updated DEIA Strategic Plan, the NTSB hired a contractor to conduct a barrier analysis study to identify barriers throughout the employee lifecycle. We used the study findings to help the agency identify our DEIA and inclusive development priorities.

- **Conducted a DEIA Cultural Needs Assessment:** To improve organizational and team productivity, the NTSB hired a contractor with expertise in DEIA to conduct a cultural needs survey, employee listening sessions, and leadership training. The contractor issued the NTSB a final report containing agency-specific DEIA recommendations.

- **The NTSB's Diversity Inclusion Advisory Council (DIAC) Enhanced the NTSB Recruitment Guide and DEIA Needs Training Survey:** The DIAC updated the NTSB's diversity resource recruitment guide sources and conducted an office-level DEIA training needs survey to guide EEODI's training needs for years to come.

- **Delivered a Respectful, Inclusive, and Safe Environments Civil Treatment Learning and Engagement Platform:** The NTSB conducted two custom Civil Treatment Leadership webinars to address respectful behavior in the workplace. The chair then issued a policy statement on communications professionalism, reminding all staff to demonstrate respect in the workplace.

- **Launched the DEIA Educational Series, including Hybrid Workplace Learning Tracks:** The NTSB implemented a DEIA educational series and added DEIA training requirements to NTSB directors' and deputy directors' performance plans. As a result, NTSB staff participated in 11 DEIA educational training sessions, seminars, and events. The training program also included resources on how to help build essential DEIA and hybrid workplace skills and knowledge.

- **NTSB EEODI Office Participated in EEOC EEO Educational Consortium (EDCON) Mentorship Program Serving as Mentors and Mentees:** Participation in this program enhanced the career development of the NTSB's EEODI professionals and ensures effective collaboration with external federal EEO stakeholders.

Executive Order 13985: Advancing Racial Equity and Support for Underserved Communities Through the Federal Government

- **Leveraged Agency Experts in Evidence and Evaluation of NTSB and OPM Data Sources:** The EEODI director, the chief data officer, and statisticians reviewed data obtained from OPM and the NTSB to identify questions, build evidence, and establish dashboards that would support strategies to move the NTSB toward becoming a model DEIA agency.

- **Hired Diverse Candidates:** The NTSB uses different hiring methods for the Civil Service to attract diverse candidates, including recruitment and referral programs to connect us with college students and recent graduates with disabilities who are eager to demonstrate their abilities in the workplace through internships or permanent jobs. We also used subject matter experts to review applications and conduct structured interviews. Our goal is to attract the right people for the right positions at the NTSB.

- **Partnered with Minority-Serving Institutions (MSI):** The NTSB partnered with MSIs, which include Historically Black Colleges and Universities (HBCU), Hispanic-Serving Institutions (HSI), Tribal Colleges and Universities (TCU), and Asian American- and Native American/Pacific Islander-Serving Institutions (AANAPISI) to enhance outreach and safety advocacy education, which also serves to increase the agency's pipeline of diverse talent. The NTSB engaged with underrepresented students and communities by increasing our outreach and advocacy partnerships through participation in the HBCU and HSI development conferences. To further our relationships with HBCUs, our newly hired CDO attended the national HBCU conference in September 2022 to identify strategies for developing a hiring pipeline between HBCUs and our agency.

- **Presented to the Tribal Transportation Safety Management System Steering Committee (TTSMSSC):** The NTSB provided an overview of the investigative process and recent accidents on tribal lands to the TTSMSSC during the National Transportation in Indian Country Conference (NTICC) meeting in August 2022. The TTSMSSC presentation resulted in—
    - Increasing collaboration/coordination opportunities with tribal officials.
    - Improving stakeholder outreach on tribal transportation safety issues.
    - Identifying best practices for NTSB investigations on tribal lands.

- **Appointed a liaison to National Academy of Sciences' Transportation Research Board's Committee on Tribal Transportation (TRBCTT):** The NTSB appointed a liaison to the National Academy of Sciences' TRBCTT, whose membership includes representatives of tribal governments, academia, industry, and state and federal agencies. Liaison activities in FY 2022 resulted in discussions on tribal transportation safety issues and tribal transportation safety equity panels at the January 2022 annual TRB meeting and the August 2022 semi-annual TRBCTT committee meetings.

- **Forged Stronger Relationships through the Conference of Minority Transportation Officials (COMTO):** In July, Chair Homendy addressed the 2022 COMTO, Navigating the Future: Advancing Transportation Beyond Disruption. The event marked the first time an NTSB chair has spoken at COMTO. At the event, the chair pledged to build an investigative agency that effectively serves everyone. To get there, she said the NTSB is committed to building a workforce representing the diversity of all the communities we serve. COMTO is a national advocate for employment diversity, inclusion, and contracting opportunities in the multi-modal, multi-billion-dollar transportation industry.

- **Partnered with the Chickasaw Nation:** During the summer of 2022, the NTSB partnered with the Chickasaw Nation to host four interns in the Offices of Aviation Safety; Highway Safety; Railroad, Pipeline and Hazardous Materials Investigations; and Research and Engineering.

- **Conducted Women in Transportation Panel:** Conducted a Women in Transportation Panel in collaboration with the Virginia Tech Transportation Institute to encourage women to pursue careers in transportation. Four diverse NTSB panel members discussed the challenges, tools, and approaches they used to advance their prospective careers in the male-dominated transportation industry.

- **Conducted Safe System Approach Roundtables:** Conducted three virtual roundtables that focus on the Safe System Approach to improving road safety. Nearly all these sessions included discussions on the need for greater equity in highway safety programs and policies. The sessions also discussed the role that safety organizations have in engaging with underserved communities and organizations to help influence safety outcomes.

- **Awarded Contracts to Small Disadvantaged Businesses (SDBs):** The NTSB awarded 13 percent of the agency's total contract spending in FY 2022 to SDBs, exceeding the federal 11 percent SDB contracting

spending goal for FY 2022 that was specified in Executive Order 13985. The agency will continue efforts to identify opportunities for SDBs, women-owned small businesses, service-disabled-veteran-owned small businesses, and HUBZone small businesses in future years and set aside procurements accordingly to meet the president's FY 2025 15 percent SDB contracting spend goal.

Executive Order 13988: Preventing and Combating Discrimination on the Basis of Gender Identity or Sexual Orientation

- **Conducted LGBTQI+ and Civil Rights Webinar:** Wesley J Reisser PhD, Chair, Interagency Working Group on LGBTQI+ Multilateral Affairs, conducted a webinar for NTSB bringing awareness of the importance of promoting diversity and enforcing protections for LGBTQI+ employees. The webinar benchmarked the Department of State's activities in ensuring inclusivity of the LGTBQI+ members into the workforce.

- **Conducted Training, including a Gender Identity, a Game Changer Webinar:** Provided training that promoted inclusion and diversity within NTSB and provided the workforce with tools to create a better inclusive environment. Educated the workplace on unconscious bias, cultural competency and leveraging diversity to maintain an inclusive workplace culture at the NTSB.

APPENDIX C: MOST WANTED LIST

The NTSB's MWL highlights transportation safety improvements needed now to prevent accidents, reduce injuries, and save lives. The NTSB issued its first MWL in October 1990 to highlight specific recommendations that could significantly improve transportation safety. Since then, the MWL, now organized by issue area, has been the NTSB's premier advocacy tool across all modes of transportation. The following are the 10 issue areas included in the 2021–2022 MWL.

Require and Verify the Effectiveness of Safety Management Systems in all Revenue Passenger-Carrying Aviation Operations

By establishing an effective SMS and creating a safety culture aimed at making safety a focus first and always, operators will improve aviation safety and reduce the risk of accidents.

An SMS should address four components: safety policy, safety risk management, safety assurance, and safety promotion. It can be scalable to the size and complexity of operations, yet too many operators either have none in place or have an ineffective one.

In 2015, the FAA required commercial airliners to develop a comprehensive SMS to improve safety for the flying public, but the FAA has not required other revenue passenger-carrying operators to have one.

Although we have seen some voluntary adoption of SMS programs, most operators continue operating without an SMS in place. It's time more got on board. The risk to the flying public is too great not to do so.

Install Crash-Resistant Recorders and Establish Flight Data Monitoring Programs

When planes crash, we want to know what happened. The good news is that technology is available today that can give us the answers. The bad news is that the FAA has not mandated that aircraft operators install it, citing privacy, security, cost, and other concerns.

Commercial airliners are required to have only FDRs and CVRs, commonly called "black boxes," but the NTSB has long called for cockpit image recorders as well. Such video would have been extremely helpful in determining flight crew actions in recent crashes in Texas, Indonesia, and Ethiopia.

The NTSB believes other types of passenger-carrying commercial aircraft, such as charter planes and air tours, should be equipped with data,

audio, and video recording devices. These operators should also have programs in place that analyze the data derived from these devices. Recorders and flight data management programs not only would help investigators identify the causes of accidents, but also would help aircraft operators prevent crashes in the first place by allowing crew actions to be evaluated regularly.

Regardless of the recorder type, it must be able to survive a crash.

Implement a Comprehensive Strategy to Eliminate Speeding-Related Crashes

Speeding is typically defined as exceeding a speed limit, but it can also mean driving at the speed limit but too fast for road conditions. Between 2010 and 2020, speeding-related crashes resulted in over 119,500 fatalities—that's about one-third of all traffic fatalities in the United States.

The true extent of the problem is likely underestimated because the reporting of speeding-related crashes is inconsistent. Speeding can result in a loss of vehicle control, which increases both the likelihood of a crash and the severity of injuries sustained. Higher vehicle speeds lead to greater changes in velocity, which, in turn, lead to increased injury severity—that's just basic science.

Intelligent speed adaptation devices on large trucks, automated enforcement (speed safety cameras), expert speed analysis tools, and education campaigns are underused in our communities. These critical tools and strategies must be implemented to address this safety problem.

Protect Vulnerable Road Users through a Safe System Approach

Our roadways were designed to move motor vehicles safely and efficiently. They often do not fully meet the needs of pedestrians, bicyclists, and motorcyclists—our VRUs. As a result, we are seeing increasing dangers to this population and too many crashes involving vehicles and VRUs. We must use a Safe System Approach to better protect VRUs and ensure safe roads for all. A Safe System addresses all aspects of traffic safety: road users, vehicles, speeds, roads, and postcrash care.

We must make better safety investments, from road treatments, vehicle design, and collision-avoidance systems to strong traffic safety laws and robust education efforts to mitigate injury risks for all road users.

Unlike motor vehicles, VRUs lack an external structure to protect them when crashes occur, and they're more likely to suffer a serious injury or death. Proven, effective countermeasures are being underused at the federal, state, and local levels to protect pedestrians, bicyclists, and motorcyclists. We have long

been concerned with the threat to VRUs. In 2018 and 2019, we published three reports on the risks to this vulnerable population and issued more than 30 new recommendations focused on reducing VRU traffic deaths.

Prevent Alcohol- and Other Drug-Impaired Driving

Driving under the influence of alcohol and other drugs remains a leading cause of highway crashes. In 2020, 30 percent of all traffic fatalities resulted from crashes in which at least one driver was alcohol-impaired. And many of these impaired-driving crashes involve drivers who both drink and use other drugs (legal, illicit, and over the counter). Complicating matters, each year, more states are passing laws allowing the use of recreational marijuana and marijuana for medicinal use.

Impaired driving is 100 percent preventable. We know a per se BAC of .08 g/dL is too high. States need to lower per se BACs to .05, an action only Utah has taken. Too many alcohol-impaired crashes have occurred involving drivers who had previously been convicted of drunk driving. All states need to implement laws requiring all drivers convicted of alcohol-impaired driving to use an interlock device, preventing future impaired driving.

We have investigated many crashes involving drug-impaired drivers, but the fact is, we don't really know how extensive the drug-impaired driving problem is because, unlike for alcohol, no standardized drug testing protocols exist. There is no established limit or threshold to determine other drug impairment. Additionally, evaluating the impact of other drugs on drivers is challenging because many drugs impair individuals differently than alcohol. Bottom line: we need to develop better drug-testing procedures and tests.

Require Collision-Avoidance and Connected-Vehicle Technologies on all Vehicles

Each year, thousands of people are killed and injured in preventable crashes. Collision-avoidance and connected-vehicle technologies can help mitigate the severity of such crashes or even stop them from occurring in the first place.

These technologies include forward-collision warning and automatic emergency braking, which can warn the driver of an upcoming hazard and act if the driver doesn't respond. Connected-vehicle technologies allow vehicles to relay important safety information to each other to avoid crashes.

Yet most passenger vehicles and commercial vehicles (such as heavy-duty trucks and school buses) on the road today are not equipped—nor required to be equipped— with such life-saving technologies. And consumers are often unaware of the availability and capabilities of these technologies. The

National Highway Transportation Safety Improvements has not developed comprehensive performance standards for these technologies, nor does it effectively evaluate them and include this information in its vehicle safety ratings.

We were alarmed by the recent regulatory decision by the Federal Communications Commission that decreased the allocated spectrum for connected-vehicle technology by 60 percent and introduced the likelihood for harmful interference by allowing unlicensed devices to operate in adjacent bands without appropriate safeguards. This decision threatens the basic viability and safety promise of connected-vehicle technology.

Eliminate Distracted Driving

Distraction occurs when drivers divert their attention away from the driving task. Crash data and research indicate personal electronic devices, such as cell phones and tablets, are among the greatest contributors to driver distraction.

Hands-free is not risk free. Using a device hands-free does not reduce driver distraction; in fact, drivers are still distracted by the conversation—this is called "cognitive distraction."

Many drivers believe they can multitask and still operate a vehicle safely. But multitasking is a myth. Humans can only focus cognitive attention on one task at a time. That's why the driving task should be a driver's sole focus.

Distracted driving is widespread, killing thousands and injuring hundreds of thousands in the United States every year. States are making some progress addressing this public health problem, but no state has implemented our recommendation calling for a ban on the use of all personal electronic devices while driving except in the case of emergency. Today, 24 states and the District of Columbia prohibit drivers of all ages from using handheld cell phones while driving. Forty-eight states and the District of Columbia have an all-driver text messaging restriction. However, Missouri and Montana have yet to adopt an all-driver text messaging ban, and drivers in Nebraska and Ohio are subject only to secondary enforcement. Thirty-seven states and the District of Columbia restrict the use of cell phones by novice drivers.

Improve Passenger and Fishing Vessel Safety

Passenger and fishing vessels present distinct safety challenges within the marine transportation industry.

Passenger Vessels

Passenger vessels range in size from small charter vessels, such as dive boats and amphibious passenger vessels (DUKW boats or "duck boats") to large cruise ships operating in international waters. The number of passengers and crew on these types of vessels varies.

Fires pose a catastrophic threat to small passenger vessels, as we saw in the Conception dive boat fire off the coast of California in which 34 people died. Our investigations have revealed that crew training and safety regulations for these vessels vary, increasing the risk to passengers and crew.

To prevent needless deaths and mitigate injuries, passenger vessels should have SMSs, use voyage data recorders, and provide adequate fire-detection and extinguishing systems and enhanced emergency egress options. Operators need to ensure that their crews have enhanced training that includes fire drills and firefighting techniques. We also need to see more roving patrols on our waterways to ensure that passengers are being transported safely.

Commercial Fishing

The domestic commercial fishing industry, which remains largely uninspected, is another marine sector of concern. Fishing consistently tops the list of most deadly occupations, due, in large part, to challenging work environments, such as poor weather and rough waters. These conditions threaten vessel stability and integrity– issues we have seen in our investigations.

We need new standards to address–and periodically reassess–intact stability, subdivision, and watertight integrity in commercial fishing vessels up to 79 feet long. More than 800 fatalities have occurred on fishing vessels in the past two decades, yet many fishing crews still aren't trained in stability management techniques or emergency response. Equally concerning, we have found that many vessels do not carry proper life-saving equipment, such as flotation and search and-rescue locator devices, on board. The US Coast Guard can improve safety on both passenger and fishing vessels by implementing our recommendations.

Improve Pipeline Leak Detection and Mitigation

All pipelines leak. Leak-detection and mitigation tools are essential and can make the difference between a minor incident and a deadly explosion. Pipeline systems equipped with leak-detection systems and automatic shutoff

valves, or remote-control valves, can warn operators of an imminent accident and allow for quick mitigation.

The NTSB first identified the need for leak-detection and mitigation methods in natural gas transmission and distribution pipelines nearly 50 years ago, but the PHMSA has yet to require operators to use these life-saving measures, and many operators won't act without regulation.

Placing service regulators outside buildings is another mitigation tool. Yet many older homes and multifamily structures still have regulators inside, which can trap accumulating gas and lead to an explosion. Methane detection also helps mitigate consequences by alerting the public to natural gas leaks, thereby minimizing public exposure. Every day we wait to enhance our mitigation systems is a day we put the public in danger.

Improve Rail Worker Safety

Too many people working on or around railroad tracks, such as train crews, maintenance-of-way employees, and mechanical workers, have been killed or injured in accidents involving train or equipment movement. Many of these workers were conducting routine maintenance or switching operations when they were struck.

Roadway workers—those who protect the track—are being killed in preventable accidents, such as those involving the use of train-approach warning systems. These systems are vulnerable to human errors, such as miscalculating site distance and underestimating the time needed for workers to clear tracks. They lack safety redundancy and should not be used as the primary form of worker protection. Without proper warning, workers may not have enough time to react to an oncoming train. The FRA and the FTA need to require railroads to implement technology to provide safety redundancy. Industry must also improve roadway worker training and scheduling practices and develop and routinely audit procedures for delivering job briefings. Watchmen, or lookouts, should also receive proper training and the required equipment. To prevent fatigue, railroads and transit agencies must develop work schedules and limitations based on science. The FRA's Roadway Worker Protection Regulations, issued in 1997, are inadequate, and the FTA needs to establish specific regulations for roadway workers.

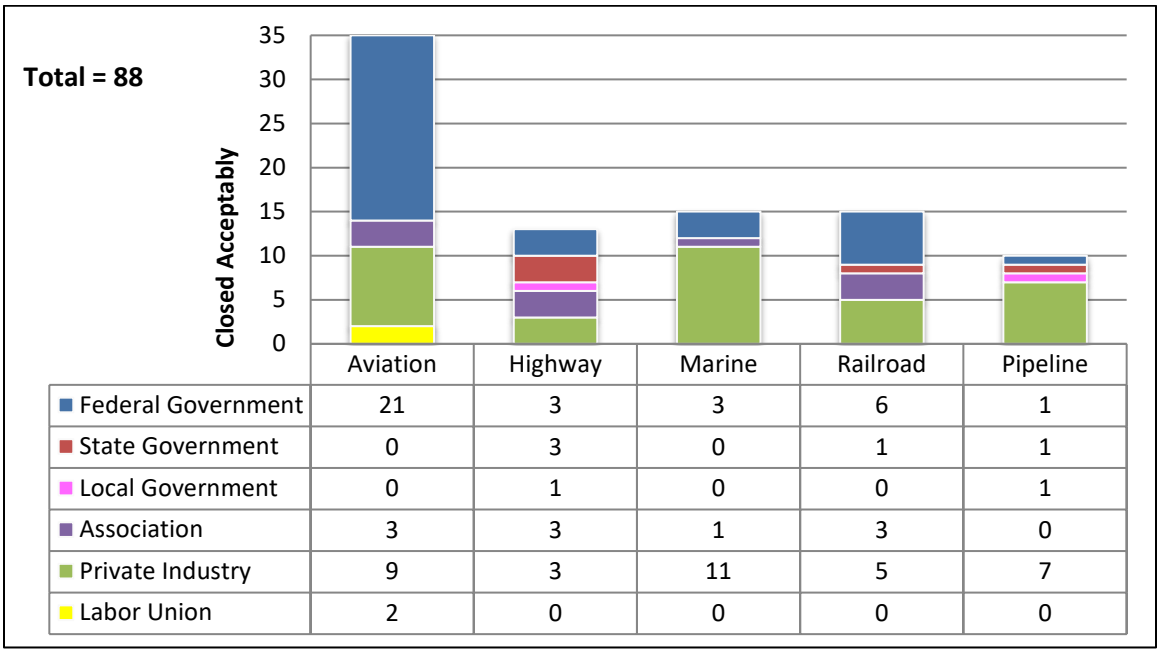
Operations crews and mechanical workers have also been at risk of injury in preventable accidents because of inadequate separation between train crews and rail cars carrying hazardous materials. Although PHMSA requires buffer cars, the distance the agency established is too short and threatens safety. Railroads should be required to implement a minimum of five cars as a buffer between train crews and highly hazardous flammable materials.

PHMSA must issue a regulation on the appropriate separation distance for keeping train crews safe.

APPENDIX D: STATUS OF SAFETY RECOMMENDATIONS

Recommendations Closed

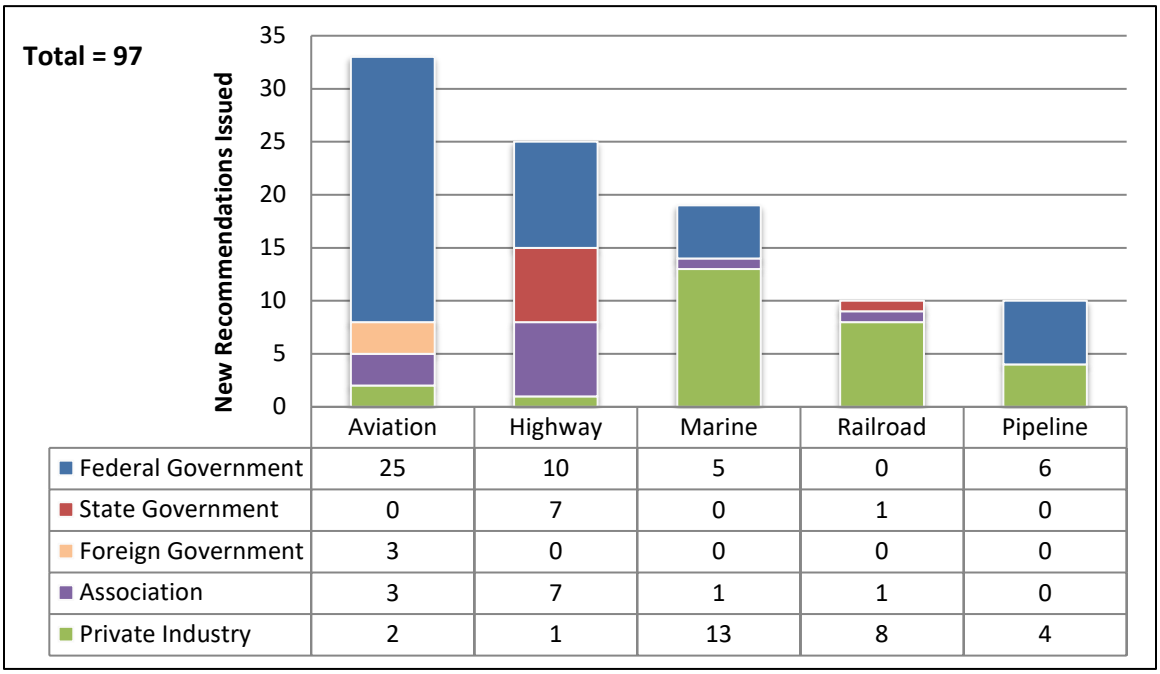
The chart below shows the distribution by transportation mode (aviation, highway, marine, railroad, pipeline) and recipient type (federal government, state government, local government, foreign government, association, private industry, labor union) of the 88 NTSB safety recommendations closed *Acceptable* from October 1, 2021, through September 30, 2022.



	Aviation	Highway	Marine	Railroad	Pipeline
Federal Government	21	3	3	6	1
State Government	0	3	0	1	1
Local Government	0	1	0	0	1
Association	3	3	1	3	0
Private Industry	9	3	11	5	7
Labor Union	2	0	0	0	0

New Recommendations Issued

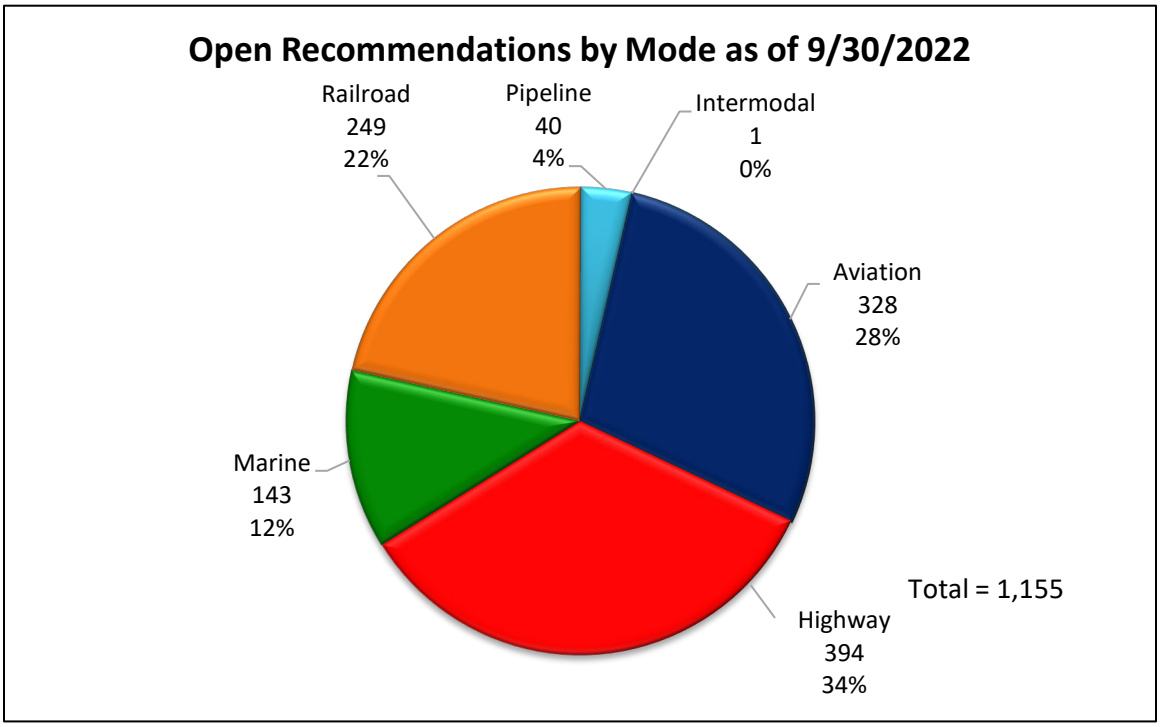
The chart below shows the distribution by transportation mode (aviation, highway, marine, railroad, pipeline) and recipient type (federal government, state government, local government, foreign government, association, private industry, labor union) of the 97 safety recommendations issued by the NTSB from October 1, 2021, through September 30, 2022.



	Aviation	Highway	Marine	Railroad	Pipeline
Federal Government	25	10	5	0	6
State Government	0	7	0	1	0
Foreign Government	3	0	0	0	0
Association	3	7	1	1	0
Private Industry	2	1	13	8	4

Open Recommendations

The chart below displays the distribution by transportation mode of the 1,155 safety recommendations open as of September 30, 2022.



APPENDIX E: TRANSPORTATION DISASTER ASSISTANCE

Significant Activities in FY 2022

Transportation Disaster Assistance Support for Accident Investigations

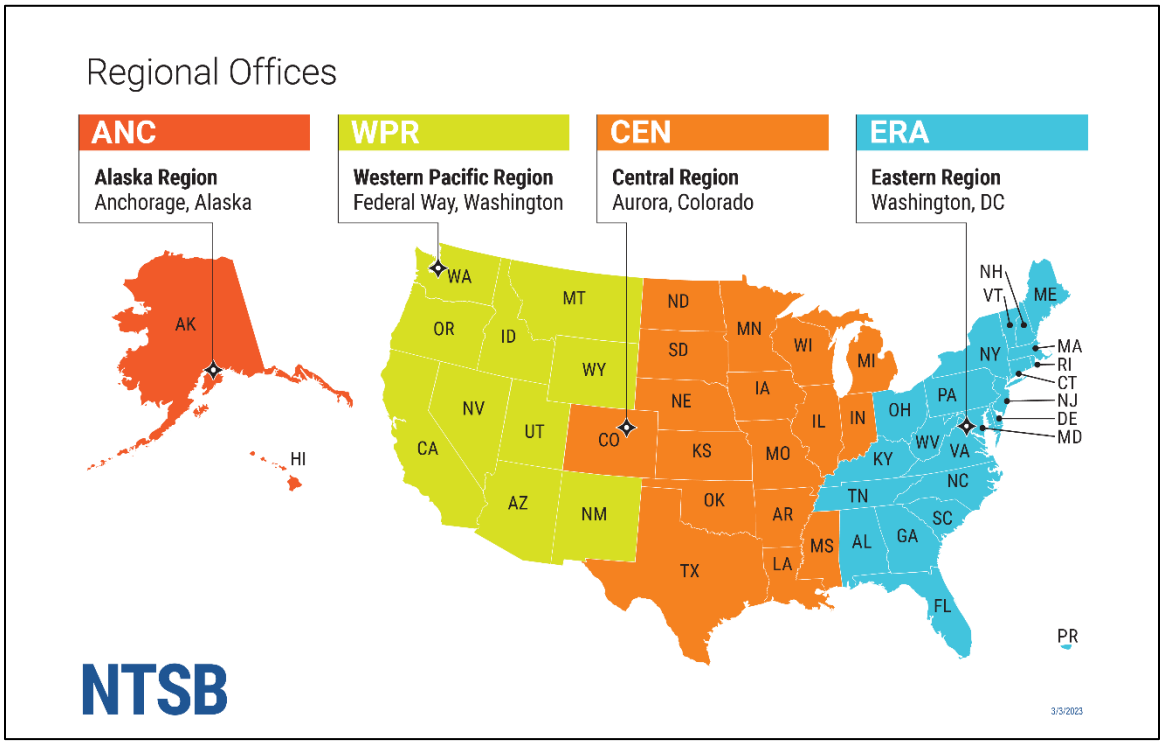
Offering information and disaster assistance services to 3,446 accident survivors, family members, and family contacts associated with NTSB investigations:

Launches:	**7**
Aviation Safety	2
Marine Safety	0
Highway Safety	4
Rail Safety	1
Other investigations supported:	**847**
Domestic aviation accidents	755
International aviation accidents	12
Rail accidents	38
Highway accidents	29
Pipeline accidents	3
Marine accidents	10

Division Outreach and Training Activities

- Staff participated in 80 outreach events, resulting in direct contact with 4,661 participants; additionally, staff responded to inquiries from 342 agencies and organizations.
- Staff supported several ICAO initiatives to promote family assistance programs among contracting States. In FY 2022, Transportation Disaster Assistance staff collaborated with the ICAO Global Aviation Training Section to develop a 3-day family assistance training course. Staff also participated in ICAO's Symposium on Assistance to Aircraft Accident Victims and their Families Family Assistance Symposium. Staff also organized a meeting hosted by ICAO's Facilitation Section during the 41st Assembly to enhance collaboration amongst various stakeholders engaged in victim and family assistance. To support individual country efforts to build or enhance family assistance programs, Transportation Disaster Assistance staff continued to offer gratis seats in the agency's family assistance course to representatives of ICAO-contracting States.
- Staff continue to engage in a collaborative effort to enhance the agency's Employee Assistance, Critical Incident Stress Awareness, and Peer Support Programs.

APPENDIX F: AVIATION SAFETY REGIONAL OFFICES



	Alaska Region	Western Pacific Region	Central Region	Eastern Region
Coverage Area	Alaska, Hawaii	Montana, Idaho, Utah, Arizona, Nevada, Washington, Oregon, California, Wyoming, and New Mexico, as well as the territories of Guam, American Samoa, and Northern Mariana Islands	Michigan, Indiana, Wisconsin, Illinois, Minnesota, Iowa, Missouri, Arkansas, Louisiana, Mississippi, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, and Colorado	Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Ohio, Pennsylvania, Maryland, Delaware, Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Alabama, Georgia, and Florida, as well as the District of Columbia, Puerto Rico, and the US Virgin Islands

APPENDIX G: HISTORICAL INFORMATION

NTSB Salaries and Expenses Funding History (in millions)

FY	Amount
2000*	$56.8
2001*	$62.8
2002*	$67.9
2003*	$72.0
2004*	$73.1
2005*	$76.1
2006*	$75.9
2007	$79.3
2008	$84.4
2009	$91.0
2010	$98.0
2011*	$97.8
2012	$102.4
2013*	$97.0
2014	$103.0
2015	$104.0
2016	$105.2
2017	$106.0
2018	$110.4
2019	$110.4
2020	$110.4
2021	$118.4
2022	$121.4

* Includes across-the-board rescissions

Current Board Members

Name	Board Title	Appointment	Term Expiration
Jennifer Homendy	Chair	August 11, 2021	August 10, 2024[1]
Bruce Landsberg	Vice Chair	July 25, 2018	December 31, 2022
Michael Graham	Member	December 19, 2019	December 31, 2025
Thomas B. Chapman	Member	December 19, 2019	December 31, 2023

[1] Chair Homendy's term as a Board member ends December 31, 2024

Under Title 49 *U.S.C.* section 1111(d), when the term of office of a Board member ends, the member may continue to serve until a successor begins service as a Board member.

Emergency Fund Activity

Fiscal Year	Appropriations (Rescissions)	Obligation Activity	Balance	Purpose/Source
2000			$2,000,000	No Activity
2001			$2,000,000	No Activity
2002		$491,687	$1,508,313	Extraordinary costs related to the crash of American Airlines Flight 587 at Belle Harbor, New York
2003		$4,914	$1,503,399	Adjustment of FY 2002 Obligations
2004		($138,000)	$1,641,399	Adjustment of FY 2002 Obligations
2004	$358,601		$2,000,000	Appropriation (P.L. 108-199)
2004	($2,116)		$1,997,884	Rescission (P.L. 108-199)
2005			$1,997,884	No activity
2006			$1,997,884	No activity
2007			$1,997,884	No activity
2008			$1,997,884	No activity
2009			$1,997,884	No activity
2010			$1,997,884	No activity
2011			$1,997,884	No activity
2012			$1,997,884	No activity
2013			$1,997,884	No activity
2014			$1,997,884	No activity
2015			$1,997,884	No activity
2016			$1,997,884	No activity
2017			$1,997,884	No activity
2018			$1,997,884	No activity
2019			$1,997,884	No activity
2020			$1,997,884	No activity
2021			$1,997,884	No activity
2022			$1,997,884	No activity

Training Center Costs and Revenues

	FY 2020	FY 2021	FY 2022
Earned revenue	$681,560	$657,679	$303,250
Subleases	$0	$0	$0
Total revenue	$681,560	$657,679	$303,250
Costs:			
Pay	$640,512	$749,148	$838,342
Travel	$8,184	$822	$13,719
Contracts	$116,360	$68,650	$92,589
Supplies	$11,004	$299	$1,855
Equipment	$0	$187	$9
Costs before space rental	$776,060	$819,106	$946,505
Space rental	$2,653,865	$2,658,650	$2,695,851
Total operating costs	$3,429,925	$3,477,756	$3,642,356
Deficit	$2,748,365	$2,820,077	$3,339,106

International Investigations

Total International Accident Investigation Costs by Fiscal Year 2012 - 2022*

FY	Costs
2012 (a)	$1,641,132
2013 (b)	$2,366,274
2014 (c)	$976,642
2015 (d)	$1,838,241
2016 (e)	$1,664,764
2017 (f)	$826,248
2018 (g)	$902,981
2019 (h)	$2,126,327
2020	$632,682
2021	$935,571
2022	$895,787

* Since the beginning of FY 2012, the agency has been able to capture both payroll and other directs costs (such as travel) through its cost accounting systems. The totals above reflect these costs.

(a) Includes $149,707 billed to the Department of Transportation (DOT) under the Safe Skies for Africa (SSA) Program.
(b) Includes $42,727 billed to the DOT under the SSA Program.
(c) Includes $64,897 billed to the DOT under the SSA Program.
(d) Includes $120,026 billed to the DOT under the SSA Program.
(e) Includes $138,115 billed to the DOT under the SSA Program.
(f) Includes $35,146 billed to the DOT under the SSA Program.
(g) Includes $88,300 billed to the DOT under the SSA Program.
(h) Includes $22,785 billed to the DOT under the SSA Program.

FY 2022 Investigation Costs by Accident*

Description	Location	Amount
A China Eastern Airlines Boeing 737-800 made impact with terrain from cruise flight.	Wuzhou, China	$ 205,489
An aircraft experienced hydraulic issues shortly after takeoff and impacted rocky terrain.	Santo Domingo, Dominican Republic	$ 170,143
A Sriwijaya Air #182 B737-500 crashed into Jakarta Bay after rapid descent several minutes after takeoff.	Jakarta, Indonesia	$ 73,224
A Sikorsky S61 loss control during landing.	Camp Dwyer, Afghanistan	$ 48,766
A Boeing 757 experienced a runway excursion during landing roll after hydraulic failure.	San Jose, Costa Rica	$ 44,474
A helicopter crashed into the road shutting down the highway.	Nuevo Laredo, Mexico	$ 37,371
An aircraft made impact with water for undetermined reasons.	Whistler, Canada	$ 22,992
Air France Flight AF011 suffered serious control issues during a go around at Paris-CDG Airport.	Paris, France	$ 21,273
An aircraft had a flight control computer anomaly.	Los Mochis, Mexico	$ 19,868
An aircraft experienced No. 1 engine failure/in-flight shutdown (IFSD) during climb to cruise.	Shymkent, Kazakhstan	$ 17,812
A Korea Coast Guard Sikorsky S-92 helicopter crashed at night in the sea shortly after takeoff.	Jeju Island, South Korea	$ 17,698
A helicopter impacted rocky terrain under unknown circumstances.	Windhoek, Namibia	$ 15,000
A fire explosion occurred.	Cockburn Town, Tokelau	$ 14,290
A Busy Bee Congo Dornier D228 (Unknown Flight #) 9S-GNH, crashed into populated area under unknown circumstances shortly after takeoff.	Gomo, Congo	$ 13,858
An aircraft experienced total loss of engine power.	Okuwa, Japan	$ 13,637

Description	Location	Amount
A Delta Airlines Airbus A319-100 rejected takeoff caused by failure engine no. 2 on runway 05L/23R and runway excursion.	Mexico City, Mexico	$ 12,420
After touch down, Dual Engine Fail Master Warning came on, and both engines stopped by themselves.	Copenhagen, Denmark	$ 10,284
A US flagged yacht collided with the stern of the tank ship causing the tank ship to sink.	Nassau, Bahamas	$ 9,156
A Boeing 747 experienced engine fire on initial climb out.	Hone Kong, China	$ 9,047
An aircraft experienced inflight engine shutdown, with diversion and emergency landing.	Shannon, Ireland	$ 8,919
During cruise "Fuel disagree" sign illuminated which led to engine shut down.	Vogo, India	$ 8,079
After takeoff, a bird struck the left engine of an airbus causing an engine fire.	Villahermosa, Mexico	$ 8,027
After landing the aircraft exited the runway and entered unpaved surface causing damage to wing and landing gear.	Vijayanagar, India	$ 7,841
A helicopter fell into the sea while trying to land and received substantial damage.	Mumbai, India	$ 7,733
After completing parachute operations, the aircraft sustained an uncontained engine failure, and the pilot conducted a forced landing.	Moruya, Australia	$ 7,178
An aircraft experienced No. 1 engine failure/IFSD.	Mexico City, Mexico	$ 7,069
An aircraft experienced powerplant system failure during en route clime to cruise.	Monts De Lam, Chad	$ 6,922
Aircraft was found in a forest and appeared to have crashed landed with a post fire on impact.	Eswatini, South Africa	$ 6,844
The aircraft experienced failure of main gearbox oil pump.	North Sea, Norway	$ 6,831

Description	Location	Amount
A Cessna 525 aircraft developed a mechanical failure shortly after departure and suffered a runway excursion after returning to land.	El Yaque, Venezuela	$ 6,500
An Airbus experienced enroute-change of cruise level which led to low pressure compressor separation, IFSD.	Paris, France	$ 6,429
An aircraft crashed after experiencing problems in both engines.	Temixco, Mexico	$ 5,342
An aircraft experienced powerplant system failure during enroute climb to cruise.	Naha, Japan	$ 5,182
An aircraft experience fuel starvation.	Sevilla, Spain	$ 5,067
During an aircraft flare, the commander decided to initiate a go-around. One thrust reverser inadvertently deployed leading to controllability problems.	Copenhagen, Denmark	$ 5,014
While enroute, the aircraft experienced failure to the right-hand engine.	Karachi, Pakistan	$ 5,005
While maneuvering to land, helicopter collided with terrain.	Evansburg, Canada	$ 5,004
Grand Total		**$ 895,788**

* Note: Report includes accidents, whether occurring in the current year or previously, with more than $5,000 in FY 2022 expenses and is cumulative through September 30, 2022. Costs include payroll as well as travel and other direct costs.

Status of Action by State and the District of Columbia for Motor Vehicle Safety Recommendations

State	Child Passenger Safety	Primary Seat Belt Enforcement	Passenger Restriction[a]	Cell Phone	Ignition Interlock	Motorcycle Helmets
Alabama	Partial	Partial	Yes	Partial	Yes	Partial
Alaska	Yes	Yes	Yes	Partial	Yes	
Arizona	Yes		Partial	Partial	Yes	
Arkansas	Partial	Partial	Yes	Partial	Yes	
California	Yes	Yes	Yes	Partial		Yes
Colorado	Yes		Yes	Partial	Yes	
Connecticut	Yes	Partial	Yes	Partial	Yes	
Delaware	Yes	Yes	Yes	Partial	Yes	
District of Columbia	Yes	Yes	Yes	Partial	Yes	Partial
Florida	Partial	Partial		Partial		
Georgia	Yes	Partial	Yes	Partial		Yes
Hawaii	Yes	Yes	Partial	Partial	Yes	
Idaho	Partial		Partial	Partial	Yes	
Illinois	Yes	Yes	Yes	Partial	Yes	
Indiana	Yes	Yes	Yes	Partial		
Iowa	Partial	Partial		Partial	Yes	
Kansas	Yes	Yes	Partial	Partial	Yes	
Kentucky	Yes	Yes	Yes	Partial	Yes	
Louisiana	Yes	Yes	Partial	Partial	Yes	Yes
Maine	Yes	Yes	Yes	Partial		
Maryland	Yes	Yes	Partial	Partial	Yes	Yes
Massachusetts	Yes		Partial	Partial		Yes
Michigan	Yes	Partial	Yes	Partial		
Minnesota	Yes	Yes	Yes	Partial		
Mississippi	Yes	Yes		Partial	Yes	Partial
Missouri	Yes		Partial	Partial	Yes	
Montana	Partial		Partial			
Nebraska	Yes		Partial	Partial	Yes	Yes
Nevada	Yes		Partial	Partial		Yes
New Hampshire	Partial		Yes	Partial	Yes	
New Jersey	Yes	Yes	Yes	Partial	Yes	Yes
New Mexico	Partial	Yes	Yes	Partial	Yes	
New York	Yes	Yes	Yes	Partial	Yes	Yes
North Carolina	Yes	Yes	Yes	Partial		Yes
North Dakota	Yes			Partial		
Ohio	Yes		Yes	Partial		
Oklahoma	Yes	Partial	Yes	Partial	Yes	
Oregon	Yes	Yes	Yes	Partial	Yes	Yes

State	Child Passenger Safety	Primary Seat Belt Enforcement	Passenger Restriction[a]	Cell Phone	Ignition Interlock	Motorcycle Helmets
Pennsylvania	Yes		Partial	Partial		
Rhode Island	Yes	Yes	Yes	Partial		
South Carolina	Yes	Yes	Partial	Partial		
South Dakota				Partial		
Tennessee	Yes	Partial	Yes	Partial	Yes	Yes
Texas	Yes	Yes	Yes	Partial	Yes	
Utah	Yes	Yes	Yes	Partial	Yes	
Vermont	Yes		Yes	Partial	Yes	Yes
Virginia	Yes		Yes	Partial	Yes	Partial
Washington	Yes	Yes	Yes	Partial	Yes	Yes
West Virginia	Yes	Yes	Yes	Partial	Yes	Yes
Wisconsin	Yes	Yes	Yes	Partial		
Wyoming	Yes		Partial	Partial		
Total	Yes = 41 + DC Partial = 8	Yes = 25 + DC Partial = 9	Yes = 31 + DC Partial = 14	Yes = 0 Partial = 49 + DC	Yes = 31 + DC	Yes = 15 Partial = 3 + DC

(a) "Restriction" refers to drivers in the intermediate (also referred to as provisional, or second) stage. Unless accompanied by a supervising driver who is at least 21 years old, these drivers are limited to no more than one passenger under age 20, family excepted, until they receive an unrestricted license or for at least 6 months.

NTSB | National Transportation Safety Board

The NTSB is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, highway, pipeline, and commercial space. We determine the probable cause of the accidents and crashes we investigate, and issue safety recommendations aimed at preventing future occurrences of accidents. For more information, visit **www.ntsb.gov**

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