National Transportation Safety Board

Fiscal Year 2023 Budget Request

National Transportation Safety Board

Office of the Chair

Washington, DC 20594

March 28, 2022

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

The Honorable Nancy Pelosi
Speaker
United States House of Representatives
Washington, DC 20515

Dear Madam President and Madam Speaker:

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, highways and transit, marine, pipeline, and commercial space. We determine the probable cause of the accidents we investigate and issue safety recommendations aimed at preventing future accidents. In addition, we carry out 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. Additionally, we 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 we also adjudicate appeals of civil penalty actions taken by the FAA.

The enclosed budget submission reflects the President's request of $129.3 million for fiscal year (FY) 2023. This funding level is an increase of $7.9 million from the FY 2022 Budget Request of $121.4 million and funds 425 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 approximately 71 percent of our expenses. Pay raises and increases in agency contributions to benefits, such as retirement, have significantly driven up personnel expenses, so we appreciate the recognition given to meet these needs through the $7.9 million increase above the FY 2022 President's Budget Request. 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, in addition to a host of other critical activities.

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 $129.3 million provides sustained support of this mission.

Sincerely,

Jennifer Homendy
Chair

Enclosures

cc: The Honorable David Price
Chairman
Subcommittee on Transportation, and Housing and
Urban Development, and Related Agencies
Committee on Appropriations
US House of Representatives

The Honorable Mario Diaz-Balart
Ranking Member
Subcommittee on Transportation, and Housing and
Urban Development, and Related Agencies
Committee on Appropriations
US House of Representatives

The Honorable Brian Schatz
Chairman
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 2023
Budget Request

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

CONTENTS

ABBREVIATIONS, ACRONYMS, AND INITIALISMS

ADS-B	automatic dependent surveillance—broadcast
ASOS	automated surface observing system
ATB	articulated tug and barge
AWOS	automated weather observing system
ARTP	Aviation Report Timeliness Project
CA	Canada
CAROL	Case Analysis and Reporting OnLine
CFR	*Code of Federal Regulations*
CIDER	Crash Investigation Data Extraction and Readout
COOP	Continuity of Operations Program
COVID-19	Coronavirus Disease 2019
CSX	CSX Transportation
CVR	cockpit voice recorder
DOT	US Department of Transportation
DREAM	Data Recorders, Electronics, and Analysis Management tool
DUKW	“duck” boat; a large amphibious vehicle
EEO	Equal Employment Opportunity
Evidence Act	Evidence-Based Policymaking Act of 2018
FAA	Federal Aviation Administration
FDR	flight data recorder
FISMA	Federal Information Security Management Act
FOIA	Freedom of Information Act
FRA	Federal Railroad Administration

FTA	Federal Transit Administration
FTE	full-time equivalent
FV	fishing vessel
FY	fiscal year
GSA	General Services Administration
ICAO	International Civil Aviation Organization
IIC	investigator-in-charge
IMO	International Maritime Organization
IT	information technology
ITV	integrated towing vessel
LR	Liberia
MAIIF	Marine Accident Investigators' International Forum
MEDICS	Medical Information Catalog System
MH	Marshall Island
mph	miles per hour
MT	Malta
MV	motor vessel
MWL	Most Wanted List of Transportation Safety Improvements
NHTSA	National Highway Transportation Safety Administration
NO	Norway
NOTAM	Notice to Airmen
NTSB	National Transportation Safety Board
OMB	Office of Management and Budget
PG&E	Pacific Gas & Electric Company

SAFTI	System for Analysis of Federal Transportation Investigations
SES	Senior Executive Service
SL	senior level
SMS	safety management system
SSA	Safe Skies for Africa
SSD	Systems Support Division
sUAS	small unmanned aircraft system
SUV	sport utility vehicle
ST	scientific and professional
TV	towing vessel
UAS	unmanned aircraft system
U.S.C.	*United States Code*
VC	St. Vincent and Grenadines
VRU	vulnerable road user

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, highways and transit, marine, pipeline, and commercial space. We determine the probable cause of the accidents we investigate and issue safety recommendations aimed at preventing future accidents. In addition, we carry out 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. Additionally, we 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 also adjudicate appeals of civil penalty actions taken by the FAA.

The enclosed budget submission reflects the President's request of $129.3 million for fiscal year (FY) 2023. This funding level is an increase of $7.9 million from the FY 2022 Budget Request of $121.4 million and funds 425 full-time equivalent (FTE) positions.

The NTSB's mission of improving transportation safety is dependent on a sufficient 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 $7.9 million increase in funding is beneficial to the agency as we strive to achieve and sustain staffing levels that fully support our mission and strategic goals. Pay raises and increases to the government's share of personnel benefits contributions will continue to have a substantial impact on us, in addition to the cross-agency workload requirements contained in the NTSB Reauthorization Act of 2018 and the pending NTSB Reauthorization Act. The requested funding increase will provide for modest progress toward achieving full staffing levels.

Accomplishing our mission also depends upon improving the quality, quantity, and usefulness of investigation-related data and having secure information technology (IT) systems to maximize performance. Funding increases in recent years enabled system development that fostered our data initiatives and enhanced our ability to investigate accidents involving emerging transportation technologies. Continued funding is required for additional IT development and modernization to keep pace with continuing advances in technology, as well as for strengthening our cybersecurity efforts so we can protect against, detect, identify, deter, and respond to persistent and increasingly sophisticated malicious cyber campaigns. Our investigators also need the capability to identify cyber elements in their vehicle systems analyses, so additional resources are required for this area, as well.

The agency made extensive progress in improving its investigation-related data systems during FY 2021. Current investigation data from all the modes are now maintained in the System for Analysis of Federal Transportation Investigations (SAFTI). We have also integrated SAFTI with the safety recommendation information currently maintained in a separate database and developed a robust search tool to provide the public with a more comprehensive view of our investigation data, safety recommendations, and dockets. Efforts now turn to expanding tools to analyze our safety data and to improve our investigative processes. To effectively conduct

our investigations and share information with the public and other stakeholders, we require resources to fully optimize SAFTI, enhance our data analytics capabilities, and upgrade and consolidate internal systems, such as the docket management application.

The coronavirus disease 2019 (COVID-19) pandemic that necessitated a nationwide lockdown beginning in March 2020, and government-wide maximum telework since then, has affected all offices and divisions of the NTSB. Over the past two years, the agency has adjusted as needed, continuing operations despite the many challenges the pandemic posed. Although travel was somewhat limited throughout much of FY 2021, we continued to investigate accidents and to achieve our mission—even making improvements to our systems and processes—during a most difficult time.

This budget request submission highlights some of our many accomplishments achieved in FY 2021. These accomplishments include the completion of accident investigation reports, accident briefs, and safety recommendation reports, and our involvement in international investigations. Our submission also underscores our efforts in advocating for adoption of our recommendations and discusses our continued emphasis on emerging transportation technologies, including unmanned aircraft systems (drones), automated vehicles, alternatively fueled vehicles, and commercial space. Achievements throughout all offices of the agency demonstrate our commitment to furthering transportation safety during FY 2021 despite the impacts of the COVID-19 pandemic.

As an agency, we are excited to invest our provided resources in the employees and systems that allow the NTSB to constantly work to improve transportation safety for the American people.

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 accidents.
- Railroad accidents involving passenger trains and select 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.

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 further assigned the NTSB the 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 (49 *U.S.C.* § 1139). In 2018, the agency's family assistance responsibilities expanded as a result of our reauthorization, 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 in advance of the media (49 *U.S.C.* § 1140). Currently, the primary focus of agency efforts is to ensure compliance for accidents involving fatalities.

To date, the NTSB has investigated nearly 152,000 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 perform investigations. Because of this dedication, we are recognized as the world's leading accident investigation agency.

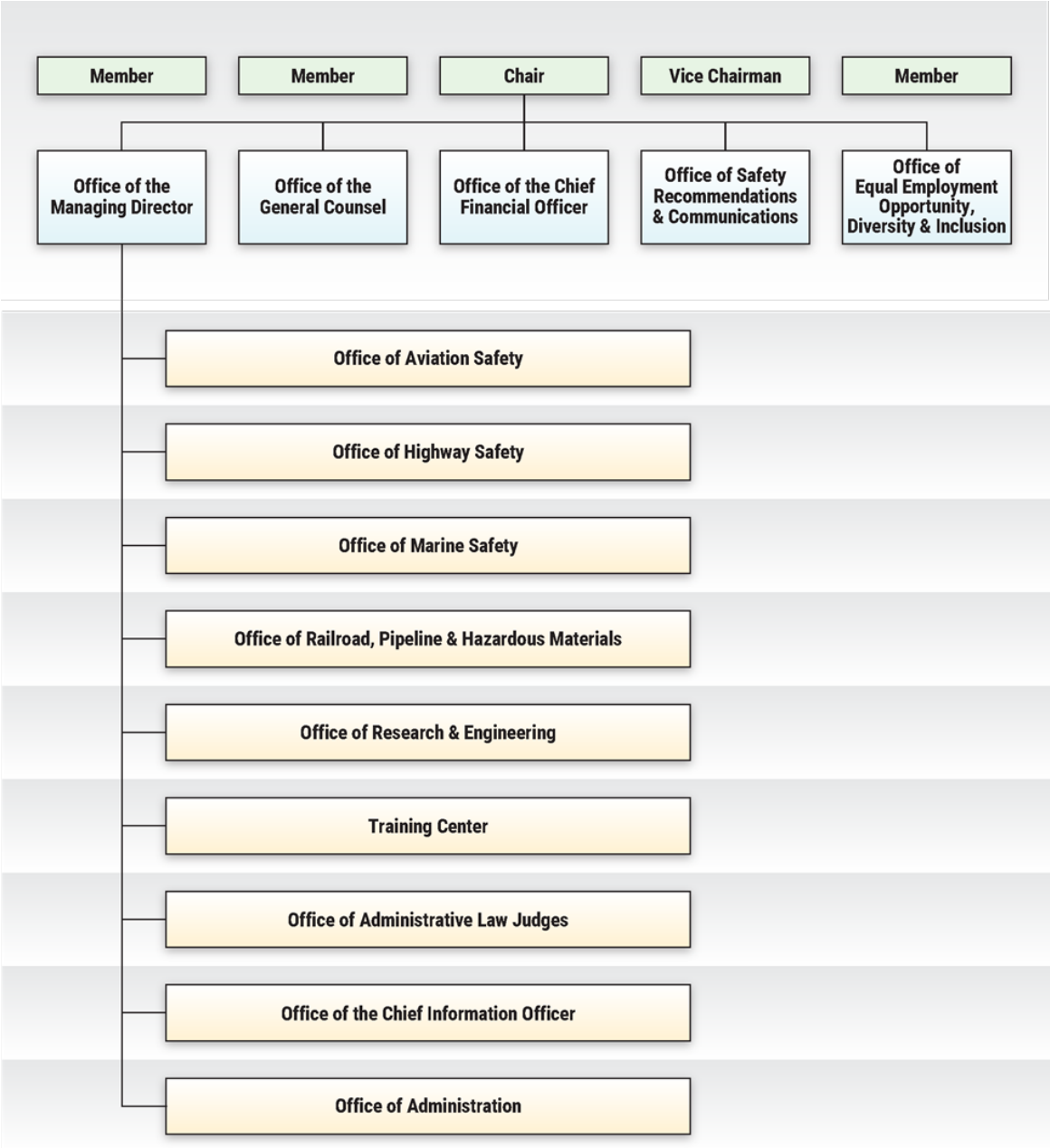
We have issued over 15,250 safety recommendations resulting from NTSB investigations to more than 2,450 recipients in all transportation modes. Since 1990, we have published the Most Wanted List (MWL) of Transportation Safety Improvements, highlighting safety-critical actions that the DOT modal administrations, the Coast Guard, the states, and other entities should take to help prevent accidents, minimize injuries, and save lives. Further information concerning the MWL appears in Appendix A.

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, and marine vessels, in addition to numerous operational safety measures, had their genesis in NTSB safety recommendations. Further information concerning the status of our safety recommendations appears in Appendix B.

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 of the NTSB. The president designates another of the members as vice chairman.

The NTSB is headquartered in Washington, DC. We also have investigators located in offices in Ashburn, Virginia; Denver, Colorado; Anchorage, Alaska; and Federal Way, Washington; as well as investigators located throughout the country who telework. The NTSB's training center is in Ashburn, Virginia.

Organization and Program Structure



RESOURCE REQUIREMENTS

Appropriations Language

Salaries and Expenses – 950310

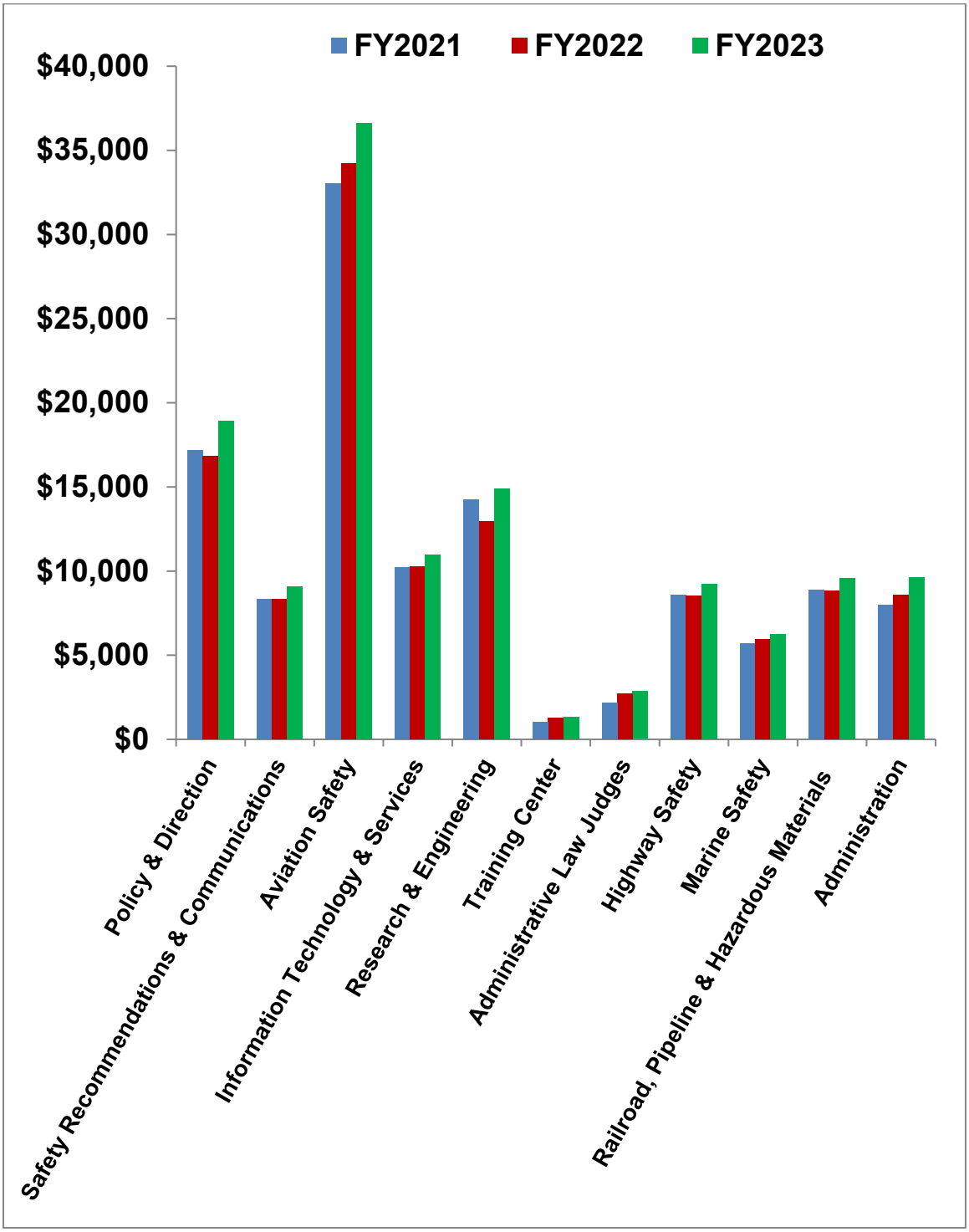
"For necessary expenses of the National Transportation Safety Board, including hire of passenger motor vehicles and aircraft*;* services as authorized by 5 *U.S.C.* 3109, but at rates for individuals not to exceed the per diem rate equivalent to the rate for a GS-15; uniforms or allowances therefor, as authorized by law (5 *U.S.C.* 5901-5902), *$129,300,000* of which not to exceed $2,000 may be used for official reception and representation expenses. The amounts made available to the National Transportation Safety Board in this Act include amounts necessary to make lease payments on an obligation incurred in FY 2001 for a capital lease."

Emergency Fund – 950311

No new funding is being requested for the Emergency Fund in FY 2023.

NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Obligations by Program Activity ($000s)



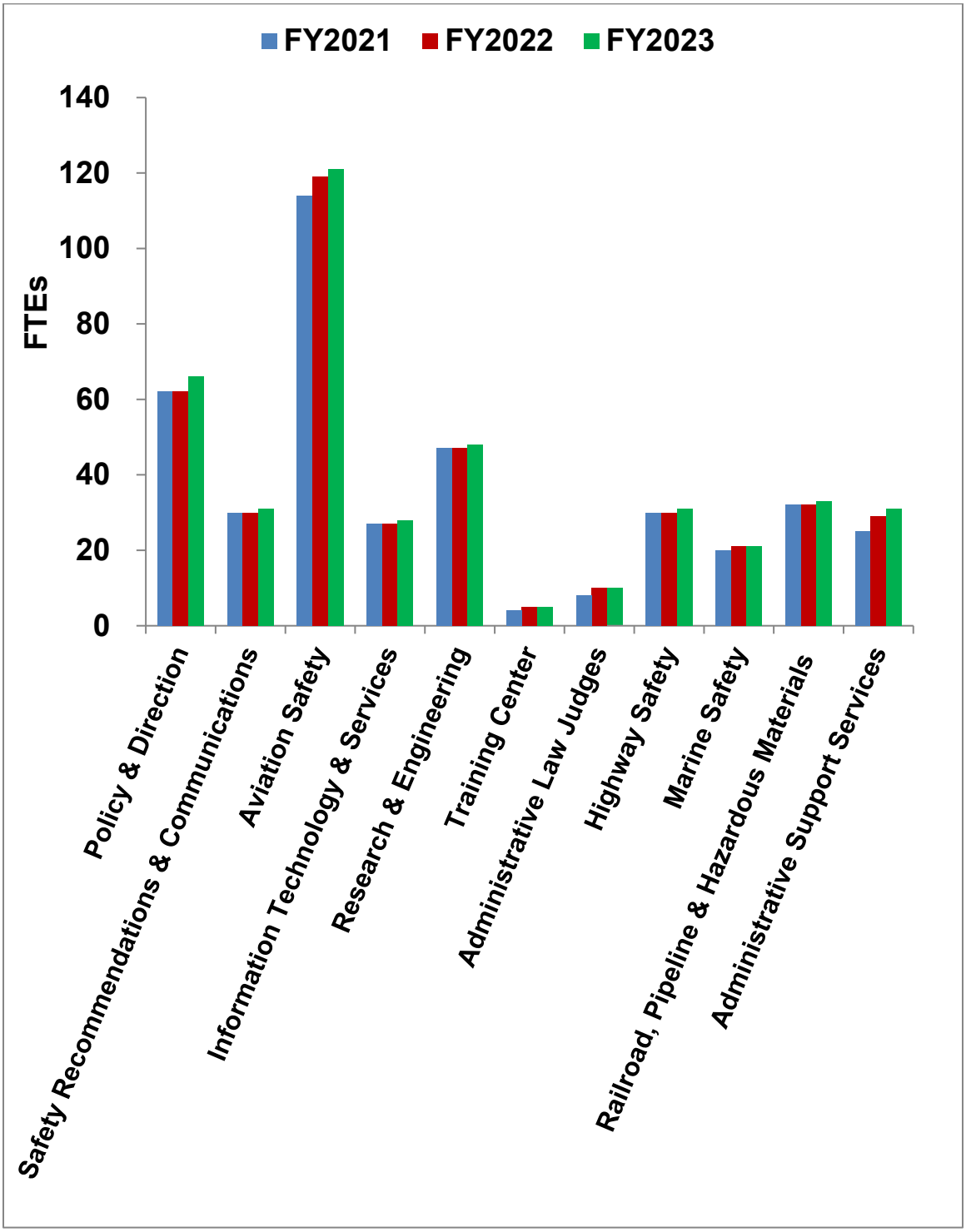
NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Obligations by Program Activity ($000s)

Identification Code: 95-0310-0-1-407	FY2021	FY2022	FY2023
Policy and Direction	17,185	16,844	18,906
Safety Recommendations & Communications	8,311	8,318	9,061
Aviation Safety	33,049	34,212	36,591
Information Technology & Services	10,239	10,280	10,978
Research & Engineering	14,252	12,974	14,875
Training Center	995	1,260	1,335
Administrative Law Judges	2,168	2,703	2,854
Highway Safety	8,570	8,499	9,242
Marine Safety	5,702	5,933	6,250
Railroad, Pipeline & Hazardous Materials Investigations	8,858	8,808	9,582
Administration	7,997	8,568	9,626
Total	117,325	118,400	129,300

NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Staffing by Program Activity



NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

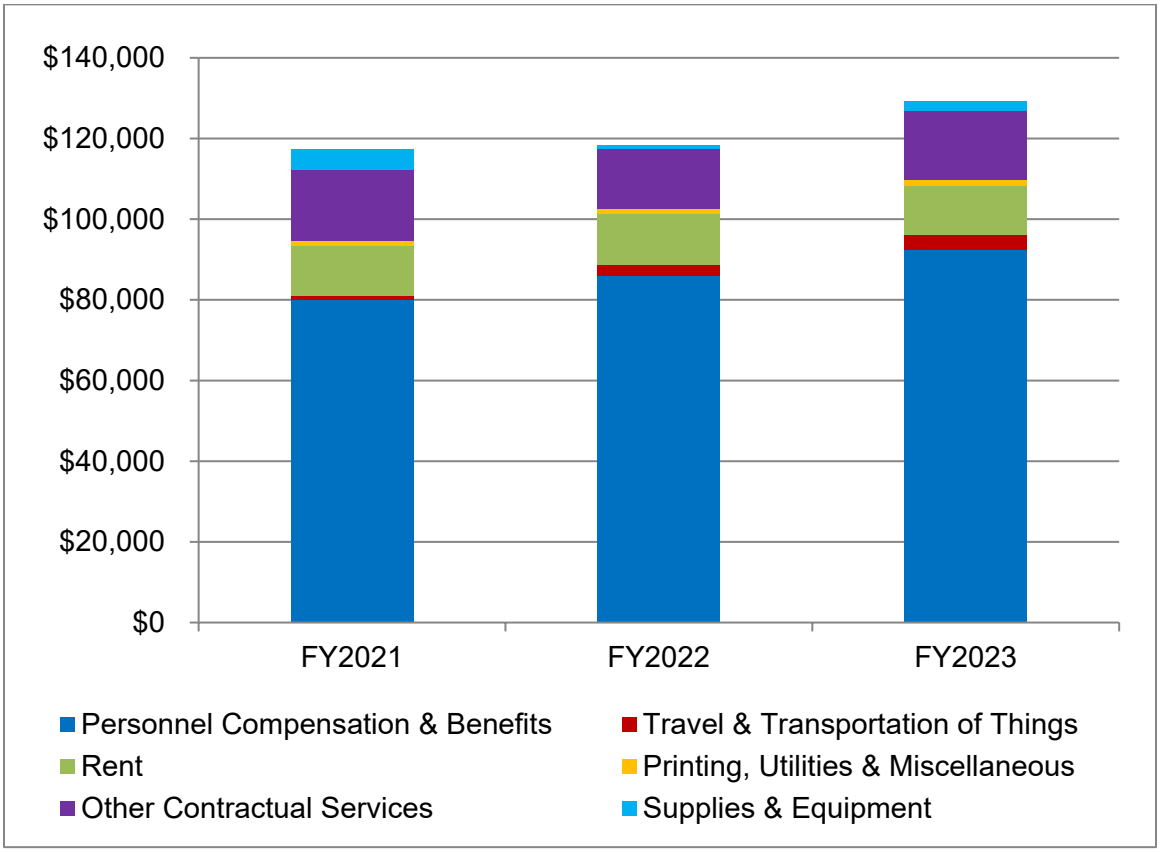
Staffing by Program Activity

Identification Code: 95-0310-0-1-407	FY 2021	FY 2022	FY 2023
Policy and Direction	**62**	**62**	**66**
Chair, Vice Chairman, Board Members	14	13	16
Office of the Managing Director	23	24	24
Office of the General Counsel	9	9	9
Office of the Chief Financial Officer	13	13	14
Office of Equal Employment Opportunity, Diversity & Inclusion	3	3	3
Safety Recommendations & Communications	**30**	**30**	**31**
Aviation Safety	**114**	**119**	**121**
Information Technology and Services	**27**	**27**	**28**
Research and Engineering	**47**	**47**	**48**
Training Center	**4**	**5**	**5**
Administrative Law Judges	**8**	**10**	**10**
Highway Safety	**30**	**30**	**31**
Marine Safety	**20**	**21**	**21**
Railroad, Pipeline and Hazardous Materials	**32**	**32**	**33**
Administration	**25**	**29**	**31**
Total	**399**	**412**	**425**

* FY 2023 assumes full Board staffing.

NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Obligations by Object Classification ($000s)



NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Obligations by Object Classification ($000s)

Identification Code: 95-0310-0-1-407		FY 2021	FY 2022	FY 2023
	Personnel Compensation and Benefits:			
11.1	Permanent Positions	54,573	58,074	61,718
11.3	Positions Other Than Permanent	2,348	2,414	3,287
11.5	Other Personnel Compensation	2,418	2,897	3,105
	Total Personnel Compensation	59,340	63,385	68,110
12.1	Personnel Benefits	20,604	22,562	24,288
	Subtotal, Personnel Compensation and Benefits	79,943	85,947	92,397
	Other Than Personnel Compensation and Benefits:			
21.0	Travel and Transportation of Persons	1,032	2,652	3,569
22.0	Transportation of Things	85	88	91
23.1	Rental Payments to General Services Administration	9,691	9,866	10,055
23.2	Rental Payments to Others	2,691	2,729	2,303
23.3	Communications, Utilities, and Miscellaneous Charges	1,262	1,121	1,179
24.0	Printing and Reproduction	99	102	108
25.0	Other Contractual Services	17,382	14,954	17,153
26.0	Supplies and Materials	910	667	917
31.0	Equipment	4,229	273	1,527
99.9	Total Obligations	117,326	118,400	129,300
	Personnel Summary:			
	FTE Employment	400	412	425

NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Analysis of Changes – FY 2022 to FY 2023

$	3,570	Staffing Changes

The requested funding level provides for an FTE level of 425, which is 13 above the FTE level supported by the FY 2022 Budget Request.

$	3,345	Pay Increase

Funds to cover the pro-rated impact of a FY 2023 4.6 percent pay raise effective January 1, 2023.

$	170	Other Personnel Compensation Increase

Funds to cover other personnel-related compensation including the FY 2023 increase to the health benefits contribution rate.

$	396	Non-Pay Inflation

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

$	3,419	Program Investments & Operational Expenses

Increases in program investments, GSA lease expenses, and contractual services expenses.

$	10,900	Total

Summary of Changes

$	118,400	FY 2022 level (supports 412 FTEs)
$	10,900	Total Increase
$	129,300	FY 2023 Level (supports 425 FTEs)

NATIONAL TRANSPORTATION SAFETY BOARD
SALARIES AND EXPENSES

Non-SES/SL/ST Awards

The following information outlines non–Senior Executive Service/senior level/scientific and professional (non–SES/SL/ST) awards spending as a percentage of non–SES/SL/ST salary spending for FY 2021 allotted funds, FY 2022, and FY 2023.

	Non–SES/SL/ST Salary Spending ($000s)	**Awards %**
FY 2021 Actual	$52,078	2.3%
FY 2022 Estimate	$55,452	2.3%
FY 2023 Request	$59,746	2.3%

POLICY AND DIRECTION

	($000s)	FTEs
FY 2022 Estimate	$16,844	62
FY 2023 Request	$18,906	66
Increase/Decrease	$2,062	4

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. An increase of 4 FTEs is supported by this funding level. No other program changes are planned.

Program Description

Policy and Direction program resources fund the Offices of the Chair, Vice Chairman, 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 Chairman, and Board Members

The chair serves as the chief executive officer for the agency. The chair, vice chairman, 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 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 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 and the senior advisor for policy and strategic initiatives.

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

The principal deputy managing director for management and operations has responsibility for the management and oversight of agency non-investigative operations and administrative programs. The Offices of the Chief Information Officer and Administration now report directly to this position, as do the Training Center, the Executive Secretariat, the Special Operations Division, and the Transportation Disaster Assistance Division. The Training Center manages workforce development and external training functions. The Executive Secretariat is responsible for managing the voting process for Board Members and for the processing and archiving of external correspondence.

The Special Operations Division coordinates the agency's involvement in special access programs and to serve 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 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 Transportation Disaster Assistance Division ensures that the agency meets its statutory obligations under the Aviation Disaster Family Assistance Act (49 *U.S.C.* section 1136), the rail passenger disaster family assistance provisions of the Rail Safety Improvement Act of 2008 (49 *U.S.C.* section 1139), and other accidents investigated by the agency (49 *U.S.C.* section 1140). This effort involves responding to all major aviation accidents and rail accidents investigated by the NTSB to coordinate federal government resources to support local and state governments, disaster relief organizations, and transportation carriers to address the concerns of survivors, families, and friends. This division also provides support for the agency's peer support and stress awareness programs as part of the employee assistance program. Additional information on division activities can be found in Appendix C.

The Occupational Safety and Health Division reports to the managing director and 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 (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 incidents and accidents.

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 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 the 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, oversees property and inventory control programs and the agency's travel and charge card programs. Additionally, 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.

Office of Equal Employment Opportunity, Diversity, and Inclusion

The Office of Equal Employment Opportunity, Diversity, and Inclusion 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. 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 an alternative dispute resolution program. Office services also include providing required educational training to NTSB staff, raising diversity 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 2022 Estimate	$8,318	30
FY 2023 Request	$9,061	31
Increase/Decrease	$743	1

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. An increase of 1 FTE is supported by this funding level. No other program changes are planned.

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 staff 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. In addition to traditional communication methods, the office uses digital and social media to facilitate robust public and stakeholder engagement.

Media Relations Division

The Media Relations Division is responsible for the following:

- Serving as 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 Office of Safety Recommendations and Communications 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 to communicate 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.
- Collaborating with the Safety Advocacy Division in support of its advocacy programs.

Government and Industry Affairs Division

The Government and Industry Affairs Division is responsible for the following:

- Informing Congress, other federal agencies, and state and local governments about NTSB activities and advising the chair, vice chairman, 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 chairman, Board members, and staff with legislative testimony.
- Providing launch support to the chair, vice chairman, Board members, and accident 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 in 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.
- Collaborating with the Safety Advocacy Division in support of its advocacy programs.

Safety Advocacy Division

The Safety Advocacy Division is responsible for the following:

- Producing the NTSB's Most Wanted List (MWL), the agency's preeminent 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 and the "Safety Compass" blog, as well as other social media venues.
- 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 the following:

- 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.
- Collaborating with the Safety Advocacy Division in support of its advocacy programs.

Digital Services Division

The Digital Services Division is responsible for the following:

- 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, producing 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 68,915 print, online, and broadcast media mentions of the agency and its work between October 1, 2020, and September 30, 2021. These mentions included information about the sinking of the fishing vessel *Scandies Rose*, a virtual Board meeting on turbulence-related injuries in air carrier operations, and such safety advocacy events as the Safe System Approach Roundtable series held to highlight critical highway issues.

A total of 337 unique hyperlinks were created and used in 80 news releases, 18 media advisories, and 657 tweets to drive web traffic to NTSB online products and information; those links received more than 121,000 clicks. Staff published 96 images to the NTSB Flickr account, earning a total of 289,000 views, demonstrating the value of using compelling imagery in the agency's products.

The division's news releases and media advisories continued to earn an average open rate of 62 percent, far above the 21 percent industry standard for government communications.

The division continued to provide media relations training to NTSB staff and transportation industry communicators, instructing 492 people in 12 sessions held between October 1, 2020, and September 30, 2021, some of which were conducted through the NTSB Training Center.

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 2021, the division supported Board member and staff testimony and legislative advocacy in the respective states on the following important safety initiatives:

- Automated vehicle testing in Connecticut
- Occupant protection in Connecticut, Massachusetts, North Dakota, and Wyoming
- Motorcycle safety in Maryland and Nebraska
- Pedestrian safety in Maryland
- Impaired driving in Hawaii
- Pipeline safety in California and Maryland
- Distracted driving in Ohio
- Speeding in California and Massachusetts

Additionally, the division facilitated technical assistance on commercial aviation, vulnerable road users, and commercial trucking oversight and technology for congressional offices drafting related legislation. The division supported major accident launches and general aviation regional investigations from headquarters. 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

In FY 2021, the Safety Advocacy Division supported several advocacy and outreach activities related to the MWL and other critical safety recommendations and engaged in 27 MWL-related activities and events.

The division supported Board members' virtual presentations, developed legislative testimony related to MWL issue areas, and briefed state representatives on highway safety issues. Staff coordinated virtual events and activities related to the 2019–2020 MWL and to the development and release of the new 2021–2022 MWL. Some of those events include—

- Safe Systems Approach Roundtable Series
    - A Safe System – July 7, 2021
    - Safe Speeds: Eliminating Speeding-Related Crashes – July 21, 2021
    - Safe Vehicles – September 9, 2021
- Launch of the National Distracted Driving Coalition – September 16, 2021

On April 6, 2021, the Board adopted the 2021–2022 MWL in a virtual, public Board meeting. In coordination with the modal offices, the division facilitated more than 50 meetings with internal office staff and Board members and created an advocacy toolkit designed to help external organizations engage with their stakeholders on these MWL safety items.

The division shared agency advocacy activities and MWL progress with stakeholders and agency staff via the *Advocacy Spotlight* e-newsletter and direct e-mail marketing. Two editions of the *Advocacy Spotlight* were sent to more than 10,000 stakeholders, and 77 e-mail notifications were sent to more than 198,000 stakeholders. Staff developed hundreds of social and digital media products promoting the NTSB's key transportation safety messages and increased followers across all platforms, reaching more than 100,000 people via Twitter, Facebook, LinkedIn, Instagram, YouTube, and Flickr. In addition, the division posted 37 blogs, written by NTSB Board members and staff, and produced 9 episodes of the "Behind-the-Scene @ NTSB" podcast, which highlighted agency activities, staff, and programs. The division also supported webinars on MWL topics specific to unique audiences and recommendation recipients, such as a webinar on fatigue in commercial trucking and a discussion on the progress made in implementing positive train control.

Safety Recommendations Division

From October 1, 2020, through September 30, 2021, the Safety Recommendations Division reviewed and analyzed 246 responses from recommendation recipients and developed recommendation classification responses for Board review and approval. Staff generated 406 follow-up letters for recommendation recipients who had not responded to NTSB safety recommendations and assisted the modal offices in developing and issuing 130 new safety recommendations based on 24 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 their requests for the 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 and the implementation of design specification and maintenance inspection programs for roads, bridges, and tunnels. On October 1, 2020, the Office of the Chief Information Officer released a much-improved safety recommendation search tool on the NTSB's public website that the division had helped to develop; the division also developed and conducted training sessions for internal staff and staff from other organizations that search for NTSB recommendations.

Outreach activities in FY 2021 included meetings to discuss open recommendations with numerous government and industry organizations, including these:

- Amtrak
- American Short Line and Regional Railroad Association

- Atmos Energy Corporation
- Chicago Transit Authority
- CSX Transportation
- Federal Aviation Administration
- Federal Motor Carrier Safety Administration
- Federal Railroad Administration
- Federal Transit Administration
- Gas Piping Technology Committee
- International Code Council
- Marquette Transportation
- Metropolitan Transit Authority
- Mitsubishi Motors Corporation
- National Association of State Directors of Pupil Transportation Services
- National Highway Traffic Safety Administration
- National Oceanic and Atmospheric Administration
- National Sheriff's Association
- National Weather Service
- Office of the Secretary of Transportation
- Pipeline and Hazardous Materials Safety Administration
- Sheet Metal, Air, Rail, and Transportation Workers Union
- Transport Canada
- Uber Advanced Technologies Group
- US Coast Guard
- Washington Gas
- Washington Metropolitan Transit Authority

Digital Services Division

In FY 2021, the Digital Services Division supported seven virtual Board meetings and three other NTSB-led events. Staff completed over 600 graphics and illustrations for use in reports and other materials; managed more than 30 print publication requests; produced more than 80 videos, podcasts, and live video streams; and fulfilled more than 1,800 website update requests.

The division also worked with the Office of the Chief Information Officer to refresh the NTSB.gov website with a contemporary, mobile-friendly design; improved information organization; and provided a more unified view of investigation information. The new site, which became available to the public on September 24, 2021, has been well received.

AVIATION SAFETY

	($000s)	FTEs
FY 2022 Estimate	$34,212	119
FY 2023 Request	$36,591	121
Increase/Decrease	$2,379	2

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. An increase of 2 FTEs is supported by this funding level. No other program changes are planned.

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; unmanned aircraft systems (UAS) 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 consisting of 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 (formerly the Major 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, and 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 NTSB investigative capabilities and agency strategy in new and innovative transportation industries to improve safety. Current areas of development include increasing NTSB comprehensive and technical proficiency in UAS accident and incident investigation, use of small unmanned aircraft system (sUAS) technology for accident scene documentation, commercial space launch/reentry accident investigation, and urban air mobility vehicle operations in the US National Airspace System.

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 chairman on a major investigation to examine issues in his or her specialty area. Group chairmen 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 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 all issues related to powerplants, 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/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 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 and drug or alcohol use.

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, and write, major aviation reports. Staff also write, analyze, and edit accident briefs, safety recommendation reports, special investigation reports, 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 the 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 special investigation 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. See Appendix D for regional office coverage.

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

This office's accomplishments include the issuance of several products related to transportation safety arising from completed and ongoing investigations. Products completed through September 30, 2021, are highlighted below, together with information on other efforts and focus areas important to both the current and future mission of the agency.

Accident Reports

Investigation reports on major accidents are adopted and issued by the Board.

Midair Collision over George Inlet, de Havilland DHC-2, N952DB, and de Havilland DHC-3, N959PA
Ketchikan, Alaska
May 13, 2019

On May 13, 2019, about 12:21 a.m. local time, two float-equipped airplanes—a de Havilland DHC-2 and a de Havilland DHC-3—collided in midair about 8 miles

northeast of Ketchikan, Alaska. The DHC-2 pilot and four passengers sustained fatal injuries. The DHC-3 pilot sustained minor injuries, nine passengers sustained serious injuries, and one passenger sustained fatal injuries. The DHC-2 was destroyed and the DHC-3 sustained substantial damage. Both were operated under the provisions of Title 14 *Code of Federal Regulations* (*CFR*) Part 135 as on-demand sightseeing flights; the DHC-2 was registered to and operated by Mountain Air Service LLC, Ketchikan, Alaska, and the DHC-3 was registered to Pantechnicon Aviation Ltd, Minden, Nevada, and operated by Venture Travel, LLC, doing business as Taquan Air, Ketchikan, Alaska.

The NTSB determined that the probable cause of the accident was the inherent limitations of the see-and-avoid concept, which prevented either of the pilots from seeing the other airplane before the collision, and the absence of visual and aural alerts from both airplanes' traffic display systems, while operating in a geographic area with a high concentration of air tour activity. Contributing to the accident were (1) the FAA's provision of new transceivers that lacked alerting capability to Capstone Program operators without adequately mitigating the increased risk associated with the consequent loss of the previously available alerting capability and (2) the absence of a requirement for airborne traffic advisory systems with aural alerting among operators who carry passengers for hire.

We identified the following safety issues during this investigation: (1) the inherent limitations of the see-and-avoid collision avoidance concept, (2) the benefit of automatic dependent surveillance-broadcast (ADS-B) Out- and In-supported traffic advisory systems in high-traffic tour areas, (3) the lack of an ADS-B In requirement for 14 *CFR* Part 135 operations, (4) the lack of cockpit display of traffic information alerting on both aircraft, (5) the loss of alerting capabilities with ADS-B systems installed as part of the FAA's post-Capstone upgrade program, (6) an inadequate checklist used in Taquan Air's operation, and (7) the lack of a requirement for safety management systems (SMS) in Part 135 operations.

The NTSB issued recommendations to the FAA, ForeFlight, Taquan Air, aviation industry groups, the National Association of Flight Instructors, and the Society of Aviation and Flight Educators.

Recommendations: 10 new, 1 reiterated
Report Adopted: April 20, 2021

Collision with Terrain During Takeoff of Parachute Jump Flight
Beech King Air 65-A90, N256TA
Mokuleia, Hawaii
June 21, 2019

On June 21, 2019, about 6:22 p.m. local time, a Beech King Air 65-A90 airplane impacted terrain after takeoff from Dillingham Airfield, Mokuleia, Hawaii. The pilot and 10 passengers were fatally injured, and the airplane was destroyed. The airplane was owned by N80896 LLC and was operated by Oahu Parachute Center LLC under the provisions of Title 14 *CFR* Part 91 as a local parachute jump (skydiving) flight.

The NTSB determined that the probable cause of this accident was the pilot's aggressive takeoff maneuver, which resulted in an accelerated stall and subsequent loss of control at an altitude that was too low for recovery. Contributing to the accident were (1) the operation of the airplane near its aft center of gravity limit and the pilot's lack of training and experience with the handling qualities of the airplane in this flight regime, (2) the failure of Oahu Parachute Center and its contract mechanic to maintain the airplane in an airworthy condition and to detect and repair the airplane's twisted left wing, which reduced the airplane's stall margin, and (3) the FAA's insufficient regulatory framework for overseeing parachute jump operations. Contributing to the pilot's training deficiencies was the FAA's lack of awareness that the pilot's flight instructor was providing substandard training.

The NTSB issued recommendations to the FAA as a result of this investigation in a separate recommendation report issued on December 16, 2020. See Safety Recommendation Reports, below, for more information.

Recommendations: 3 new
Report Adopted: March 16, 2021

Rapid Descent into Terrain, Island Express Helicopters Inc. Sikorsky S-76B, N72EX
Calabasas, California
January 26, 2020

On January 26, 2020, about 9:46 a.m. local time, a Sikorsky S-76B helicopter entered a rapidly descending left turn and crashed into terrain in Calabasas, California. The pilot and eight passengers died, and the helicopter was destroyed. The on-demand flight was operated by Island Express Helicopters Inc., Long Beach, California, under visual flight rules and the provisions of Title 14 *CFR* Part 135. The flight had departed from John Wayne Airport, Orange County, Santa Ana, California, about 9:07 a.m. destined for Camarillo Airport, Camarillo, California, about 24 miles west of the accident site.

The NTSB determined that the probable cause of this accident was the pilot's decision to continue flight under visual flight rules into instrument meteorological conditions, which resulted in the pilot's spatial disorientation and loss of control. Contributing to the accident was the pilot's likely self-induced pressure and the pilot's plan continuation bias, which adversely affected his decision-making, and Island Express Helicopters Inc.'s inadequate review and oversight of its safety management processes.

We identified the following safety issues during this investigation: (1) the pilot's preflight weather and flight risk planning, (2) the flight's entry into instrument meteorological conditions and the pilot's inadequate adverse weather avoidance, (3) the pilot's spatial disorientation, (4) influences on the pilot's decision to continue flight into adverse weather, (5) Island Express's incomplete implementation of its SMS, (6) the benefits of a mandatory SMS, (7) the benefits of flight simulation devices for pilot training in adverse weather avoidance, (8) the benefits of a flight data monitoring program, and (9) the value of crash-resistant flight recorder systems in preventing future accidents.

The NTSB issued recommendations to the FAA and Island Express Helicopters Inc.

Recommendations:	4 new, 5 reiterated
Report Adopted:	February 9, 2021

Accident Briefs

Investigations resulting in accident briefs are more limited in scope than those leading to major accident reports and have the primary purpose of determining probable cause. These briefs may be issued by the office director under delegated authority or may be adopted by the Board. This report details 5 of the 2,392 briefs completed through September 30, 2021.

Miami Air Boeing 737 Runway Overrun
Jacksonville, Florida
May 3, 2019

On May 3, 2019, at 9:42 p.m. local time, Miami Air International flight 293, a Boeing 737-81Q, N732MA, departed the end of runway 10 while landing at Jacksonville Naval Air Station, Jacksonville, Florida, and came to rest in shallow water in St. Johns River. Of the 2 pilots, 4 flight attendants, 1 mechanic (in the jumpseat), and 136 passengers onboard, one minor injury was reported; the rest were not injured. The airplane was substantially damaged. The flight was operated as a Title 14 *CFR* Part 121 supplemental nonscheduled passenger flight from Leeward Point Field, Guantanamo Bay, Cuba, to Jacksonville Naval Air Station.

The NTSB determined that the probable cause of this accident was the airplane's extreme loss of braking friction due to heavy rain and the water depth on the ungrooved runway, which resulted in viscous hydroplaning. Contributing to the accident was the operator's inadequate guidance for evaluating runway braking conditions and conducting en route landing distance assessments. Contributing to the flight crew's continuation of an unstabilized approach were (1) the captain's plan continuation bias and increased workload related to the weather and check airman duties and (2) the first officer's lack of experience.

Recommendations:	None
Brief Adopted:	July 28, 2021

Impact with Terrain Short of the Runway
Windsor Locks, Connecticut
October 2, 2019

On October 2, 2019, about 9:53 a.m. local time, a Boeing B-17G was destroyed when it impacted terrain short of runway 6 at Bradley International Airport, Windsor Locks, Connecticut. The commercial pilot, airline transport pilot, and five passengers were fatally injured; the crew chief/flight engineer and four passengers were seriously injured; and one passenger and one person on the ground sustained minor injuries. The airplane was operated by the Collings Foundation as a Title 14 *CFR* Part 91 local commercial sightseeing flight.

The NTSB determined that the probable cause of the accident was the pilot's failure to properly manage the airplane's configuration and airspeed after he shut down the No. 4 engine following its partial loss of power during the initial climb. Contributing to the accident was (1) the pilot/maintenance director's inadequate maintenance while the airplane was on tour, which resulted in the partial loss of power to the Nos. 3 and 4 engines, (2) the Collings Foundation's ineffective SMS, which failed to identify and mitigate safety risks, and (3) the FAA's inadequate oversight of the Collings Foundation's SMS.

The safety issues identified during this investigation were further evaluated in the aviation investigation report, *Enhance Safety of Revenue Passenger-Carrying Operations Conducted Under Title 14 Code of Federal Regulations Part 91* (see Other Efforts and Focus Areas for more information).

Recommendations: 6 new
Brief Adopted: May 17, 2021

Collision with Hangar During Takeoff
Addison, Texas
June 30, 2019

On June 30, 2019, about 9:11 a.m. local time, a Textron Aviation B-300 (marketed as King Air 350) was destroyed when it impacted a hangar shortly after takeoff from runway 15 at Addison Airport, Addison, Texas. A postimpact fire ensued, and the airline transport pilot, the commercial co-pilot, and eight passengers sustained fatal injuries. The airplane was owned by EE Operation LLC and operated as a Title 14 *CFR* Part 91 personal flight en route to Albert Whitted Airport, St. Petersburg, Florida.

The NTSB determined that the probable cause of this accident was the pilot's failure to maintain airplane control following a reduction of thrust in the left engine during takeoff. The reason for the reduction in thrust could not be determined. Contributing to the accident was the pilot's failure to conduct the airplane manufacturer's emergency procedure following a loss of power in one engine and to follow the manufacturer's checklists during all phases of operation.

Recommendations: None
Brief Adopted: May 13, 2021

Loss of Tail Rotor Effectiveness During Aerial Firefighting Operations
Tujunga, California
September 2, 2017

On September 2, 2017, about 9:48 a.m. local time, a Leonardo AW139 helicopter was substantially damaged when it entered an uncommanded right yaw and descent while conducting a water drop during an aerial firefighting mission near Tujunga, California. The pilot and crewmember were not injured. The helicopter was operated as a public aerial firefighting flight. The pilot reported, and onboard data confirmed, that there were no mechanical malfunctions or anomalies that would have precluded normal operation of the

helicopter. Review of the conditions surrounding the accident indicated that, as the pilot performed the water drop, the helicopter likely encountered radiant heat from the fire and its associated smoke columns, which reduced the helicopter's performance. The helicopter was also operating with a quartering tailwind at the time of the loss of control, which was within the critical wind azimuth published by the manufacturer.

The NTSB determined that the probable cause of this accident was a yaw excursion and uncontrolled descent due to a loss of tail rotor effectiveness during aerial firefighting operations, resulting in an impact with trees. A contributing factor was the pilot's failure to maintain sufficient airspeed, coupled with a quartering tailwind, and the operator's lack of guidance about the hazards associated with aerial firefighting operations near and around smoke columns.

As a result of the investigation, on May 7, 2020, the Department of Interior published an Interagency Aviation Accident Prevention Bulletin to discuss the hazards associated with smoke columns in wildland fires.

Recommendations: None
Brief Issued: May 6, 2021

Impact with Terrain Following Weather Encounter
Ely, Nevada
February 15, 2019

On February 15, 2019, about 5:30 p.m. local time, a Cirrus SR22 airplane was destroyed when it impacted terrain near Ely, Nevada. The pilot and passenger were fatally injured. The pilot was conducting a visual flight rules cross-country flight when he encountered weather en route and chose to divert to another airport. Although a snowstorm was in progress at the airport, with visibility around 1/4 to 1/2 mile, the airport's weather reporting facility indicated 9 statute miles visibility and light snow. The airplane impacted terrain while maneuvering in the vicinity of the airport in icing conditions. The investigation revealed that the visibility reporting at the airport had not been accurate for weeks before the accident and had been a concern for pilots operating at the airport.

The NTSB determined that the probable cause of the accident was the pilot's decision to continue the visual flight rules flight into instrument meteorological conditions and icing conditions, which resulted in a high rate of descent and impact with terrain. Contributing to the accident was the inaccurate weather reporting from the airport weather reporting facility.

As a result of this investigation, the NTSB issued safety recommendations to the National Weather Service and the FAA in a separate report titled *Revise Processes, Procedures, and Reporting Capabilities for Automated Weather Systems* (see Safety Recommendation Reports, below, for more information).

Recommendations: 3 new
Brief Issued: February 11, 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 safety information that would result in further 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 from October 1, 2020, through September 30, 2021, by class and state, territory, or major body of water (please note that the NTSB did not have any new class 1 investigations during the reporting timeframe). Investigation classes are defined after the table.

State	Class Pending	Class 2	Class 3	Class 4	Total
Alabama			8	7	15
Alaska		2	22	59	83
Arizona			17	29	46
Arkansas			10	6	16
Atlantic Ocean			1		1
California		1	44	36	81
Colorado			22	29	51
Connecticut		1		4	5
Delaware				1	1
Caribbean Sea			1		1
Florida	1		49	38	88
Georgia			19	17	36
Hawaii		1	2	2	5
Idaho			10	26	36
Illinois			8	13	21
Indiana			11	11	22
Iowa			8	7	15
Kansas			13	6	19
Kentucky			5	5	10
Louisiana			14	11	25
Maine			1	5	6
Maryland			7	4	11
Massachusetts			3	9	12
Michigan			10	16	26
Minnesota			8	9	17
Mississippi			5	6	11
Missouri			5	9	14

State	Class Pending	Class 2	Class 3	Class 4	Total
Montana			6	11	17
Nebraska			4	4	8
Nevada			5	15	20
New Hampshire			4	3	7
New Jersey			1	10	11
New Mexico		1	5	6	12
New York			15	11	26
North Carolina			21	22	43
North Dakota			4	2	6
Ohio			13	14	27
Oklahoma			8	7	15
Oregon		1	12	16	29
Pennsylvania			7	15	22
Rhode Island				1	1
South Carolina			10	6	16
South Dakota			4		4
Tennessee		1	12	8	21
Texas			59	36	95
Utah			10	14	24
Vermont			1	3	4
Virginia			9	10	19
Washington			15	29	44
West Virginia			1	3	4
Wisconsin			11	13	24
Wyoming			2	4	6
Total	**1**	**8**	**540**	**628**	**1,179**

***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 members 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 a significant effort collecting evidence across several investigative areas and a substantial investment of resources. 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 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 investigator-in-charge, 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 following Board approval that identifies 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 seek to identify the cause of the accident. The investigation is led by an investigator-in-charge. In some cases, the investigator-in-charge 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 investigator-in-charge 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 Pending*:** Investigations identified as pending are accidents or incidents that have been reported to the NTSB and are being evaluated, based on available information, for further classification.

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.

Through September 30, 2021, the Office of Aviation Safety was notified of and assisted on 219 international investigations. Of these, investigators launched or traveled in support of three investigations. The following investigation required significant US involvement:

- 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 is being investigated by the National Transportation Safety Committee of Indonesia. 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 737 MAX, Ethiopia
Addis Ababa Bole International Airport, Addis Ababa, Ethiopia
March 10, 2019

On March 10, 2019, Ethiopian Airlines flight 302, a Boeing 737 MAX, crashed shortly after takeoff. All 157 passengers and crew onboard were fatally injured. The accident is being investigated by the Ethiopian Civil Aviation Authority. The NTSB US-accredited representative and technical advisors provided comments on the draft final report in February 2021. The investigation is continuing and is expected to be completed later this year.

Boeing 737-800, Iran
Tehran Imam Khomeini International Airport
January 8, 2020

On January 8, 2020, Ukraine International Airlines flight 752, a Boeing 737-800, crashed shortly after takeoff from Tehran Imam Khomeini International Airport, Tehran, Iran, killing all 167 passengers and 9 crew onboard. The accident is being investigated by the Iranian Aircraft Accident Investigation Board. The NTSB US-accredited representative and technical advisors provided comments on the draft final report in February 2021. The final report was released in March 2021.

Safety Recommendation Reports

During accident or incident investigations, safety issues are sometimes identified that warrant Board adoption of safety recommendations outside of a final report or brief. Safety recommendation reports, which may be issued at any time during an accident investigation, are used to make recommendations on such issues. 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."

Revise Processes, Procedures, and Reporting Capabilities for Automated Weather Systems

These recommendations address various concerns with malfunctioning automated surface observing systems (ASOS) and automated weather observing systems (AWOS), as well as their respective reporting capabilities, which can result in erroneous weather information being provided to the transportation community. The recommendations derive from the NTSB's investigation of a fatal accident involving a privately operated Cirrus SR22 that crashed while maneuvering at low altitude near Ely, Nevada, on February 15, 2019, as well as our investigation of the sinking of the amphibious passenger vessel *Stretch Duck 7* on July 19, 2018, near Branson, Missouri.

We identified the following safety issues in this report: (1) a lack of clarity in National Weather Service guidance concerning the terms "outage" and "failure," and specific maintenance actions to address erroneous sensor reporting that does not generate failure flags and can negatively impact safety if users are provided erroneous weather information; (2) inconsistent criteria for issuing ASOS- and AWOS-related notices to airmen (NOTAM), which could prevent pilots from being advised via NOTAM that ASOS information may be inaccurate or unreliable; and (3) ineffective maintenance procedures to account for internal clock drift on some models of non-federal AWOS, leading to erroneous observation timestamping and obsolete longline dissemination of AWOS observations.

The NTSB issued four new safety recommendations. Recipients included the National Weather Service and the FAA.

Recommendations: 4 new
Report Adopted: February 1, 2021

Provide Inspectors with Automatic Notification of Flight Instructors with Substandard Student Pass Rates

The investigation of a Beech King Air 65-A90 that impacted terrain after takeoff in Mokuleia, Hawaii, fatally injuring the pilot and all 10 passengers, identified issues regarding pilot training and FAA oversight of flight instructors with a student practical test pass rate of less than 80 percent, which the FAA has established as substandard.

Because a substandard student pass rate might be an indication of a flight instructor who does not effectively teach the necessary skills associated with pilot certificates and ratings, additional FAA oversight of such instructors is necessary to help improve their performance and identify those instructors who are not able to improve.

The NTSB issued three new safety recommendations to the FAA.

Recommendations: 3 new
Report Adopted: December 16, 2020

F&M Enterprises and Stratus Oil Filter Adapter Assembly Oil Leaks

This recommendation was derived from both preliminary findings of ongoing investigations and reports of airplane accidents in which airplanes were equipped with an oil filter assembly installed under a supplemental type certificate. In each of these accidents, oil leaked from the assembly, resulting in oil starvation to the engine and a subsequent total loss of engine power. Our investigations suggest that the leaks could be attributed to the installation or maintenance of the oil filter adapter assembly.

The NTSB issued one new safety recommendation to the FAA.

Recommendation: 1 new
Report Adopted: November 30, 2020

Other Efforts and Focus Areas

Safety of Revenue Passenger-Carrying Operations Conducted under Title 14 *Code of Federal Regulations* Part 91

The NTSB has a long history of concerns about the safety of various revenue passenger-carrying operations conducted under Title 14 *CFR* Part 91. These operations, which carry thousands of passengers for compensation or hire each year, are not held to the same maintenance, airworthiness, or operational standards as air carrier, commuter, on-demand, and air tour operations conducted under 14 *CFR* Parts 121, 135, and 136, respectively.

Members of the public who pay to participate in Part 91 revenue passenger-carrying activities are likely unaware that these operations have less stringent requirements than other commercial aviation operations. Although the types of Part 91 revenue passenger-carrying operations are diverse, the need for greater safety requirements and more comprehensive oversight applies to all these operations

We evaluated the following safety issues in examining eight fatal NTSB accident investigations that occurred between 2010 and 2019 (including the Mokuleia, Hawaii, and Windsor Locks, Connecticut, accidents discussed previously): (1) the need for an appropriate framework for Part 91 revenue passenger-carrying operations, (2) the need to identify regulatory loopholes and omissions and address them in the new framework, (3) the need for increased FAA oversight, and (4) the need for SMS.

The NTSB issued six new safety recommendations to the FAA. We also reiterated four previously issued recommendations.

Recommendations: 6 new, 4 reiterated
Report Adopted: March 23, 2021

Aviation Report Timeliness Project (ARTP)

On March 15, 2020, the Office of Aviation Safety implemented multiple enhancements to its aviation investigation process as a result of outcomes from the ARTP. The objective of the project is to improve the efficiency of our investigations using structured, data-driven management techniques and the implementation of incremental process changes. The project continues to look at ways to streamline existing procedures to improve timeliness of report completion while improving quality. The program is evaluated on an ongoing basis with bi-weekly meetings that include all Office of Aviation Safety chiefs, as well as quarterly briefings and training with staff. By March 2021, 98 percent of cases required to have a work plan had one, and over 90 percent of the work plans had been developed within 15 business days of case assignment, as specified in ARTP procedures.

NTSB Unmanned Aircraft Program and Notice of Proposed Rulemaking Concerning Unmanned Aircraft Accidents

The office has continued to expand the agency's two-pronged UAS program. One prong is investigations, which has expanded the knowledge base and necessary training to investigate accidents and incidents involving UAS effectively and comprehensively. The other prong is operations, which uses UAS and advanced photogrammetry and geographic information system image processing to document accident sites in support of all modal investigations.

Concerning the notification and reporting requirements that determine which UAS accidents or incidents the NTSB will investigate, the agency solicited comments to proposed rulemaking in May 2021 to amend the definition of "unmanned aircraft accident" in the governing regulations. Currently, the regulations describe such an accident as an occurrence associated with the operation of any public or civil UAS that takes place between the time that the system is activated with the purpose of flight and the time that the system is deactivated at the conclusion of its mission, in which: (1) any person suffers death or serious injury or (2) the aircraft has a maximum gross takeoff weight of 300 pounds or greater and sustains substantial damage.

Given the evolving nature of UAS technology and industry, the NTSB proposes replacing the weight-based condition with the condition that an accident involving a UAS having an airworthiness certificate or airworthiness approval is reportable. This amendment will allow the NTSB to quickly respond to UAS events that have safety significance. The investigation prong of the NTSB UAS program will continue to keep up with the extremely dynamic and explosively growing segment of aviation through additional investigations of significant accidents and incidents, increased outreach, and growing knowledge of the industry.

The NTSB UAS program is a gold standard for government and industry, with members serving on numerous safety groups. We continue to maintain our leadership position in flight operations by conducting multimodal accident site documentation using sUAS. For example, the NTSB used sUAS to support the investigation of an April 2021 accident involving an in-flight breakup of an airplane, which came down in pieces over remote,

densely forested terrain. Ground searches for the wreckage pieces were unable to locate several major structural and flight control components of the tail and right wing. The sUAS was used to search for these missing pieces by overflying as much terrain in the primary search area as possible and capturing aerial imagery that investigators reviewed to look for wreckage pieces. The NTSB will continue to train staff and demonstrate proficiency well beyond FAA requirements by using the training standards established by the leading unmanned aircraft association.

Commercial Space

The NTSB has been involved in commercial space investigations for over 30 years. Meanwhile, the growth of FAA-licensed, commercial space transportation operations has continued to accelerate under the oversight of the FAA's Office of Commercial Space Transportation. According to the FAA, between October 1, 2020, and September 30, 2021, there were 44 licensed launches and 2 licensed reentries; this number is expected to continue to increase consistently over the next 10 years. To prepare for this growing number of commercial space launches and reentries, the NTSB has been developing specific and comprehensive policies and procedures to ensure that the agency is positioned to investigate accidents effectively in this burgeoning industry. The Air Carrier and Space Investigations Division is working to establish strong relationships with numerous commercial space stakeholders, and the agency has invested a significant amount of time and funding to train our cross-division group of subject matter experts for commercial space accident and incident investigations. To grow and maintain technical proficiency and engagement with industry, we will continue to execute a robust plan of outreach and training through attendance at industry conferences, subscriptions to publications, observation of multiple launches, and participation in externships.

Resources in Support of the Turbulence Safety Research Report

The office contributed the time and subject matter expertise of 10 specialists, 4 division chiefs, and the office's director and deputy director to the research and development of the turbulence safety research project led by the Office of Research and Engineering. The contributions of the Office of Aviation Safety included aviation case studies management, and knowledge and skills in meteorology, operational factors, air traffic control, human performance, aircraft systems, and cabin safety.

Ongoing Significant Aviation Accident and Incident Investigations

Location	Date	Description	Fatalities
Honolulu, Hawaii	7/2/2021	Engine failure after takeoff	0
Denver, Colorado	2/20/2021	Right engine failure after takeoff	0
Palmer, Alaska	3/27/2021	Impact with terrain	5
Soldotna, Alaska	7/31/2020	Midair collision	7
Lafayette, Louisiana	12/28/2019	Crash after takeoff	5

Location	Date	Description	Fatalities
Lilhue, Hawaii	12/26/2019	Helicopter crash during air tour	7
Dutch Harbor, Alaska	10/17/2019	Crash during landing	1

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

HIGHWAY SAFETY

	($000s)	FTEs
FY 2022 Estimate	$8,499	30
FY 2023 Request	$9,242	31
Increase/Decrease	$743	1

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. An increase of 1 FTE is supported by this funding level. No other program changes are planned.

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 their circumstances. 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), and 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 special 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 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, if implemented, reduce or eliminate the risks identified in the investigations and provide policymakers with unbiased analysis.

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, major highway accident investigations are conducted by multidisciplinary teams, with six investigators on each team: an IIC and five other investigators with expertise in vehicle, highway, human performance, survival, and motor carrier factors. The teams are supported by two crash reconstructionist 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.

Division staff is augmented by personnel from other NTSB offices who provide expertise in vehicle simulations, medical issues, occupant protection, fire science, metallurgy/materials, hazardous materials, statistical data analysis, video analysis, communications (accident notification), public/government/family affairs, legal issues, and recommendation follow-up.

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 the report. This division is also responsible for managing investigative hearings and forums on national highway safety issues.

Accomplishments and Ongoing Efforts

This office's accomplishments include issuance of a number of products related to transportation safety arising from completed and ongoing investigations. Products completed through September 30, 2021, are highlighted below, together with information on other efforts and focus areas important to both the current and future mission of the agency.

Accident Reports

Investigation reports on major accidents are adopted and issued by the Board.

Medium-Size Bus Roadway Departure, Return, and Rollover
Bryce Canyon City, Utah
September 20, 2019

On September 20, 2019, about 11:30 a.m. local time, a 2017 medium-size bus was traveling east on Utah State Route 12, a two-lane highway, near Bryce Canyon City in Garfield County, Utah. The posted speed limit was 65 mph; the bus was traveling at about 64 mph. The bus was operated by the motor carrier America Shengjia and occupied by a 60-year-old driver and 30 passengers on a tour from Los Angeles, California, to Salt Lake City, Utah. When the bus's right wheels departed the right edge of the roadway, the driver steered left, a maneuver that redirected the bus into the westbound travel lane. The driver then steered sharply to the right, causing the bus to roll onto its left side. It slid for about 85 feet, struck the guardrail, rolled over the guardrail, and came to rest upright, with its front end partially blocking the westbound travel lane. As a result of the crash, 4 passengers were fatally injured, 17 sustained serious injuries, and 9 sustained minor injuries. Thirteen passengers were either fully or partially ejected from the bus during the crash sequence. The bus driver

was not injured. All rear seating positions were equipped with lap belts, and the driver and front passenger seats were equipped with lap/shoulder belts.

The NTSB determined that the probable cause of the Bryce Canyon City, Utah, crash was the bus driver's failure, for undetermined reasons, to maintain the bus within its travel lane and his subsequent steering overcorrections, which caused the bus to become unstable and roll over. Contributing to the severity of the crash was the roof's deformation, caused by the rollover, and its further collapse upon impact with the guardrail, which created ejection portals and compromised the survival space of the passenger seating compartment. Also contributing to the severity of the crash was the failure of the National Highway Transportation Safety Administration (NHTSA) to develop and promulgate standards for bus roof strength and window glazing to enhance the protection of bus passengers. Contributing to the ejections and the severity of the injuries was the lack of passenger lap/shoulder belts on the bus.

We identified the following key safety issues during this investigation and report: (1) lack of requirements for vehicle technology to prevent medium-size bus road departures and rollovers and (2) lack of occupant protection and crashworthiness standards for medium-size buses.

The NTSB issued 3 new safety recommendations to NHTSA. We also reiterated five previously issued recommendations.

Recommendations:	3 new, 5 reiterated
Report Adopted:	May 10, 2021

Collision Between Pickup Truck with Trailer and Group of Motorcycles
Randolph, New Hampshire
June 21, 2019

About 6:26 p.m. local time on June 21, 2019, a 2016 Ram 2500 Tradesman crew-cab pickup truck towing an unladen 2015 Quality vehicle-hauling trailer, operated by Westfield Transport Incorporated and driven by a 23-year-old driver, was traveling west on US Route 2, a two-lane road with a speed limit of 50 mph, in Randolph, Coos County, New Hampshire. A group of 15 motorcycles—carrying 15 riders and 7 passengers—traveling in staggered formation had just entered the eastbound lane from a driveway opposite the intersection with Valley Road. About 1,100 feet east of Valley Road, the combination vehicle, which had crossed the centerline, collided with the motorcycle leading the formation, then struck another motorcycle. The vehicle continued leftward, colliding with four additional motorcycles, before coming to rest on an earthen embankment along the eastbound shoulder. A postcrash fire ensued that enveloped the pickup truck and two of the motorcycles. Five motorcycle riders and two passengers died in the crash, and an additional five riders and two passengers were injured. The pickup truck driver was not injured.

The NTSB determined that the probable cause of the Randolph, New Hampshire, crash was the pickup truck driver's crossing the centerline and encroaching into the oncoming lane of travel, which occurred because of his impairment from the use of multiple drugs.

Contributing to the crash was Westfield Transport's substantial disregard for and egregious noncompliance with safety regulations. Also contributing was the failure of the Massachusetts Registry of Motor Vehicles to revoke the pickup truck driver's Massachusetts driver's license when notified of his loss of driving privileges in another state.

We identified and evaluated the following key safety issues during this investigation and report: (1) deficiencies in out-of-state driver's license notification processing, (2) insufficient federal oversight of motor carriers, and (3) shortcomings in motorcycle rider safety.

The NTSB issued six new safety recommendations. Recipients included the Federal Motor Carrier Safety Administration, the Massachusetts Department of Transportation, 49 states—Massachusetts excepted—the District of Columbia, and the Commonwealth of Puerto Rico, the National Association of State Motorcycle Safety Administrators, and the Motorcycle Safety Foundation. We also reiterated five previously issued recommendations.

Recommendations:	6 new, 5 reiterated
Report Adopted:	December 1, 2020

Safety Risks to Emergency Responders from Lithium-Ion Battery Fires in Electric Vehicles
Multiple Locations including West Hollywood, California
June 15, 2018

The NTSB investigated three electric vehicle crashes resulting in postcrash fires and one noncrash fire involving an electric vehicle, all of which illustrate the risks to emergency responders posed by the vehicles' high-voltage lithium-ion batteries. The NTSB also examined national and international standards established to maximize the safety of electric vehicles. Particular attention was given to the emergency guidance documents supplied by vehicle manufacturers to mitigate the safety risks to first and second responders who deal with electric vehicle crashes and high-voltage lithium-ion battery fires.

Fires in electric vehicles powered by high-voltage lithium-ion batteries pose the risk of electric shock to emergency responders from exposure to the high-voltage components of a damaged lithium-ion battery. A further risk is that damaged cells in the battery can experience uncontrolled increases in temperature and pressure (thermal runaway), which can lead to hazards such as battery reignition and fire. The risks of electric shock and battery reignition and fire arise from the "stranded" energy that remains in a damaged battery.

We identified and evaluated the following key safety issues during this investigation and report: (1) the inadequacy of vehicle manufacturers' emergency response guides for minimizing the risks to first and second responders posed by high-voltage lithium-ion battery fires in electric vehicles and (2) gaps in safety standards and research related to high-voltage lithium-ion batteries involved in high-speed, high-severity crashes.

The NTSB issued four new safety recommendations. Recipients included NHTSA, the manufacturers of electric vehicles equipped with high-voltage lithium-ion batteries (BMW Group, BYD Motors, FCA Group, General Motors Company, Ford Motor Company, Gillig, Honda Motor Company, Hyundai Motor Company, Karma Automotive, Kia Motors Corporation, Mercedes-Benz USA, Mitsubishi Motors, Nissan Motor Company, Nova Bus Inc., Porsche Cars North America, Proterra Inc., North American Subaru, Tesla Inc., Toyota Motor North America, Van Hool and NV, Volkswagen Group of America, and Volvo Car Corporation), the National Fire Protection Association, the International Association of Fire Chiefs, the International Association of Fire Fighters, the National Alternative Fuels Training Consortium, the National Volunteer Fire Council, and the Towing and Recovery Association of America.

Recommendations: 4 new
Report Adopted: November 13, 2020

Accident Briefs

Investigations resulting in accident briefs are more limited in scope than those leading to major accident reports and have the primary purpose of determining probable cause. These briefs may be issued by the office's director under delegated authority or may be adopted by the Board.

Median-Crossing Multivehicle Crash and Postcrash Fire on Interstate 75
Alachua, Florida
January 3, 2019

On January 3, 2019, about 3:41 p.m. local time, a 2016 Freightliner truck-tractor in combination with a semitrailer, operated by Eagle Express Lines, was traveling north at 69 to 70 mph in the right lane of Interstate 75 in Alachua County, Florida, when it abruptly veered to the left and traveled across the other two travel lanes. The semitrailer sideswiped and ensnared a 2016 Acura MDX, then crashed through a median barrier and entered oncoming traffic, striking a 2006 Chevrolet 12-passenger van that was owned and operated by a church group. The van rolled over twice before coming to rest in an upright position, and 10 of the 12 persons on board were ejected through windows and openings in the vehicle structure. Two of the ejected passengers as well as debris from the collision struck a 2006 Chevrolet pickup truck; the 2016 Freightliner next struck a 2018 Freightliner truck-tractor semitrailer traveling in the far-right southbound lane. The unbelted driver of the 2016 Freightliner was ejected, and a postcrash fire ignited. Although the Acura was wedged underneath the Freightliner's semitrailer, the Acura's driver was able to exit the vehicle before it was fully engulfed in flames.

Seven vehicle occupants were fatally injured, including the two Freightliner drivers and five of the passengers ejected from the van. Of the remaining nine vehicle occupants, only the driver of the pickup truck was not injured. Five van passengers were wearing their available restraints—including three that were ultimately ejected from the vehicle. The driver and front seat passenger were restrained with lap/shoulder belts. The drivers of the

passenger car, the 2018 Freightliner, and the pickup truck were all wearing their seat belts at the time of the crash.

The NTSB determined that the probable cause of the Alachua, Florida, multivehicle crash was the medical incapacitation of the Eagle Express truck driver, which resulted in his failure to maintain his travel lane and led to the truck's crossing the highway's center median and colliding with several vehicles in the opposite lanes of travel.

We identified the following key safety issue in this report: medical incapacitation.

Recommendations: None
Brief Issued: May 17, 2021

Other Efforts and Focus Areas

Safety Risks to Emergency Responders from Lithium-Ion Battery Fires in Electric Vehicles Video

The NTSB issued Safety Report 20/01, "Safety Risks to Emergency Responders from Lithium-Ion Battery Fires in Electric Vehicles," on January 13, 2021. This video summarizes that report and focuses on the safety risks to first and second responders posed by electric vehicles that are powered by high-voltage, lithium-ion batteries. Images from the investigations and graphics highlighting the design of electric vehicle battery systems aid users in understanding the complexities faced by emergency responders when encountering a postcrash fire in an electric vehicle. The video is available on the NTSB YouTube channel.

Pedestrian Bridge Collapse Over SW 8th Street: Illustrated Digest

The illustrated digest of the NTSB's accident report NTSB/HAR-19/02, which can be found at www.ntsb.gov, contains a description of the Miami, Florida, bridge collapse that occurred on March 3, 2018, its probable cause, safety issues, and the safety recommendations that are detailed in the full report. The digest, developed to strengthen awareness and knowledge in the bridge community and the public regarding the failure mechanisms, as well as the safety changes needed to avoid similar failures in the future, uses a visual presentation to provide users a concise way of acquiring an in-depth understanding into the NTSB investigation of the bridge collapse.

Safe System Approach Roundtable Series
A Safe System, Safe Speeds, Safe Vehicles

In 2021, The Office of Highway Safety supported the Office of the Chair and the Office of Safety Recommendations and Communications to launch a Safe System approach roundtable series. The three main objectives for the series were (1) to better understand the Safe System Approach, how it complements our current approach to road safety in the United States, and the benefits of a Safe System approach; (2) to explore the current state of the Safe System approach in the United States and to learn from international partners and stakeholders from cities across the United States that have moved toward a safe system

approach; and (3) to identify what actions need to be taken to move toward a Safe System approach.

NTSB Most Wanted List

In 2021, The Office of Highway Safety developed five Most Wanted List 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 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 our stakeholders to address these key challenges.

Historic Safety Cases

In 2021, The Office of Highway Safety worked to transition our historic investigative cases to the new NTSB multimodal database for investigations, SAFTI. This database makes highway crash investigation information for cases from 2010 to current available to the public through our Case Analysis and Reporting OnLine (CAROL) query tool.

Ongoing Significant Highway Accident Investigations

Location	Date	Description	Fatalities
Coral Gables, Florida	9/13/2021	A single, electric vehicle crash and postcrash fire in a residential area.	2
Greenville, Alabama	6/19/2021	A multivehicle crash in wet weather conditions.	10
Phoenix, Arizona	6/9/2021	A multivehicle crash involving a traffic queue resulting from previous lane closures.	4
Spring, Texas	4/17/2021	A single-vehicle crash in a residential area.	2
Fort Worth, Texas	2/11/2021	A multivehicle crash in winter weather conditions. (Our focus is on the pretreatment of the roadway.)	6
Avenal, California	1/1/2021	A roadway departure followed by an overcorrection resulting in a head-on collision.	8
Searchlight, Nevada	12/10/2020	A box truck collided with a group of bicyclists and a support vehicle on a high-speed roadway.	5
Decatur, Tennessee	10/27/2020	A boom truck departed the right side of the roadway, overcorrected, and impacted an oncoming school bus.	2
North Charleston, South Carolina	7/1/2020	A multivehicle crash involving a 2018 Ford F-350 pickup truck colliding with a 2017 state patrol vehicle and 2005 tow truck that were parked in the traffic lanes while working an earlier crash. The police officer and tow truck operator were out of their vehicles at the time of the crash.	1

Location	Date	Description	Fatalities
Arlington, Wisconsin	6/12/2020	A 2013 Freightliner truck-tractor in combination with a 2017 Utility semitrailer struck a 2021 Kia passenger vehicle, which was at the end of a traffic queue resulting from two previous crashes.	4
Pala Mesa, California	2/22/2020	A 2014 medium size bus built on a Freightliner chassis departed the roadway to the right, collided with a roadside barrier, rolled down an embankment, and came to rest on its roof.	3
Mt. Pleasant, Pennsylvania	1/5/2020	A motorcoach overturned on the roadway, resulting in a multivehicle crash involving three truck-tractor semitrailer combination vehicles.	5
Belton, South Carolina	12/17/2019	A medium size bus was impacted by a passenger vehicle that crossed the centerline.	1

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

MARINE SAFETY

	($000s)	FTEs
FY 2022 Estimate	$5,933	21
FY 2023 Request	$6,250	21
Increase/Decrease	$317	0

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. No other program changes are planned.

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 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 Coast Guard and concurred with by the NTSB Chair, to life, property, or the environment by hazardous materials.

For select major marine casualties, the office launches a full investigative team and presents the investigative product to the Board. For all other major marine casualties, the office launches a field team of marine investigators to the scene to gather information to develop a marine accident brief report. Most of these investigation reports are issued by the office director through delegated authority; briefs involving public/nonpublic marine accidents and briefs that contain safety recommendations are adopted and issued by the Board.

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 34 percent of NTSB marine accident 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* (Casualty Investigation Code), the office also participates with the Coast Guard as a substantially interested State 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, most notably for joint US/flag-state marine accident investigations. We also cooperate with other accident investigation organizations worldwide at annual meetings held virtually, such as the Marine Accident Investigators' International Forum (MAIIF), a non-governmental organization status with IMO, Europe MAIIF, and MAIIF Americas, which track developments related to marine accident 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 accidents. 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 accident 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 administers the investigative quality management program. The division consists of technical writer-editors who are responsible for drafting and editing major marine accident reports, marine accident brief reports, safety recommendation reports, special investigation reports, the *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 through September 30, 2021,

are highlighted below, along with information about other efforts and focus areas important to both the current and future mission of the agency.

Accident Reports

Investigation reports on major accidents are adopted and issued by the Board.

Capsizing of Roll-on/Roll-off Vehicle Carrier *Golden Ray*
St. Simons Sound, Brunswick River, near Brunswick, Georgia
September 8, 2019

About 1 a.m. September 8, 2019, after unloading and loading vehicle cargo during the previous day, the 656-foot-long, Marshall Islands-flagged (MH) roll-on/roll-off vehicle carrier *Golden Ray* departed the Colonel's Island Terminal in the Port of Brunswick, Georgia, en route to Baltimore, Maryland. As the vessel approached the Atlantic Ocean, it was turned to starboard and began to heel quickly to port. Water flooded through open watertight doors to the engine and steering gear rooms. The pilot and 19 of the 23 crewmembers were rescued the same day; 4 engineering crewmembers remained trapped in the engine room until the following evening, when responders cut into the vessel's hull to rescue them. Two crewmembers suffered serious injuries. Total costs for the loss of the vessel were estimated at $62.5 million, and total costs for the loss of the cargo were estimated at $142 million.

The NTSB determined that the probable cause of the capsizing of the *Golden Ray* was the chief officer's error entering ballast quantities into the stability calculation program, which led to his incorrect determination of the vessel's stability and resulted in the *Golden Ray*'s having an insufficient righting arm to counteract the forces developed during a turn while transiting outbound from the Port of Brunswick through St. Simons Sound. Contributing to the accident was G-Marine Service Co. Ltd.'s lack of effective procedures in their safety management system for verifying stability calculations.

We identified the following safety issues during this investigation: (1) improperly calculating vessel stability and (2) lack of company oversight for calculating vessel stability.

The NTSB made recommendations to G-Marine Service Co. Ltd.

Recommendations:	2 new
Report Adopted:	August 26, 2021

Capsizing and Sinking of Commercial Fishing Vessel *Scandies Rose*
Sutwik Island, Alaska
December 31, 2019

On December 31, 2019, US Coast Guard Communications Detachment Kodiak received a distress call from the fishing vessel *Scandies Rose* (US). The vessel was en route from Kodiak to fishing grounds in the Bering Sea when it capsized about 2.5 miles south of Sutwik Island, Alaska, and sank several minutes later. At the time of the accident,

the *Scandies Rose* had seven crewmembers aboard, two of whom were rescued by the Coast Guard several hours later. The other missing crewmembers were not found and are presumed dead. The *Scandies Rose*, valued at $15 million, was declared a total loss.
The NTSB determined that the probable cause of the capsizing and sinking of the commercial fishing vessel *Scandies Rose* was the inaccurate stability instructions for the vessel, which resulted in a low margin of stability to resist capsizing, combined with the heavy asymmetric ice accumulation on the vessel due to localized wind and sea conditions that were more extreme than forecasted during the accident voyage.

We identified the following safety issues during this investigation: (1) the effect of extreme icing conditions; (2) the vessel's inaccurate stability instructions; (3) the need to update regulatory guidelines on calculating and communicating icing for vessel stability instructions; and (4) the lack of accurate weather data for the accident area.

The NTSB made recommendations to the Coast Guard, the National Oceanic and Atmospheric Administration, the National Weather Service, and to the North Pacific Fishing Vessel Owners' Association. The NTSB also reiterated recommendations to the Coast Guard.

Recommendations:	7 new, 2 reiterated
Report Adopted:	June 29, 2021

Collision between Liquefied Gas Carrier *Genesis River* and *Voyager* Tow
Houston Ship Channel, Upper Galveston Bay, Texas
May 10, 2019

On May 10, 2019, at 3:16 p.m. local time, the 754-foot-long, 122-foot-wide liquefied gas carrier *Genesis River* (PA) collided with a 297-foot-long tank barge being pushed ahead by the 69-foot-long towing vessel *Voyager* (US). As a result of the collision, two cargo tanks in the barge were breached, spilling over 11,000 barrels of reformate, a gasoline blending stock, into the waterway from the barge's breached cargo tanks. The Houston Ship Channel was closed to navigation for 2 days during response operations and did not fully open for navigation until May 15. The total cost of damages to the *Genesis River* and the barges was estimated at $3.2 million. The cost of reformate containment and cleanup operations totaled $12.3 million. There were no injuries reported.

The NTSB determined that the probable cause of the collision between the liquefied gas carrier *Genesis River* and the *Voyage*r tow was the *Genesis River* pilot's decision to transit at sea speed, out of maneuvering mode, which increased the hydrodynamic effects of the Bayport Flare's channel banks, reduced his ability to maintain control of the vessel after meeting another deep-draft vessel, and resulted in the *Genesis River* sheering across the channel toward the tow.

We identified the following safety issues during this investigation: (1) the challenges of navigating large vessels in the Bayport Flare area of the Houston Ship Channel and (2) vessel speed while transiting in a narrow channel.

The NTSB issued six new safety recommendations. Recipients included K-Line Energy Ship Management and the Houston Pilots. We also reiterated two previously recommendations.

Recommendations: 6 new, 2 reiterated
Report Adopted: March 10, 2021

Fire Aboard Small Passenger Vessel *Conception*
Platts Harbor, Channel Islands National Park, Santa Cruz Island, 21.5 miles South-Southwest of Santa Barbara, California
September 2, 2019

On September 2, 2019, about 3:14 a.m. local time, the US Coast Guard received a distress call from the *Conception* (US), a 75-foot-long small passenger vessel operated by Truth Aquatics Inc. The vessel had been anchored in Platts Harbor on the north side of Santa Cruz Island, 21.5 nautical miles south-southwest of Santa Barbara, California, when it caught fire. When the fire started, 5 crewmembers were asleep in their bunks in the crew berthing on the upper deck, and 1 crewmember and all 33 passengers were asleep in the bunkroom below. Despite firefighting and search and rescue efforts, the vessel burned to the waterline and sank just after daybreak; no survivors were found. Thirty-three passengers and one crewmember died. The surviving crew were transported to shore, and two were treated for injuries. Loss of the vessel was estimated at $1.4 million.

The NTSB determined that the probable cause of the fire on board the *Conception* was the failure of Truth Aquatics Inc. to provide effective oversight of its vessel and crewmember operations, including requirements to ensure that a roving patrol was maintained, which allowed a fire of unknown cause to grow undetected in the vicinity of the aft salon on the main deck. Contributing to the undetected growth of the fire was the lack of a US Coast Guard regulatory requirement for smoke detection in all accommodation spaces. Contributing to the high loss of life were the inadequate emergency escape arrangements from the vessel's bunkroom, as both exited into a compartment that was engulfed in fire, thereby preventing escape.

We identified the following safety issues during this investigation: (1) lack of small passenger vessel regulations requiring detection in all accommodation spaces, (2) lack of roving patrol, (3) small passenger vessel construction regulations for means of escape, and (4) ineffective company oversight.

The NTSB issued 10 new safety recommendations. Recipients included the US Coast Guard, the Passenger Vessel Association, the Sportfishing Association of California, the National Association of Charterboat Operators, and Truth Aquatics. We also reiterated one recommendation.

Recommendations: 10 new, 1 reiterated
Report Adopted: October 20, 2020

Accident Briefs

Investigations resulting in accident briefs are more limited in scope than those leading to major accident reports and have the primary purpose of determining probable cause. These briefs may be issued by the office director under delegated authority or may be adopted by the Board. This report details 8 of the 25 briefs completed through September 30, 2021.

Contact of Bulk Carrier *GH Storm Cat*'s Crane with Zen-Noh Grain Facility
Mississippi River, Convent, Louisiana
November 11, 2020

On November 11, 2020, about 9:10 a.m. local time, the bulk carrier *GH Storm Cat* (MH) no. 1 crane boom contacted the Zen-Noh Grain Corporation facility in Convent, Louisiana, while the crew was completing corn-loading operations. The vessel was moored starboard side to with a crew of 19. No pollution or injuries were reported. The vessel's crane was undamaged; damage to the shoreside conveyor gallery was estimated to be $481,006.

The NTSB determined that the probable cause of the *GH Storm Cat*'s crane contact with the Zen-Noh grain facility runway was the absence of a dedicated signalman, which led to the ship's crane operator's misjudgment of the location of the crane boom while lowering the payloader to the pier.

Recommendations: None
Brief Issued: September 30, 2021

Fire aboard Private Yacht *Andiamo*
Island Gardens Deep Water Marina, Miami, Florida
December 18, 2019

On December 18, 2019, about 7:21 p.m. local time, a fire broke out aboard the privately owned yacht *Andiamo* (MH) while moored at the Island Gardens Deep Harbour Marina on Watson Island in Miami, Florida. The crew of four and a guest on board safely evacuated the vessel as the fire quickly spread. While local firefighters and crews from neighboring yachts attempted to extinguish the fire, the yacht capsized onto its starboard side. No injuries were reported, but an oil sheen was observed. Total damage was estimated at $6.78 million: the *Andiamo*, valued at $6.3 million, was declared a constructive total loss; repair costs for the marina and adjacent vessels were $480,000.

The NTSB determined that the probable cause of the fire aboard the private yacht *Andiamo* was burning candles left unattended that resulted in an undetected fire in a guest cabin. Contributing to the severity of the fire was the crew's failure to complete timely repairs to a fire-detection and alarm system known to be inoperable for 2 months.

Recommendations: None
Brief Issued: August 27, 2021

Collision between *Cooperative Spirit* Tow and *RC Creppel* Tow
Mississippi River, Destrehan, Louisiana
January 26, 2020

On January 26, 2020, at 5:33 a.m. local time, the towing vessel *Cooperative Spirit* (US) was pushing 40 barges upbound on the Lower Mississippi River, and the towing vessel *RC Creppel* (US) was pushing two barges downbound when the two tows collided at mile 123, near Destrehan, Louisiana. The *RC Creppel* capsized as a result of the collision. Minutes later, the upbound dry bulk carrier *Glory First* (MI) made contact with the starboard side of the *Cooperative Spirit*'s tow. All 42 barges from both tows broke free and were later recovered. One of the four *RC Creppel* crewmembers was rescued; the remaining three were never recovered and are presumed dead. The accident resulted in the release of about 8,000 gallons of diesel fuel into the river and sulfuric acid vapors into the atmosphere, and an estimated $3,781,126 in property damage to the 3 vessels and 11 barges.

The NTSB determined that the probable cause of the collision was the two pilots' insufficient radio communication before meeting in a bend and their failure to broadcast accurate AIS information regarding tow size.

Recommendations: None
Brief Issued: August 12, 2021

Collision of Cargo Vessel *Nomadic Milde* and Bulk Carrier *Atlantic Venus*
Mississippi River, South Kenner, Louisiana
May 8, 2020

On May 8, 2020, about 4:55 p.m. local time, the anchored general cargo vessel *Nomadic Milde* (MH) collided with the anchored bulk carrier *Atlantic Venus* (PA) on the Lower Mississippi River near New Orleans, Louisiana, then struck a nearby chemical dock and grounded on the bank. No injuries were reported. The *Nomadic Milde* released an estimated 13 gallons of lube oil into the river. Damage to both vessels and the dock was estimated at $16.9 million.

The NTSB determined that the probable cause of the collision between the *Nomadic Milde* and *Atlantic Venus* was the bridge team on the *Nomadic Milde* not effectively monitoring the vessel's position and therefore not detecting that the vessel was dragging anchor and had moved from its original position during high-water conditions in proximity to other vessels.

Recommendations: None
Brief Issued: August 11, 2021

Container Damage and Loss aboard Deck Cargo Barge *Ho'omaka Hou*, Towed by *Hoku Loa*
Pacific Ocean, north-northwest of Hilo, Hawaii
June 22, 2020

On June 22, 2020, about 2:30 a.m. local time, the deck cargo barge *Ho'omaka Hou* (US) was under tow by the towing vessel *Hoku Loa* (US) off the northeast coast of the big island of Hawaii en route to Hilo, when 50 40-foot containers stacked on the after deck of the barge toppled, causing 21 to fall into the ocean. There were no injuries or pollution reported. Eight containers were eventually recovered by salvors, and 13 remain missing. Cargo loss was estimated at $1.5 million, and damage to the barge and containers was estimated at $131,000.

The NTSB determined that the probable cause of the collapse of container stacks onboard the barge *Ho'omaka Hou* towed by the *Hoku Loa* was the company's failure to provide the barge team with an initial barge load plan, as well as inadequate procedures for monitoring stack weights, which led to undetected reverse stratification of container stacks that subjected the stacks' securing arrangements to increased forces while in transit at sea.

Recommendations: None
Brief Issued: April 6, 2021

Collision between Offshore Supply Vessel *Cheramie Bo Truc No 22* and Articulated Tug and Barge *Mariya Moran/Texas*
Port Arthur, Texas
November 14, 2019

On November 14, 2019, about 4:15 a.m. local time, the offshore supply vessel *Cheramie Bo Truc No 22* (US) was outbound for sea transiting Sabine Pass with a crew of five, when it collided with the inbound articulated tug and barge (ATB) *Mariya Moran/Texas* (US), with a pilot and nine crew aboard, in the vicinity of Texas Point. About 6,641 gallons of diesel oil were released, and the waterway was closed for 12 hours. No injuries were reported. The *Cheramie Bo Truc No 22*, valued at $1.2 million, was declared a total loss. The *Mariya Moran* and *Texas* sustained $654,572 in damages.

The NTSB determined that the probable cause of the collision between the offshore supply vessel *Cheramie Bo Truc No 22* and ATB *Mariya Moran/Texas* was the offshore supply vessel mate's turn across the path of the ATB during a meeting situation. Contributing to the accident was a lack of early communication from both vessels**.**

Recommendations: None
Brief Issued: March 25, 2021

Contact of *Savage Voyager* Tow with Jamie Whitten Lock & Dam
Dennis, Mississippi
September 8, 2019

On September 8, 2019, at 3:55 a.m. local time, the towing vessel *Savage Voyager* (US) and its tow of two loaded tank barges were engaged in southbound locking operations at the Jamie Whitten Lock & Dam on the Tennessee-Tombigbee Waterway, 6 miles from Dennis, Mississippi. After lock operations began, the bow of barge *PBL 3422* contacted the lock's upper gate sill and was hung up as the water level dropped, resulting in hull failure and a cargo tank breach. About 117,030 gallons (2,786 barrels) of crude oil were released into the lock. No injuries were reported. The damaged barge cost $402,294 to repair, and costs to return the lock to service 18 days later were about $4 million.

The NTSB determined that the probable cause of the contact of the *Savage Voyager*'s tow with the Jamie Whitten Lock & Dam was the tow moving out of position in the lock chamber while locking down when the crew did not effectively monitor and maintain the vessel's position during its descent, resulting in the aft barge becoming hung on the upper gate miter sill.

Recommendations: None
Issued Adopted: February 19, 2021

Contact of Liquid Petroleum Gas Carrier *Levant* with Mooring Dolphin
Ferndale, Washington
December 15, 2019

On December 15, 2019, about 4:06 a.m. local time, the liquefied petroleum gas carrier *Levant* (MH) was shifting 0.7 miles from its anchorage to the Petrogas Ferndale Wharf in Ferndale, Washington, when it struck the wharf's south mooring dolphin. The mooring dolphin and catwalk connecting it to the wharf were destroyed, and the *Levant*'s forward ballast tank was penetrated and flooded. There were no injuries to the vessel's crew or persons on the wharf. There was no release of pollutants or the ship's liquified cargo of propane and butane. Damage to the vessel was estimated at $1.5 million. Damage to the south mooring dolphin and adjoining catwalk was estimated at $6.75 million.

The NTSB determined that the probable cause of the contact of the liquid petroleum gas carrier *Levant* with a mooring dolphin at the Petrogas Ferndale Wharf was the pilot's approach with excessive speed and at too steep an angle, resulting from the pilot's and bridge team's poor bridge resource management.

Recommendations: None
Brief Issued: January 19, 2021

International Accident Brief

The Office of Marine Safety is 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. In a unique case, a Canadian flag bulker on domestic voyage between two Canadian ports experienced a marine casualty approaching the Soo Locks, in Sault Sainte Marie, Michigan.

The Transportation Safety Board of Canada requested to be granted substantially interested state status from the US Coast Guard and reviewed both the NTSB's and the US Coast Guard's completed reports.

Contact of Bulk Carrier *Atlantic Huron* with the Soo Locks West Center Pier Sault Sainte Marie, Michigan
July 5, 2020

On July 5, 2020, about 2:50 a.m. local time, the self-unloading bulk carrier *Atlantic Huron* (CA) was transiting the Upper St. Mary's River, west of the Soo Locks, in Sault Sainte Marie, Michigan, with a crew of 25. While on approach to the locks and attempting to slow, the vessel experienced a propulsion problem involving the vessel's controllable pitch propeller system. The vessel subsequently contacted the west center pier at 6.8 knots. Before reaching the lock gate, the vessel's motion was halted, and the crew moored the vessel to the pier. No pollution or injuries were reported. Damages to the vessel ($1,633,000) and pier ($573,000) were estimated at $2.2 million.

The NTSB determined that the probable cause of the contact between the *Atlantic Huron* and the west center pier at Soo Locks was a failure to follow the manufacturer's requirement to use thread-locking fluid during installation of the feedback ring locking pin set screw on the vessel's controllable pitch propeller system, which led to the failure of the controllable pitch propeller's oil distribution box.

Recommendations: None
Brief Issued: April 13, 2021

Investigative Hearings

Investigative hearings are public hearings related to investigations in which the agency is authorized to obtain testimony under oath. When the Coast Guard, as part of the investigation of a major marine casualty, holds a Marine Board of Investigation Hearing, NTSB investigators join in as an equal partner. Consistent with Coast Guard responsibility to direct the course of the investigation, those NTSB investigators designated by the Marine Board of Investigation may (1) make recommendations about the scope of the investigation, (2) call and examine witnesses, and (3) submit or request additional evidence.

USCG Formal Marine Board of Investigation Investigative Hearing into the Sinking of the US Fishing Vessel *Scandies Rose*
Seattle, Washington
February 22 to March 5, 2021

The NTSB did not hold a public hearing or take depositions for this accident. From February 22 to March 5, 2021, the Coast Guard conducted a formal hearing into the

accident. During the hearing, Coast Guard and NTSB investigators questioned 43 individuals, including the surviving crewmembers, company management, commercial fishing vessel workers, industry safety educators and advocates, naval architects, Coast Guard personnel, and commercial fishing industry stakeholders.

Other Efforts and Focus Areas

Meetings and Presentations

- MAIIF Annual Meetings
  - MAIIF General virtual meeting, May 20-21, 2021
  - Americas MAIIF virtual meeting, August 9-12, 2021
- IMO sub-committee meetings
  - MS Director attended the IMO Sub-Committee on Implementation of IMO Instruments (III), July 1-5, 2021

Seafloor Workshop

The second segment of an NTSB Seafloor Workshop was held on December 16, 2020 and featured seven virtual presentations covering both aviation and marine investigations. Over 70 participants from more than two dozen countries discussed technologies, trends, and issues related to seafloor operations. The 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.*

Ongoing Significant Marine Accident Investigations

Location	Date	Description	Fatalities
Chignik Lagoon, Alaska	9/22/2021	F/V *Alice A (US) & F/V Alrenice* (US) fire	0
New Orleans, Louisiana	8/29/2021	5 vessels - Hurricane Ida	0
Jean Lafitte, Louisiana	8/29/2021	Leo Kerner Bridge – Hurricane Ida	0
Bath, Maine	7/30/2021	*Mary E* (US)	0
Anchorage, Alaska	7/29/2021	*Tenacious* (US)	0
New Orleans, Louisiana	7/12/2021	*Jalma Topic* (LR)	0
Grand Isle, Louisiana	6/25/2021	*Elliot Cheramie* (US)	0
Fernandina Beach, Florida	6/15/2021	*Safe Catherine Lane* (US)	0
Brooklyn, New York	6/5/2021	*Seastreak Commodore* (US)	0
St. Louis, Missouri	5/18/2021	TV *Mary Lynn* (US), engine room fire	0
Atlantic Ocean, 85 miles east of Cape Cod, Massachusetts	4/30/2021	Fishing vessel *Nobska* (US), engine room fire	0
Santa Barbara Channel, California	4/28/2021	Container ship *President Eisenhower* (US), engine room fire	0
Seattle, Washington	4/22/2021	Ferry *Wenatchee* (US), engine room fire	0

Location	Date	Description	Fatalities
Gulf of Mexico, Port Fourchon, Louisiana	4/13/2021	Lift boat *Seacor Power* (US), capsizing/listing	13
Abbeville, Louisiana	3/22/2021	TV *Ava Claire* (US), contact w/lock	0
Alton, Illinois	3/19/2021	TV *Kevin Michael* (US), contact w/lock	0
Baton Rouge, Louisiana	3/17/2021	TV *Miss Dorothy* (US), engine room fire	0
Ingleside, Texas	3/16/2021	MV *Riverside* (MT), main engine shut down	0
New Orleans, Louisiana	3/16/2021	MV *Bow Tribute* (NO), contact w/water intake facility	0
Marquesas Keys, Florida	3/16/2021	Yacht *La Dolce Vita* (VC), fire	0
Pier 24, Tacoma, Washington	2/17/2021	FV *Aleutian Falcon* (US), fire	0
Sturgeon Bay, Wisconsin	2/1/2021	Lake Bulker *Roger Blough* (US), engine room fire	0
Rigolets Pass, Pennsylvania	1/13/2021	TV *Robert Cenac* (US), contact w/ CSX bridge	0
South Pass 83, Louisiana	1/7/2021	*Ocean Princess* (US) / *South Pass 83A*, contact	0
Yabucoa, Puerto Rico	12/24/2020	Integrated towing vessel (ITV) *Proassist III* (US), flooding	0
Honolulu, Hawaii	12/19/2020	Offshore supply vessel *Ocean Intervention* (US), engine explosion	0
Pascagoula, Mississippi	12/11/2020	FV *Lucky Angel* (US), fire	0
20 nm NO of Provincetown, Massachusetts	11/23/2020	FV *Emmy Rose* (US), flooding	4
Lafitte, Louisiana	11/22/2020	ITV *Trent Joseph* (US), collision	0
Chesapeake, Virginia	11/14/2020	ITV *Island Lookout* (US), contact w/bridge	0
Gulf of Mexico	10/17/2020	MV *Atina* (MT) / *SP-57B* (US), contact	
Sabine Pass, Texas	10/11/2020	*Cheramie Bo-TRUC No.* 33 (US) / US Coast Guard cutter *Harry Claiborne*, collision	0
Ekuk Beach, Alaska	8/31/2020	Barge *SM-3* (US), grounding/stranding	0
Corpus Christi, Texas	8/21/2020	Dredge *Waymon L Boyd* (US), fire/explosion	2
Jacksonville, Florida	6/4/2020	MV *Höegh Xiamen* (NO), fire/explosion	0
Galveston Bay Entrance, Texas	1/14/2020	FV *Pappy's Pride* (US) / *Bow Fortune* (NO), collision	3

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

RAILROAD, PIPELINE AND HAZARDOUS MATERIALS INVESTIGATIONS

	($000s)	FTEs
FY 2022 Estimate	$8,808	32
FY 2023 Request	$9,582	33
Increase/Decrease	$774	1

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. An increase of 1 FTE is supported by this funding level. No other program changes are planned.

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, and evacuation of residences.

The division does not investigate every railroad accident reported to the Federal Railroad Administration (FRA) or every rail transit accident reported to the Federal Transit Administration (FTA). To use NTSB resources most efficiently, criteria have been established to help identify for investigation those accidents that pose significant safety issues. The division also assesses selected railroad safety issues, often based on a set of accident investigations specifically undertaken as the basis for such study. In other cases, the special studies 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 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. The division also 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 mode, 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.

Investigations typically involve 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 reports and briefs to ensure that they are logical and well-organized. In addition, the division's editors ensure the quality of NTSB responses to notices of proposed rulemaking, papers, congressional testimony, and speeches on matters pertaining to railroad, pipeline, and hazardous materials safety. The division is also responsible for the effective development of the NTSB's transportation safety policy, guidance, protocols, applicable portions of NTSB orders, and replies to safety inquiries from Congress, other federal agencies, state and local agencies, industry, and the public.

Accomplishments and Ongoing Efforts – Railroad Division

This division's accomplishments include the issuance of products related to transportation safety arising from completed and ongoing investigations. Products completed through September 30, 2021, are described below.

Railroad Accident Reports

Investigation reports on major accidents are adopted and issued by the Board.

Amtrak Roadway Worker Fatality
Bowie, Maryland
April 24, 2018

On April 24, 2018, about 8:58 a.m. local time, northbound Amtrak train 86 struck and killed an Amtrak rail gang watchman near the Bowie State Train Station in Bowie, Maryland. The accident occurred on main track 1 at milepost 119.2 on the Philadelphia to Washington line, located on Amtrak's Northeast Corridor. At the time of the accident, main track 2 was out of service under a continuous track outage for track maintenance, and the adjacent tracks immediately to the east and west of main track 2 (main tracks 1 and 3, respectively) were in service for train movements. Three watchmen were protecting the roadway workers and watching for trains moving on adjacent tracks to warn workers of approaching trains. One watchman was positioned near the boarding platform, another was positioned in a nearby curve, and the third watchman was positioned toward the end of the curve, near a work gang of welders. The third watchman was the employee struck by the train. No passengers or crewmembers on Amtrak train 86 were injured.

The NTSB determined that the probable cause of the accident was Amtrak's insufficient site-specific safety work plan for the Bowie project that (1) did not consider the multiple main tracks in a high noise environment and (2) did not provide the rail gang watchman with a safe place to stand with level footing and sufficient sight distance to perform his duties, which led him to stand on an active track in a work zone in the path of Amtrak train 86. Contributing to the accident was Amtrak's decision to use train approach warning for roadway worker protection in lieu of the protections that could have been provided by the positive train control system.

We identified the following safety issues in this investigation: (1) inadequate site-specific safety risk assessment, (2) unsafe train speeds in established work zones and, (3) ineffective roadway worker protection.

The NTSB issued three new safety recommendations. Recipients included the FRA, the Amtrak, and Class I railroads. We also reiterated two previously issued recommendations.

Recommendations:	3 new, 2 reiterated
Report Adopted:	September 27, 2021

BNSF Railway Collision
Kingman, Arizona
June 5, 2018

On June 5, 2018, about 2:50 p.m. local time, a westbound BNSF Railway intermodal train operating in multiple main tracks in centralized traffic control territory collided with the rear of a slow-moving eastbound work train in an area known as Crozier Canyon, about 33 miles east of Kingman, Arizona. The westbound intermodal train consisted of one forward-facing locomotive and two rear-facing locomotives at the front of the train and 72 loaded cars; the loaded eastbound work train consisted of 29 cars and 2 forward-facing locomotives. After assuming the work train was headed west based on radio transmissions, the westbound intermodal train crew decided to proceed past a red restrictive signal at a speed slow enough, but not exceeding 15 mph, to permit stopping short of a train, a car, an obstruction, a stop signal, a derail, or an improperly lined switch, but tall trees on the inside of the curve impaired visibility. Both trains were operating with positive train control. One contract employee traveling on the work train died; another contract employee was air lifted to a hospital in Las Vegas with serious injuries.

The NTSB determined that the probable cause of the accident was the failure of the BNSF Railway train crew of the intermodal train to operate in accordance with restricted speed requirements and stop short of the opposing train. Contributing to the accident was (1) BNSF Railway's failure to establish sufficient on-track safety and (2) the FRA's interpretation of Title 49 *CFR* Part 214 Subpart C that allows work trains to lay rail without using a form of on-track safety.

We identified the following safety issues in this investigation: (1) protection of roadway workers and (2) restricted speed accidents.

The NTSB issued two new safety recommendations to the FRA.

Recommendations:	2 new
Report Adopted:	May 10, 2021

Collision of Union Pacific Railroad train MGRCY04 with a Stationary Train
Granite Canyon, Wyoming
October 4, 2018

On October 4, 2018, at 7:40 p.m. local time, an eastbound Union Pacific Railroad freight train (striking train) collided with the rear of a stationary Union Pacific Railroad freight train (stationary train) after cresting a hill and descending a grade for about 13 miles. The striking train consisted of 3 leading locomotives and 105 railcars. The locomotive engineer and conductor of the striking train were killed, and 3 locomotives and railcars 1 through 57 of the striking train derailed; 8 railcars of the stationary train derailed. Damages were estimated by Union Pacific Railroad to be $3.2 million.

The NTSB determined that the probable cause of the collision was the failure of the striking train's air brake system, due to an air flow restriction in the brake pipe, and the failure of

the end-of-train device to respond to an emergency brake command. Contributing to the accident was the failure of Union Pacific Railroad to maintain the railcars in accordance with federal regulations, including performing single railcar air brake tests regularly. Further contributing to the accident were communication protocols, set by FRA regulations and industry standards, that allowed extended time intervals for loss of communication notification between the head-of-train device and the end-of-train device without warning the train crew of the loss of communication.

We identified the following safety issues in this investigation: (1) railcar maintenance, inspection, and testing; (2) end of train device communication; and (3) loss of telemetry communication in grade locations.

The NTSB issued five new safety recommendations. Recipients included the FRA, the Association of American Railroads, and the American Short Line and Regional Railroad Association. We also reiterated three previously issued recommendations.

Recommendations:	5 new, reiterated 3
Report adopted:	December 29, 2020

CSX Train Derailment with Hazardous Materials Release
Hyndman, Pennsylvania
August 2, 2017

On August 2, 2017, at 4:54 a.m. local time, 33 rail cars on a CSX train derailed in Hyndman Borough, Bedford County, Pennsylvania. The train consisted of 5 locomotives and a total of 178 cars (128 loaded and 50 empty), including derailed cars 53 through 65. Three derailed tank cars containing hazardous materials were breached, resulting in a fire and damage to three homes. No injuries or loss of life occurred. A 1-mile radius evacuation zone was established, which affected about 1,000 residents, and several highway-railroad grade crossings were closed. The evacuation was lifted about 12:00 p.m. on August 5. CSX reported $1.8 million in damages for the derailed equipment and $60,000 in damages to the track structure.

The NTSB determined the probable cause of the accident was the inappropriate use of hand brakes on empty rail cars to control train speed, and the placement of blocks of empty rail cars at the front of the train consist, leading to elevated longitudinal forces and increased lateral forces at the wheel-rail interface at the curve in the rail on the leading 42 cars, combined with tread buildup on the 35th car, which was the first to derail. Contributing to the derailment were CSX operating practices that accepted the use of hand brakes on empty rail cars to control train speed and allowed blocks of empty rail cars to be placed at the front of the train consist.

We identified the following safety issues in this investigation: (1) operating practices for building train consists, (2) the use of hand brakes to control train movement, and (3) the assessment and response to fires involving jacket tank cars.

The NTSB issued six new safety recommendations. Recipients included the FRA, CSX, the American Association of Railroads, and the Security and Emergency Response Training Center.

Recommendations: 6 new
Report Adopted: November 23, 2020

Ongoing Significant Railroad Accident Investigations

Location	Date	Description	Fatalities
Joplin, Montana	9/25/2021	National Railroad Passenger Corporation Derailment with Passenger Fatalities	3
Castroville, Texas	9/22/2021	Union Pacific Railroad Contractor Employee Fatality	1
Newington, New Hampshire	5/19/2021	Pan Am Railways Conductor Fatality	1
Louisiana, Missouri	4/7/2021	BNSF Railway Employee Fatality	1
Vail, Arizona	1/31/2021	Union Pacific Railroad Employee Fatality	1
Tupelo, Mississippi	12/23/2020	Kansas City Southern Railway Company Employee Fatality	1
Pritchard, Alabama	11/17/2020	Continental Rail Incorporated Contractor Employee Fatality	1
North Canaan, Connecticut	10/14/2020	Housatonic Railroad Employee Fatality	1
Bronx, New York	9/10/2020	New York City Transit Employee Fatality	1
Tempe, Arizona	7/29/2020	National Railroad Passenger Corporation Derailment with Passenger Fatalities	0
Draffin, Kentucky	2/13/2020	CSX Freight Train Derailment with Hazardous Materials Release	0
Sacramento, California	8/22/2019	Collision Between Sacramento Regional Transit District Light Rail Vehicles	0
Philadelphia, Pennsylvania	7/8/2019	Southeastern Pennsylvania Transit Authority Train Struck Two Track Workers	1
Baltimore, Maryland	2/7/2019	Norfolk Southern Railway Conductor Fatality	1
Upper Darby, Pennsylvania	8/22/2017	Rear-End Collision Between Southeastern Pennsylvania Transit Authority Trains	0

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

Accomplishments and Ongoing Efforts – Pipeline

This division's accomplishments include issuance of products related to transportation safety arising from completed and ongoing investigations. The products completed through September 30, 2021, are described below.

Pipeline Accident Report

Investigation reports on major accidents are adopted and issued by the Board.

Pacific Gas & Electric Third-Party Line Strike and Fire
San Francisco, California
February 6, 2019

On February 6, 2019, at 1:07 p.m. local time, the excavator operator for a third-party contractor, Kilford Engineering Inc., impacted a Pacific Gas & Electric Company (PG&E) branch connection with the mini excavator trenching bucket attachment during mechanical excavation for fiberoptic conduit installation, which resulted in the release and ignition of natural gas. The accident occurred in the Richmond District, a neighborhood in San Francisco, California. A nearby restaurant with a rental unit above caught fire. There were no injuries. Estimated damages to nearby buildings and the pipeline system exceeded $10 million.

The NTSB determined that the probable cause of the February 6, 2019, release of natural gas from the Pacific Gas & Electric Company distribution pipeline and the subsequent fire was the failure of the Kilford Engineering Inc. operator and spotter to follow safe excavation practices within the tolerance zone, which resulted in the mini excavator trenching bucket attachment impacting the pipeline's branch connection.

We identified the following safety issues during this investigation: (1) third-party excavation damage to buried natural gas pipelines, (2) enforcement challenges of California's damage prevention law, (3) PG&E's data integration gaps during the development of the VIP, and (4) insufficient joint emergency response planning between PG&E and San Francisco, California, emergency response agencies.

As a result of this investigation, the NTSB issued 3 new safety recommendations. Recipients included the PG&E, the San Francisco Police Department, the San Francisco Fire Department, and the San Francisco Department of Emergency Management.

Recommendations: 3 new
Report Adopted: July 27, 2021

Atmos Energy Corporation Natural Gas-Fueled Explosion
Dallas Texas
February 23, 2018

On February 23, 2018, at 6:38 a.m. local time, a natural gas–fueled explosion occurred at a residence in Dallas, Texas. The residence sustained major structural damage, but when

first responders arrived on scene at 6:44 a.m., they observed no smoke or fire. Four family members had been injured and one killed in the explosion. Following the explosion, NTSB investigators located a through-wall crack in the 71-year-old natural gas main that served the residence. In the 2 days before this explosion, two gas-related incidents had occurred on the same block at houses served by the same natural gas main, each incident resulting in significant structural damage and burn injuries to one occupant.

The NTSB determined that the probable cause of the explosion was the ignition of an accumulation of natural gas that had leaked from a gas main damaged during a sewer replacement project 23 years earlier and undetected by Atmos Energy Corporation's investigation of two related natural gas incidents on the 2 days prior to the explosion. Contributing to the explosion was Atmos Energy Corporation's insufficient wet weather leak investigation procedures. Contributing to the severity of the explosion was Atmos Energy Corporation's inaction to isolate the affected main and evacuate the houses. contributing to the degradation of the pipeline system was Atmos Energy Corporation's inadequate integrity management program.

We identified the following safety issues during this investigation: (1) incident investigation, (2) leak investigation, (3) methane detection, (4) incident reporting, and (5) integrity management.

As a result of this investigation, the NTSB issued 13 new safety recommendations. Recipients included the Pipeline and Hazardous Materials Safety Administration, the Railroad Commission of Texas, the Dallas Fire-Rescue Department, Atmos Energy Corporation, and the Gas Piping Technology Committee. The NTSB also reiterated three previously issued recommendations.

Recommendations: 13 new, 3 reiterated
Report Adopted: January 12, 2021

Ongoing Significant Pipeline Accident Investigations

Location	Date	Description	Fatalities
Coolidge, Arizona	8/15/2021	Transmission pipeline rupture and fire	2
Farmersville, Texas	6/28/2021	Release of natural gas and flash fire from pipeline during pigging	2
Hillsboro, Kentucky	5/4/2020	Natural gas pipeline rupture and fire in rural area	0
Danville, Kentucky	8/1/2019	Natural gas pipeline rupture and fire affecting nearby homes	1

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

Accomplishments and Ongoing Efforts – Hazardous Materials Investigations

This division's accomplishments include the issuance of products related to transportation safety arising from completed and ongoing investigations. The product completed through September 30, 2021, is described below.

Safety Recommendation Report

During accident or incident investigations, safety issues are sometimes identified that warrant Board adoption of safety recommendations outside of a final report or brief. Safety recommendation reports, which may be issued at any time during an accident investigation, are used to make recommendations on such issues. 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."

Placement of DOT-111 Tank Cars in High Hazard Flammable Trains and the Use of Buffer Cars for the Protection of Train Crews

The NTSB investigated two separate derailments of high hazard flammable trains in Draffin, Kentucky, and Fort Worth, Texas, that resulted in breached tank cars and hazardous material fires. We found that, in both derailments, least-protective DOT-111 tank cars had been placed in positions that increased the risk of derailment and breaching of the tank cars, resulting in release of their hazardous materials contents. Additionally, in Draffin, Kentucky, the lead locomotives were separated from the hazardous materials tank cars by only one buffer car, which shortened the distance between the breached tank cars and the crewmembers, increasing the risk of injury or death.

The NTSB issued one new recommendation. Recipients included the Association of American Railroads, the American Short Line and Regional Railroad Association, and the Renewable Fuels Association. We also reiterated two previously issued recommendations.

Recommendation(s): 1 new, 2 reiterated
Report Adopted: December 2, 2020

Ongoing Significant Hazardous Materials Investigation

Location	Date	Description	Fatalities
Beach Park, Illinois	4/25/2019	Anhydrous Ammonia release from nurse tanks	0

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

RESEARCH AND ENGINEERING

	($000s)	FTEs
FY 2022 Estimate	$12,974	47
FY 2023 Request	$14,875	48
Increase/Decrease	$1,901	1

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. An increase of 1 FTE is supported by this funding level. No other program changes are planned.

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 two program areas, 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 includes 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, 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 (FDRs) and cockpit voice recorders (CVRs), 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 illicit substances.

Program Area - Chief Data Scientist

The chief data scientist supports the agency-wide effort to better utilize data for strategic decision-making and is designated 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.

Accomplishments and Ongoing Efforts

Safety Research Division

In FY 2021, the Safety Research Division responded to 268 requests for data analysis and statistical information from other NTSB offices, Board members, Congress, and the public. In addition to responding to these requests, division staff evaluated safety issues for multiple accident investigations, published two annual statistical reviews of aviation accidents, completed and issued a research study and safety recommendations on turbulence-related accidents and injuries, and began work on a new study of polydrug use among drivers in the United States. These are some examples of the division's efforts:

Preventing Turbulence-Related Injuries in Air Carrier Operations Conducted Under Title 14 *Code of Federal Regulations* Part 121
Safety Research Report

Turbulence-related accidents are the most common type of accident involving air carriers operating under Title 14 *CFR* Part 121. From 2009 through 2018, the NTSB found that turbulence-related accidents accounted for more than a third of all Part 121 accidents; most of these accidents resulted in one or more serious injuries but no aircraft damage. This research examined safety issues related to the turbulence problem from a systemwide perspective. The NTSB's research (1) summarized the basic types and causes of turbulence; (2) described the safety impacts of turbulence, including characteristics of and trends in turbulence-related accidents and injuries across Part 121 air carrier operations; (3) examined methods used to reduce the likelihood of turbulence encounters and turbulence-related injuries in Part 121 air carrier operations; and (4) identified proven and emerging best practices and safety countermeasures.

Safety issues addressed included (1) insufficient submission and dissemination of turbulence observations, (2) a lack of shared awareness of turbulence risks, (3) the need for mitigation of common turbulence-related injury circumstances, and (4) the need for updated turbulence guidance.

As a result of this research, the NTSB made safety recommendations to the FAA, the National Weather Service, Airlines for America, the Regional Airline Association, and the National Air Carrier Association.

Recommendations: 21 new, 4 reiterated
Report Adopted: August 10, 2021

Capsizing and Sinking of Commercial Fishing Vessel *Scandies Rose*
Sutwik Island, Alaska
December 31, 2019

The commercial fishing vessel Scandies Rose sank 2.5 miles south of Sutwik Island, Alaska. The vessel had a crew of seven; two were rescued, but five others missing after the accident have never been found. Division staff completed a geospatial study to help

investigators visualize icing accumulation conditions at the time of the accident using an algorithm developed for predicting vessel sea spray icing.

Report Adopted: June 29, 2021

Midair Collision over George Inlet, de Havilland DHC-2, N952DB, and de Havilland DHC-3, N959PA
Ketchikan, Alaska
May 13, 2019

Two float-equipped airplanes—a de Havilland DHC-2 and a de Havilland DHC-3—collided in midair about 8 miles northeast of Ketchikan, Alaska. On the DHC-2, the pilot and four passengers sustained fatal injuries. On the DHC-3, the pilot sustained minor injuries, nine passengers sustained serious injuries, and one passenger sustained fatal injuries. Division staff completed data and statistical analysis requests used in the investigation, public meeting, and final report.

Report Adopted: April 20, 2021

Fire Aboard Small Passenger Vessel *Conception*
Santa Cruz Island, California
September 2, 2019

A 75-foot commercial diving vessel *Conception,* with 39 persons on board, burned to the waterline and subsequently sank in about 60 feet of water. Thirty-three passengers and one crewmember died. Division staff completed a data report on small passenger vessel accident characteristics and the prevalence of accidents and injuries involving these vessels in the United States.

Report Adopted: October 20, 2020

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

A 2013 Dodge Journey sport utility vehicle (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. 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 for this investigation.

Investigation in Process

Hazardous Liquid Pipeline Strike and Subsequent Explosion and Fire Aboard Dredging Vessel *Waymon Boyd*
Corpus Christi, Texas
August 21, 2020

The US-flagged dredge vessel *Waymon Boyd* struck a submerged 16-inch liquid propane pipeline during dredging operations in Corpus Christi, Texas. 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 and final report.

Investigation in Process

Crash Involving Three Combination Vehicles, a Motorcoach, and a Passenger Vehicle
Mount 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 codriver of one of the other vehicles involved died, and 59 motorcoach passengers were injured. Division staff supported the investigation by summarizing research on the effects of rotating schedules on sleep and alertness, fatigue risk management programs, and biomathematical models of fatigue.

Investigation in Process

Drug and Polydrug 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 in the highway mode. The NTSB 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 will examine the polydrug use problem and develop safety recommendations to help reduce highway accidents and injuries. Specifically, the research goals are to (1) review and describe what is known about the association between the use of various drugs and highway crash risk, (2) document drugged driving prevalence and trends in the United States using the best currently available data, and (3) identify and promote the use of best practices for documenting drugged driving prevalence and understanding the associated crash risk.

Investigation in Process

2018 US Civil Aviation Accident Summary
2019 Preliminary Aviation Accident Statistics
Annual Reports

Division staff compiled, organized, and published the agency's *2000-2019 Preliminary Aviation Statistics* on October 27, 2020, and the *Calendar Year 2018 Summary of US Civil Aviation Accidents* on December 16, 2020. Division staff 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 2018.

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. Examples of these efforts include the following:

Pacific Gas & Electric Third-Party Line Strike and Fire
San Francisco, California
February 6, 2019

The excavator operator for a third-party contractor, Kilford Engineering Inc., impacted a Pacific Gas & Electric Company branch connection with a mini excavator trenching bucket attachment during mechanical excavation for fiberoptic conduit installation, which resulted in the release and ignition of natural gas. The accident occurred in the Richmond District in San Francisco, California. Division staff provided materials failure analysis of the failed pipe section.

Report Adopted: July 27, 2021

Atmos Energy Corporation Natural Gas-Fueled Explosion
Dallas, Texas
February 23, 2018

In close succession, a natural gas-fueled explosion occurred at a single-story residence in Dallas, Texas; an explosion and subsequent fire occurred at another residence less than 415 feet from the first explosion; and a structural fire occurred at a third residence less than 310 feet from the first explosion. Division staff conducted a metallurgical evaluation of a leak in a natural gas service main that runs along a common alley servicing the properties. Staff also supported the fire and explosion investigations.

Report Adopted: January 12, 2021

Fire Aboard Small Passenger Vessel *Conception*
Santa Cruz Island, California
September 2, 2019

A 75-foot commercial diving vessel *Conception,* with 39 persons on board, burned to the waterline and subsequently sank in about 60 feet of water. Thirty-three passengers and one crewmember died. Division staff provided fire and explosion expertise, examining the vessel wreckage and determining the fire origin, cause, and tenability. Staff also prepared multi-physics computational fire models using a fire dynamics simulator and Pyrosym to aid investigators in understanding the nature of the fire.

Report Adopted: October 20, 2020

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 Inc. 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, resulting in two fatalities and one injury. 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

Atmos Energy Corporation Natural Gas-Fueled Explosion During Routine Maintenance
Farmersville, Texas
June 28, 2021

Routine natural gas pipeline maintenance activities involving the insertion of an in-line inspection tool (pig) into a launcher, near Farmersville, Texas, resulted in an explosion that ejected the pig from the launcher shortly after it was inserted (while employees were manually removing a metal insertion tool). The explosion was directed toward four employees, injuring all of them, two fatally. Preliminary information indicates that natural gas was leaking into the launcher, through the flare flow line, and venting through the flare tip following the explosion. There were two valves that connected the launcher to the gas transmission system, which was owned and operated by Atmos. The NTSB retained these two valves as evidence for further evaluation. Division staff performed leak testing on the valves and used valve leak data to perform multiphysics computer simulations to investigate the explosion. Staff also inspected the pig for potential ignition sources.

Investigation in Process

Multivehicle Crash Involving a Truck Tractor in Combination with a Semitrailer
Greenville, Alabama
June 19, 2021

A multivehicle crash involving a truck tractor in combination with a semitrailer occurred along Interstate 65 near Greenville, Alabama, approaching the bridge over Pigeon Creek. In total, 12 vehicles and 38 vehicle occupants were involved. As a result of the multiple collisions, a fire ensued. Fire consumed two combination units, a van, and three other vehicles. Ten passengers died, and 26 people sustained injuries. Division staff launched to the accident site and performed a cause and origin investigation of the fire.

Investigation in Process

Crash Involving a Tesla Model S
Spring, Texas
April 17, 2021

A 2019 Tesla Model S electric passenger car with two occupants crashed while traveling on a residential street in Spring, Texas. The vehicle departed the roadway while negotiating a curve and collided with a tree. A postcrash fire ensued that fully engulfed the vehicle. Local firefighters had a difficult time extinguishing the fire, and the vehicle's batteries reignited on several occasions. Both occupants were fatally injured. Division staff conducted a metallurgical evaluation of the fire-damaged steering wheel to determine whether an occupant had been in the driver's seat at the time of the collision.

Investigation in Process

United Airlines Flight 328 Boeing 777 Engine Incident
Denver, Colorado
February 20, 2021

United Airlines flight 328, a Boeing 777-222, experienced a failure of the right engine, a Pratt & Whitney PW4077, shortly after takeoff from Denver International Airport, in Denver, Colorado. The airplane sustained minor damage, but there were no injuries to the 239 passengers and crew on board. Division staff provided oversight of the metallurgical failure analysis.

Investigation in Process

Union Pacific Railroad Freight Train Derailment, Hazardous Material Release and Fire
Tempe, Arizona
July 29, 2020

A Union Pacific Railroad freight train with 3 locomotives and 97 mixed-freight cars derailed 12 cars as the train traveled over a wooden trestle leading up to a steel superstructure bridge over Tempe Town Lake in Tempe, Arizona. One derailed tank car

that fell from the trestle released 2,201 gallons of cyclohexanone, causing a fire. Division staff provided a metallurgical failure analysis of fractured track.

Investigation in Process

Natural Gas Pipeline Rupture and Fire
Hillsboro, Kentucky
May 4, 2020

A 30-inch-diameter natural gas transmission pipeline owned and operated by Enbridge Inc. ruptured near Hillsboro, Kentucky. About 148 million cubic feet of natural gas was released. The rupture occurred at a girth weld and resulted in a crater about 20 feet wide. Staff provided oversight of the metallurgical failure analysis.

Investigation in Process

Natural Gas Pipeline Rupture and Fire
Danville, Kentucky
August 1, 2019

A 30-inch-diameter natural gas transmission pipeline owned and operated by Enbridge Inc. ruptured and released about 66 million cubic feet of natural gas, which then ignited. The accident resulted in the death of 1 person, the hospitalization of 6 people, and the evacuation of 75 residents from the Indian Camp mobile home park near Danville, Kentucky. Division staff provided metallurgical expertise at the accident scene, determined the key evidence to examine, and performed a full metallurgical failure analysis of the failed pipe section.

Investigation in Process

Anhydrous Ammonia Release from a Nurse Tank Trailer
Beach Park, Illinois
April 25, 2019

About 750 gallons of anhydrous ammonia liquefied compressed gas were released from two 1,000-gallon nurse tanks mounted on a farm trailer that was being pulled by a tractor applying the liquid as a fertilizer. As a result of the hazardous materials release, 41 people, including 11 first responders, were injured and treated for various degrees of injury from non-life-threatening to critical. Division staff inspected and documented the condition of the excess flow valves and the hose connection hardware.

Investigation in Process

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. Here are some examples of these efforts:

Midair Collision over George Inlet, de Havilland DHC-2, N952DB, and de Havilland DHC-3, N959PA
Ketchikan, Alaska
May 13, 2019

Two float-equipped airplanes—a de Havilland DHC-2 and a de Havilland DHC-3—collided in midair about 8 miles northeast of Ketchikan, Alaska. On the DHC-2, the pilot and four passengers sustained fatal injuries. On the DHC-3, the pilot sustained minor injuries, nine passengers sustained serious injuries, and one passenger sustained fatal injuries. Division staff received and attempted to recover data from a wide assortment of devices including cameras, smartphones, tablets, and avionics. Video and data recovered were used in the investigative process.

Report Adopted: April 20, 2021

Crash Involving a Tesla Model 3
Coral Gables, Florida
September 13, 2021

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

Crash Involving a Tesla Model S
Spring, Texas
April 17, 2021

A 2019 Tesla Model S electric passenger car with two occupants crashed while traveling on a residential street in Spring, Texas. The vehicle departed the roadway while negotiating a curve and collided with a tree. A postcrash fire ensued that fully engulfed the vehicle. Local firefighters had a difficult time extinguishing the fire, and the vehicle's batteries reignited on several occasions. Both occupants were fatally injured. Division staff documented security camera footage that was provided to the NTSB. Additionally, staff extracted data from the 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

United Airlines Flight 328, Boeing 777-222, N772UA, Right Engine Failure
Denver, Colorado
February 20, 2021

United Airlines flight 328, a Boeing 777-222, experienced a failure of the right engine, a Pratt & Whitney PW4077, shortly after takeoff from Denver International Airport, in Denver, Colorado. The airplane sustained minor damage, but there were no injuries to the 239 passengers and crew on board. Division staff downloaded and analyzed data from the FDR and the CVR. A group met at NTSB headquarters to produce a transcript of the CVR.

Investigation in Process

Track Maintenance Worker Fatally Injured by 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 a second contractor was seriously injured while performing track maintenance. Division staff analyzed the locomotive's event data recorder, outward- and inward-facing video recordings, and relevant mobile device records.

Investigation in Process

Crash Involving a Motorcoach, Three Combination Vehicles, and a Passenger Vehicle
Mount 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 codriver of one of the other vehicles involved died, and 59 motorcoach passengers were injured. Division staff documented the dashcam video from one of the vehicles involved in the accident.

Investigation in Process

Crash of a Pilatus PC-12
Chamberlain, South Dakota
November 30, 2019

A Pilatus PC-12 operated as a Part 91 flight crashed shortly after takeoff from Chamberlain Municipal Airport in Chamberlain, South Dakota. Including the pilot, 12 people were on board. Nine occupants were fatally injured and three suffered serious injuries. Division staff downloaded and analyzed data from the FDR and the CVR and processed imagery from videos recorded on the ground. A group was convened at NTSB headquarters to produce a transcript of the CVR.

Investigation in Process

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. The airplane received substantial damage. Division staff downloaded and analyzed data from the FDR and the CVR. A group was convened at NTSB headquarters to produce a transcript of the CVR.

Investigation in Process

Vehicle Performance Division

In a typical year, Vehicle Performance staff members 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. Here are some examples of these efforts:

Midair Collision over George Inlet, de Havilland DHC-2, N952DB, and de Havilland DHC-3, N959PA
Ketchikan, Alaska
May 13, 2019

Two float-equipped airplanes—a de Havilland DHC-2 and a de Havilland DHC-3—collided in midair about 8 miles northeast of Ketchikan, Alaska. On the DHC-2, the pilot and four passengers sustained fatal injuries. On the DHC-3, the pilot sustained minor injuries, nine passengers sustained serious injuries, and one passenger sustained fatal injuries. Division staff used ADS-B data, recorded data recovered from one accident aircraft, and onboard photographs and videos recorded by passengers to determine a time history for the relative positions of the two aircraft and the collision geometry. Staff also performed detailed

three-dimensional laser scans of two exemplar aircraft, and then used simulation software to determine the visibility of each aircraft to the pilot of the other aircraft. Staff reconstructed the appearance of the electronic displays in each aircraft, illustrating the traffic information available to the pilot of each aircraft. In addition, staff developed an animation of the accident sequence, highlighting the potential for improving the traffic information available to pilots.

Report Adopted: April 20, 2021

Rapid Descent Into Terrain, Island Express Helicopters Inc., Sikorsky S-76B, N72EX
Calabasas, California
January 26, 2020

A Sikorsky S-76B helicopter entered a rapidly descending left turn and crashed into terrain in Calabasas, California. The pilot and eight passengers died, and the helicopter was destroyed. Division staff used surveillance video to determine the visibility conditions near the location of the accident. Staff also used ADS-B position data to evaluate the motion of the aircraft and determine the forces felt by the pilot to assist human factors experts with evaluating the possibility of spatial disorientation.

Report Adopted: February 9, 2021

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

A Bombardier Inc., 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. 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

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. Division staff are using ADS-B data obtained from the FAA along with computer simulations to understand the sequence of events.

Investigation in Process

Sinking of the Fishing Vessel *Emmy Rose*
Atlantic Ocean near Provincetown, Massachusetts
November 23, 2020

The US Coast Guard District One in Boston, Massachusetts, received an emergency position-indicating radio beacon signal from the commercial fishing vessel *Emmy Rose*. The vessel had been underway with four persons on board. The Coast Guard launched a search and found a debris field, strong diesel odor, and an empty life raft. Division staff mapped the locations of the radio beacon broadcasts and assisted with planning the search for the vessel using sonar. The vessel was located, and it will be further investigated with a remotely operated vehicle.

Investigation in Process

Crash Involving a Motorcoach, Three Combination Vehicles, and a Passenger Vehicle
Mount 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 codriver of one of the other vehicles involved died, and 59 motorcoach passengers were injured. Division staff are performing 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.

Investigation in Process

Crash of a Pilatus PC-12
Chamberlain, South Dakota
November 30, 2019

A Pilatus PC-12 operated as a Part 91 flight crashed shortly after takeoff from Chamberlain Municipal Airport in Chamberlain, South Dakota. Including the pilot, 12 people were on board. Nine occupants were fatally injured and three suffered serious injuries. Division staff are using recorded data from the FDR, coupled with computer simulations and pilot-in-the-loop simulations to understand the sequence of events.

Investigation in Process

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. The airplane received substantial damage. Division staff are using data from the flight recorders and physical evidence to evaluate the aircraft braking performance during the runway overrun.

Investigation in Process

Anhydrous Ammonia Release from a Nurse Tank Trailer
Beach Park, Illinois
April 25, 2019

About 750 gallons of anhydrous ammonia liquefied compressed gas were released from two 1,000-gallon nurse tanks mounted on a farm trailer that was being pulled by a tractor applying the liquid as a fertilizer. As a result of the hazardous materials release, 41 people, including 11 first responders, were injured and treated for various degrees of injury from non-life-threatening to critical. Division staff reviewed ammonia-leak data from the scientific literature and conducted tests of the excess flow valves from the nurse tanks to learn why the excess flow valves did not prevent release of the ammonia.

Investigation in Process

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. Here are some examples of these efforts:

Collision with a Hangar on Takeoff
Addison, Texas
June 30, 2019

A Beech BE-300 collided with a hangar and terrain after takeoff from Addison Airport, in Addison, Texas. The airline transport pilot, the commercial copilot, and eight passengers

sustained fatal injuries. A medical officer is evaluating the flight crew for evidence of medical conditions or use of medications or other substances.

Brief Adopted: May 18, 2021

Sport Utility Vehicle 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. A medical officer is investigating the medical conditions and toxicology findings for both drivers.

Investigation in Process

Collision Between Box Truck, Multiple Bicyclists, and an Outback
Searchlight, Nevada
December 10, 2020

A 2019 Isuzu NPR-HD box truck struck multiple bicyclists and a 2019 Subaru Outback riding along US-95 near Searchlight, Nevada. As a result of the crash, five cyclists were fatally injured; one cyclist and the driver of the Outback sustained serious injuries; and one cyclist sustained minor injuries. A medical officer is investigating the medical conditions and toxicology findings for the driver of the box truck.

Investigation in Process

Freightliner Truck-Tractor Struck Multiple Vehicles
Arlington, Wisconsin
June 12, 2020

A 2013 Freightliner truck-tractor in combination with a 2017 Utility semitrailer was traveling north on Interstate 94 in Arlington, Wisconsin, when it struck multiple vehicles. A traffic queue had formed from two earlier crashes about 2 miles north near exit 119. In the third crash, four people died, including the driver of the 2013 Freightliner and four people were injured; one person was not injured. A medical officer is performing an evaluation of medical conditions for the Freightliner driver.

Investigation in Process

Chief Data Scientist

Through September 30, 2021, the chief data scientist continued to lead agency-wide efforts to better utilize data for strategic decision-making and develop advanced data science

capabilities. During FY 2021, he developed new capabilities for analyzing safety issues, recommendations, and safety actions across all NTSB investigations and created data analysis and visualization tools to improve agency processes. The chief data scientist, along with representatives from the Offices of the Chief Information Officer and Aviation Safety, continued to lead the improvements to SAFTI, as directed by Congress in the NTSB's 2018 budget reauthorization. Using the new reporting capabilities of that system, he developed a library of dashboards for monitoring investigation tasks; he also led an agency workgroup that assessed the use of its labor-cost accounting system to aid in the management of investigations.

As the agency's designated chief data officer, the chief data scientist formed the NTSB Data Governance Body as required by the Evidence Act and Office of Management and Budget guidance, and he represents the NTSB on the Federal Chief Data Officer Council. He developed a charter that has been approved by the Data Governance Body and published on the agency website, and the Data Governance Body is now meeting on a quarterly schedule and progressing on the agency's implementation of the Federal Data Strategy.

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 flight data recorders; 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

System	Description	RE 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
PREVIEW	The Protected Recording Viewer 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
RAPTR	The Rome Audio Processing Tool 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

TRAINING CENTER

	($000s)	FTEs
FY 2022 Estimate	$1,260	5
FY 2023 Request	$1,335	5
Increase/Decrease	$75	0

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. No other program changes are planned.

Program Description

The NTSB Training Center is a component of the Office of the Managing Director. The Training Center is responsible for training NTSB staff and our partners in investigations, developing training plans, and overseeing the development and implementation of workforce development programs.

Accomplishments and Ongoing Efforts

The Training Center continues to evaluate its courses, further refine the offerings, and improve instruction in all areas of technical, investigative, supervisory, and leadership development, and other aspects of mission support. It offers course content in investigative skills that target processes, procedures, and technical issues critical to the agency's mission of accident investigation and adds new courses and initiatives in response to senior leadership strategic priorities for the agency's workforce. These courses are generally open only to NTSB investigative and support staff.

In FY 2021, the Training Center began market research to replace or upgrade the capabilities of its learning management system, and the Training Center's custom course registration system with a single, integrated system to aid in scheduling, approving, delivering, and evaluating all agency training, including courses in accident investigation offered to employees of other federal agencies and transportation industry partners as well as courses offered only to NTSB employees. The system will need to track registrations and maintain a permanent record of all education and training activities, generate transcripts, collect payment from non-NTSB employees, and track staff competencies and skills and developmental training plans.

Full-time training officers and advisers coordinate the development of group training by regularly conducting needs analyses and assessments and by focusing on all-hands and long-term training requirements. 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 workforce development training are

highly transferable and add significant value to the investigative and mission support functions.

These are some of the key initiatives of the Training Center during FY 2021:

- ***Integrating virtual delivery with next-generation training methods.*** The pandemic brought both challenges and opportunities to the NTSB Training Center. Initially, courses were postponed and rescheduled, but as restrictions on in-person activities persisted, the Training Center adapted, moving over 90 percent of its courses to a virtual platform in FY 2020, and continuing to offer courses at the same level during FY 2021. Although not all courses or course content are compatible with virtual delivery, the pandemic provided an opportunity to begin evaluating innovative approaches for this delivery that will enable us 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. However, during FY 2021, it became clear that "virtual fatigue" was setting in, as course enrollments declined, and students began opting to wait for in-person training to resume.

  In preparation for the closure of the Ashburn training facility in December 2022, the TWA Flight 800 reconstructed wreckage is being decommissioned. Seeing this as a long-term opportunity, in FY 2021, the Training Center began exploring innovative and engaging alternatives for teaching cutting-edge investigative techniques using virtual and augmented reality, animation, and other training technologies, both in-person and at a distance, to help us maintain some degree of interactivity if we lose the ability for hands-on learning exercises.

- ***Expanding workforce development for all NTSB Staff*:** We continue to expand the course offerings for NTSB career professionals through an innovative curation strategy that maximizes the number and variety of courses available to them. We continued our participation in the Federal Small Agency Council's training cooperative, sharing excess course capacity among member agencies, and extended our interagency agreements with the US Department of Interior University and the Treasury Executive Institute to provide essential training in acquisitions, federal supervision, project management, and leadership and managerial development topics for staff, supervisors, senior executives, and aspiring leaders. Expanded offerings have included new courses through private sector training sources, as well as one-on-one executive coaching, yielding targeted career development support tailored to individual needs. Our workforce development curriculum is designed to address important cross-functional technical, administrative, and leadership competencies at the agency.

- ***Strongly emphasizing technical training for NTSB investigators*:** We continue to upgrade and refine investigators' skills by redesigning and deploying such courses as Interviewing Techniques for Accident Investigators, Investigating Human Fatigue Factors, and updating our Accident Site Photography course to illustrate the use of Unmanned Aerial Vehicles (UAV or "drones") for capturing precision aerial imagery to aid in our investigations.

- ***Offering investigation courses for federal agencies and external stakeholders:*** The Training Center is often contacted to develop and present classes for other agencies in accident investigation in aviation as well as other modes of transportation. During FY 2021, we conducted training for Blue Origin, Delta Airlines, Norfolk Southern, and Waymo on managing communications during a major transportation accident. We are undertaking a major update of the 2-week Aircraft Accident Investigation course that has trained NTSB investigators and their counterparts around the world since the founding of the NTSB Training Center, and we continue to offer Advanced Aircraft Mishap Analysis and Reporting and Advanced Marine Mishap Analysis and Reporting courses for the US Coast Guard (2 courses that we have tailored specifically for that agency). This year, 18 employees from the DOT and its modal administrations attended our courses, as did 232 employees from the Department of Homeland Security (including the Coast Guard), and 42 employees from the Department of Defense and other federal agencies (primarily those that conduct public aviation operations). We also provided accident investigation training for 65 students representing 26 nations.

- ***Evaluating and updating current courses and developing courses to produce new revenue streams.*** Our staff evaluates each course that the center offers and makes swift and necessary adjustments for the next offering. We continually evaluate and update content with more recent examples and case studies to enhance learning and add modules as necessary to incorporate new and upcoming transportation investigative tools; as noted above, we periodically undertake major revisions to courses that reflect changes in technology, NTSB strategic objectives, and identified training needs.

- ***Professional IT Certifications and Training.*** The Training Center responded to the needs expressed by the Office of the Chief Information Officer about professional development training for its staff. Through the Training Center's curated training courses, NTSB employees completed 67 courses in Information Technology—many of which were designed to prepare individuals for widely accepted certifications.

FY 2021 Activities

Courses with External Enrollment

Courses at the Training Center (virtual):	**Students**
Aircraft Accident Investigation	69
Aircraft Accident Investigation Orientation for Aviation Professionals	47
Accident Investigation Orientation for Railroad Professionals	39
Cognitive Interviewing	79
Family Assistance	48
Helicopter Accident Investigation (Cancelled)	0
Investigating Human Fatigue Factors	30
Accident Site Photography (Cancelled)	0
Managing Communications Following a Major Aircraft Accident or Incident	69
Attendance Subtotal– Courses at Training Center	**381**

Contract Courses:	Students
Managing Communications During a Major Aviation Accident – Blue Origin	26
Managing Communications During a Major Aviation Accident – Delta Airlines	59
Managing Communications During a Major Transportation Accident – Norfolk-Southern	58
Managing Communications During a Major Transportation Accident – Waymo	14
Aviation Mishap Analysis and Reporting Course – US Coast Guard	98
Attendance Subtotal – Contract Courses	**255**
Total Attendance – Courses with Public Enrollment	**636**

Course Areas Offered Exclusively for NTSB Employees

Course Category:	Students
Compliance & Administration	3,014
Information Technology/Computer Skills	99
Diversity, Equity & Inclusion	61
Writing/Communications/Project Management/General Skills	130
Leadership & Supervision	96
Mission	127
Retirement	154
Safety & Health	291
Pandemic Management	13
Total Attendance	**3,985**

ADMINISTRATIVE LAW JUDGES

	($000s)	FTEs
FY 2022 Estimate	$2,703	10
FY 2023 Request	$2,854	10
Increase/Decrease	$151	0

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. No other program changes are planned.

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 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.

The NTSB currently has four judges, two of which are stationed in Washington, DC. In July, two new judges were hired. One is stationed in Circuit IV, the central United States, and the other is stationed in Circuit III, the western United States. The Circuit IV judge is moving to San Antonio, Texas, in early FY 2022, and the Circuit III judge plans to relocate to the Denver, Colorado, area in early 2022.

The Pilot's Bill of Rights, Public Law No. 112-53 (August 3, 2012), requires judges to apply the Federal Rules of Evidence and Federal Rules of Civil Procedure to the extent practicable to their proceedings. Either the certificate holder or the FAA can appeal a judge's decision

in these cases to the five-member Board. The Board's review on appeal of an administrative law judge's decision is based on the record of the proceeding, which includes hearing testimony (the transcript), exhibits, the judge's decision, and appeal briefs submitted by the parties.

The FAA has the right to appeal the Board's decisions to the US Court of Appeals when it determines that the decisions "will have a significant adverse impact" with respect to aviation safety duties and powers designated to be carried out by the FAA. Under the Pilot's Bill of Rights, airmen and mechanics now also have the right to appeal all adverse Board decisions to a US District Court or to a US Court of Appeals. The District Court's review of the Board's decision is based on the evidence from the record before the Board, including hearing testimony, transcripts, exhibits, decisions, and briefs submitted by the parties. The Court of Appeals has the power to affirm, modify, or set aside the decision, in whole or in part, or, if the need is determined, to order further proceedings by the Board. The decision of the Court of Appeals is subject to review by the US Supreme Court on writ of certiorari.

Section 716 of the Aviation Investment and Reform Act for the 21st Century, Public Law 106-181 (April 5, 2000), expanded the NTSB's jurisdiction to include, upon petition by the affected certificate holder, reviews of FAA designations of safety enforcement actions as emergencies that require the order to be effective immediately. The Board has delegated this review authority to its administrative law judges. However, in the event of an appeal to the Board from a law judge's decision on the merits of the emergency or other immediately effective order, the Board may, at its discretion, note in its order disposing of the appeal its views on the law judge's ruling on the petition, and such views serve as binding precedent in all future cases. The Pilot's Bill of Rights provides for substantive independent and expedited review by the US District Court of any decision by the FAA Administrator to make such an order effective immediately.

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 Coast Guard administrative law judges and may be appealed to the Vice Commandant of the Coast Guard. The ruling of the Vice Commandant may then be appealed to the NTSB's full Board. The same higher appellate process is followed for marine certificate actions.

Accomplishments and Ongoing Efforts

The Office of Administrative Law Judges completed these actions through September 30, 2021:

- Emergency cases filed: 112
- Emergency cases closed: 101
- Emergency hearings held: 18

- Cases in which respondents waived the emergency procedures: 56
- Petitions challenging the FAA's determination to bring the case as an emergency processed: 24
- New cases filed: 253 (146 of which were enforcement cases; 91 of which were certificate denials, mainly medical certificate denials)
- Cases closed: 196 cases
- Hearings held: 19
- Appeals of decisions made by NTSB administrative law judges to the full Board processed: 9 (3 of which were emergencies, 2 of which were non-emergencies, and 4 of which were procedural dismissals)

INFORMATION TECHNOLOGY AND SERVICES

	($000s)	FTEs
FY 2022 Estimate	$10,280	27
FY 2023 Request	$10,978	28
Increase/Decrease	$698	1

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. An increase of 1 FTE is supported by this funding level. No other program changes are planned.

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 consists of 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 has the responsibility of securing the network and defending against outside threats. The help desk staff performs 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 include 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 the archives of accident investigation files, NTSB reports, and other agency records. 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 defines the business, 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 3,554 service desk requests for the agency's distributed locations (headquarters, regional offices, and teleworkers) through September 30, 2021. The division's IT specialists continued to support the agency's mission by launching on major accident investigations during FY 2021 to assist 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 continuing to meet many challenges related to the global pandemic. With 100 percent of NTSB staff working from home, and while addressing concerns rising from an increased demand for remote services, division staff performed a full refresh of cellular services and

devices for more than 300 employees. This refresh allowed for the delivery of new cellular equipment to each NTSB cellular phone-carrying employee and has met user needs for Microsoft Teams–enabled cell phones that have more memory, larger screens, and faster, more reliable service and bandwidth than the previous, now-antiquated devices. A recent user survey indicated a high degree of satisfaction with the deployment process and enhanced mobile communications capabilities.

The division performed regular monthly maintenance activities for all agency IT systems at which time systems were taken off-line and updated to protect against known vulnerabilities. Additionally, during FY 2021, the division deployed new laptops to all NTSB staff. This was a significant undertaking during max-telework conditions. The division devised a plan that allowed for the new laptops to be individually configured for each user remotely. After the remote configuration, division staff facilitated the shipment and/or pickup of the new laptops. The deployment process was completed according to plan in just 8 weeks.

Systems Support Division

In FY 2021, the Systems Support Division minimized security vulnerabilities and performance instability throughout the agency by enhancing more than eight outdated applications and migrating them to newer versions of Windows operating systems. The outdated applications posed a significant risk, as they were not built to withstand emerging security threats and were not supported by the Windows operating system. The division also migrated the applications to the cloud, further increasing security and stability, while reducing costs associated with on-premise hardware and physical space, and identified the need for governance in Azure Cloud operations, which are currently non-existent. The cloud governance and policies will reduce security risks and increase efficiency in the management of the cloud resources. The division will continue with upgrading aged applications and decommissioning out-of-support Windows operating systems throughout FY 2022.

During FY 2021, 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, and the Project Status Board. Division staff worked closely with other offices and teams as noted below to help successfully launch their projects:

- Developed the Office of Safety Recommendations and Communication's new portal, InsideNTSB
- Synchronized and migrated data for the SAFTI application
- Integrated the Case Appeals Filing System and MEDICS to the new Kiteworks on the cloud
- Enhanced the Training Center Reservation application to the latest technology
- Upgraded the public application web server from the Windows 2012 server to the Windows 2019 server
- Revamped the development operations process in Azure Cloud
- Evaluated the new electronic version of OGE-450 filing

- Planned the development of a new learning management system and upgrade of FOIAXpress and FOIA National Portal
- Upgraded FOIA pay.gov to the new pay.gov web application programming interface system
- Collaborated on, tested, and launched a new approach to dynamically capture laptop metrics to help eliminate inventory and compliance issues
- Assisted with the design and implementation of a new publication tool for the MyDMS docket management system
- Retired legacy systems.

The division addressed 23 service requests (such as postings, add/edit sites, and others) and 131 incident (application or database-related) requests, as well as participated in many other tasks including Networks Operations Center/Security Operations Center and networking activities. Other ongoing activities include the upgrade to the Software as a Service Incident Management software (replacing Heat) and the migration of most in-house applications and databases to later Operating System and Structured Query Language versions.

The Systems Support Division was solely responsible for an upgrade to the agency's public-facing website to the latest SharePoint platform that facilitated the launch of the highly anticipated CAROL tool. This paved the way for the site refresh project that is currently underway. The website redesign modernized the visual style, improved content organization and display, and integrated data from Line-of-Business applications. The site's workflows replaced the paper-based processing of annual OGE-450 forms used prior to the pandemic; remote form processing would not be possible without this online solution. The website refresh project will comply with various federal policies, including 21st Century Integrated Digital Experience Act, Connected Government Act, OMB M-17-06, Policies for Federal Agency Public Websites and Digital Services, OMB Circular A-130, Managing Information as a Strategic Resource, Digital Government Strategy, Section 508 Law and Technical Standards, and Emergency Support Function 15 (ESF-15 - Public Affairs – Annex R) of the National Response Framework.

Records Management Division

The Records Management Division posted 1,101 accident dockets through September 30, 2021, while the FOIA office received 453 new FOIA requests and processed 584 of these requests. Revamped FOIA practices resulted in reducing the backlog of requests to 113. The office continues to assist the public with their inquiries and to address prior requests.

The Records Management Division also works with the chief privacy officer to create a controlled unclassified information program to review all privacy impact assessments and system of records notices for the agency. The division's revamping of the records management program meets all National Archives and Record Administration requirements. The enhancement includes agency inventory of records, scheduling records, records training, and increasing resources. The division's staff assists the public in obtaining accident information from CAROL queries and investigation dockets.

Enterprise Architect Division

The Enterprise Architect Division continues to work on various efforts to standardize business processes, to analyze and visualize NTSB's data to comprehend and identify trends and patterns, and to enable all the agency's data users to more effectively make better-informed decisions based on that data. This division continues to lead the post-implementation enhancement requests and data integration for SAFTI for all modal offices, enabling these offices to standardize the accident investigation process, resulting in structured data.

The division has launched various initiatives, including the integration of SAFTI with investigative studies and other line of business applications such as MEDICS and Big Red (renamed DREAM), which has streamlined the investigative process and improved data analytics and metrics. This effort has empowered decision makers to measure, monitor, and manage the key activities and processes needed to achieve the agency's strategic goals.

Division staff also designed and developed the Report Writing Assistant, a Microsoft Word macros-based tool, to improve NTSB's report writing process. The tool has enabled writers to streamline writing tasks with features that include an acronym manager, recommendations list, and a tool that logically reorders report sections automatically. It has improved writers' efficiency while preventing inadvertent errors in reports.

The division supported the Computer Services Division with its refresh of cellular services and devices. The effort required porting mobile numbers from its previous provider to the new provider and new device and returning old devices to the previous provider for credits. By returning the devices, NTSB avoided extraneous costs normally required to securely dispose of the devices, which led to cost savings for the agency.

Division staff are working to implement an agency-wide data analytics program. The program will develop processes, infrastructure, human capital, and training to use internal and external data to improve predictions and enable informed decision-making in support of the NTSB's new 5-year strategic plan. The division expects to begin implementing this project in FY 2022.

The division continues to provide guidance, design oversight, and technical advice in all NTSB software development efforts, IT consulting services to various divisions, and contracting officer's technical representative services for various IT initiatives.

Chief Technology Officer Program

The core of Office of the Chief Information Officer activities include 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.

In FY 2021, the office deployed Multi-Factors Authentication and Single Sign-On capabilities as components of the enterprise Identity Access Management ecosystem to provide secure and flexible access to NTSB enterprise applications and services. The office continues to expand cloud environment in Microsoft Azure that extended the NTSB computing environment to the cloud to host enterprise applications such as SAFTI, CAROL, NTSB.gov, PREVIEW and future applications. It also deployed an enterprise proxy service that enhances security of all public facing web applications and provides an enterprise high-availability capability that all future enterprise applications can leverage; in addition, the office built an enterprise data analytic gateway as the beginning of the data-driven decision intelligence initiative.

Priorities for FY 2022 and the following years include converting the agency's network from IPv4 to IPv6, per OMB mandate, creating the development operations environment in Azure to standardize application development efforts, enhancing the collaboration tool for remote work, completing the development of the enterprise case management tool for accident investigation, developing enterprise data analytic capabilities, continuing to migrate enterprise applications and service to the cloud, and enhancing the agency's cybersecurity program.

IT Security Program

The security program continued to advise the chief information officer regarding the agency's FISMA compliance requirements and advocated the expanded use of such external cybersecurity enhancement services as re-instituting required third party 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 FY 2020 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 2022 Estimate	$8,568	29
FY 2023 Request	$9,626	31
Increase/Decrease	$1,058	2

Overview of the Request

The funding level for this program reflects the pro-rated impact of a pay raise of 4.6 percent projected for January 1, 2023, and an increase in employee health benefit contribution rates. An increase of 2 FTEs is supported by this funding level. No other program changes are planned.

Program Description

The Office of Administration coordinates and manages infrastructure and support activities for the NTSB, providing support in the areas of human resource management, labor relations, facilities management, security, and acquisition and lease management. Physical inventory, shipping and receiving, and management of the NTSB conference and training center facilities are also major functions. Three divisions carry out the office's work: Administrative Operations and Security, Acquisition and Lease Management, and Human Resources.

Administrative Operations and Security Division

The Administrative Operations and Security Division is responsible for the day-to-day support for the direction and operation of NTSB facilities and our building management program including security, property management, facilities management, mail services, and fleet vehicle transportation.

Acquisition and Lease Management Division

The Acquisition and Lease Management Division manages the NTSB acquisition program and provides best value business solutions to support the agency's mission. The division awards and administers contracts and agreements, manages the purchase card program, awards and manages real property leases for both the NTSB headquarters and regional offices, and provides customers with acquisition guidance 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 manages labor and employee relations, benefits, pay and leave,

performance management and awards, the telework program, and the employee assistance program.

Accomplishments and Ongoing Efforts

Administrative Operations and Security Division

The Administrative Operations and Security Division maintains the agreement with the GSA to meet the requirements of Homeland Security Presidential Directive 12 for Personal Identity Verification credentials for all employees and contractors. This agreement continues the implementation of the physical access control system upgrades for NTSB headquarters, the regional offices, and the Training Center to comply with the new program requirements. The installation of the physical access control system upgrades for the NTSB's headquarters facility began in FY 2020; although project completion was delayed by the pandemic, it has resumed, and scheduling of the upgrades at the regional offices is in process. Project completion is anticipated to be in FY 2022. The requirement for the upgrade at the Training Center has been removed because the facility will be closed in 2023. The installation of new network video recorders (security cameras and system) at headquarters is ongoing and is expected to be completed in FY 2022.

During the first quarter of this fiscal year, we provided the agency's FY 2020 annual property disposition report to the GSA, in accordance with federal management regulations; we also completed the FY 2020 annual accountable asset inventory and validation for the agency, although there was a delay in reporting those results internally. The annual accountable asset inventory and validation for FY 2021 has been completed and the final report provided to the CFO's office in accordance with the FY 2021 inventory plan.

The division completed the continuity of operations business process analysis and business impact analysis and worked with the Acquisition and Lease Management Division to award the contract for the next phase, which includes revisions to the continuity of operations program (COOP) using the information gained from the analyses. Revisions to the NTSB's COOP plan have been completed and the final draft plan is pending approvals. A briefing to senior management on the updated COOP program was also conducted. Additionally, briefings to key COOP personnel as well as training for the NTSB staff have been scheduled for completion in early FY 2022. The division also completed the annual Federal Emergency Management Agency's Eagle Horizon COOP drill, which was performed virtually this year.

Acquisition and Lease Management Division

The Acquisition and Lease Management Division executed 305 contract actions to support the mission of the agency. The division continued to provide support for and training in the acquisition process and in roles and responsibilities for purchase cardholders, ensuring that investigators are better prepared to request and receive the mission-critical goods and services they need to complete accident investigations.

Utilizing GSA's Enterprise Infrastructure Solutions contract, the division awarded a new contract for internet protocol services, managed trusted internet protocol services, and managed network services, providing essential agency access to the internet, government intranets, and extranets. The division also executed a contract to refresh the computer workstations in the agency's Response Operations Center, replacing aging equipment and ensuring that the center has devices that suit their work responsibilities.

The Acquisition and Lease Management Division partnered with the Office of the Chief Information Officer to develop an updated, comprehensive statement of work designed to enhance customer service by contracting with a value-added technology and information partner. The effort culminated in a contract award for IT Support services that will potentially be in effect for up to 5 years. The contract includes scope for services that also support records management, data analytics, and various software platforms developed by the NTSB.

The Acquisition and Lease Management Division awarded a contract to perform a barrier analysis in support of the Office of Equal Employment Opportunity Diversity and Inclusion (EEODI). The services include statistical analyses and related support services, as well as a review of the application of the agency's policies and procedures regarding the entire workforce in comparison to the national civilian labor force (NCLF) and eight major occupations in comparison to their respective relevant civilian labor force (RCLF). The contract was awarded in response to a presidential executive order requiring agencies to recognize and work to redress inequities in policies and programs that serve as barriers to equal opportunity.

Human Resources Division

The Human Resources Division continued to work with the Office of Personnel Management to administer the Federal Employee Viewpoint Survey. Employee participation in the 2020 survey had an 82 percent response rate, far exceeding the record response of the most recent 5 years. Employees continue to engage in the annual survey process to assess the leadership and management practices that contribute to agency performance and employee satisfaction. The results demonstrate that NTSB employees continue to be satisfied with their work and understand how it contributes to achieving the mission. In addition, there was a positive increase of 10 percent or more in the areas of communication, employee recognition, high standards of honesty and integrity and support for work–life programs. The survey continues to provide valuable information that senior leadership uses to improve the work environment and, ultimately, productivity and mission accomplishment.

The 2019 reorganization in the Human Resource Division continues to provide increased oversight and planning for the recruitment process and HR operations. In the virtual environment of FY 2021, the priority for the division was to maintain the agency's ability to recruit and fill vacant positions and onboard new staff. The staff collaborated with hiring managers in the program offices throughout the agency to analyze job duties and address skill gaps. The recruitment process resulted in hiring 28 new employees for mission-critical and mission-support positions and to provide opportunities to 6 current employees with

selections for internal career promotions or reassignments to new positions. In the Office of Administration, we were successful in filling four human resources specialist positions.

The division held position management discussions and presentations to agency leadership to address organization efficiencies and improvements that could be gained by reducing the span of control for division supervisors. A review of headquarters and regional offices showed division and regional office span of control as high as 18 to 1. In a recent initiative, we developed a new level of first-line supervision with two branch chiefs, and divided staff between two supervisors. These steps improved the work–life experience for supervisors, addressing succession planning and employee development and coaching, and reducing workflow problems. Building on this success, we will develop strategies and identify opportunities for improvement across the agency.

The division collaborated with the OCIO on a project to transition an Excel spreadsheet from an internal tracking document of recruitment activity to a SharePoint portal where hiring managers and senior leadership could view their office-specific information. This SharePoint site will be refined to create additional dashboards of information to show progress and identify challenges.

During FY 2021, the agency continued to identify and pursue additional avenues to market technical positions, and the division used LinkedIn to showcase NTSB jobs and encourage NTSB employees to use their networks to market vacant positions. Our Careers page on the agency website listed current openings, provided information about the agency, and gave prospective applicants information about applying for federal jobs.

The agency's chief human capital officer and the director of the Office of Administration began leading a taskforce to address aspects of the recruitment program to include hiring manager training, marketing, and attracting diverse pools of candidates. During their initial meetings, they decided to examine the hiring process and develop tools to better clarify roles and responsibilities. The Human Resources Division teamed with the staff of the training center to identify the first training opportunity. Hiring managers participated in a training to learn or refresh their skills in writing a position description.

During the fiscal year, the Office of Administration received approval to move forward with a percentage-based performance and incentive awards program. The objective was to give supervisors and senior leadership flexibility in deciding the amount of awards and to provide a program with incentives based on performance or contribution to the accomplishment of the Office mission.

Division staff collaborated with offices across the agency to receive nominations and facilitate the voting and approval of recipients for the agency's highest awards. The annual major awards ceremony was held seamlessly in a virtual environment and included virtual backgrounds, numerous presentations, and employee acceptance speeches.

As the pandemic continued, division staff participated with the agency-level task force to address the challenge of completing mission-critical work and addressing the safety and physical and mental health of employees. The agency developed a risk assessment process

to address travel and investigations; division staff evaluated guidance from the Office of Personnel Management and OMB and gathered best practices from other agencies to amend policies and develop approaches to employee relations issues, work schedules, leave, and telework. We found that our recently updated telework policy, employee assistance program, variety of leave and work schedule options, and training for supervisors and employees enabled the NTSB to maintain operations and even excel during the pandemic. Working with leaders throughout the agency, we are preparing for a measured and safe return to the office as public health conditions and statistics improve over time.

To support the COVID-19 vaccine mandate, the agency conducted an information and education campaign via email and portal postings, assessed the status of employee vaccinations, and established procedures for visitors. In addition, representatives of the Human Resources Division worked with others in the agency workgroup to prepare for the associated reasonable accommodation process, where needed, and the division worked with the NTSB chair and the Safety Division to offer the voluntary option of in-person swearing in for new employees.

The agency received full certification of the performance management system for senior executive service employees to the Office of Personnel Management. As of September 30, the request for full certification of the performance management system for senior level employees was still pending response. Achieving full certification will position the agency to attract the most talented candidates for our positions by offering a more competitive compensation package and retain critical skills to address the agency mission requirements.

APPENDIX A: FEDERAL DATA STRATEGY

Significant Activities in FY 2021

The NTSB remains committed to implementing the Evidence Act and achieving the data management objectives defined by the Federal Data Strategy and Annual Action Plans. Our strategic plan commits to improving agency products and processes through data analysis, and we are developing metrics that will support Evidence Act requirements for all agencies to invest in and 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 2021 included these:

- The chief data officer and the NTSB Data Governance Body initiated a comprehensive, agency-wide data maturity assessment. The results of the assessment will be used to develop the agency data strategy and to prioritize projects, staffing, and infrastructure planning to improve data management, access, and use.
- In response to the requirements of our 2018 reauthorization, we completed implementation of a new multimodal database, SAFTI, and released the CAROL query tool on our website, ntsb.gov, thus enabling public searches of investigation data, safety recommendations, and investigation dockets. The new query tool supports open data formats and provides greater public access to, and transparency of, agency investigation records. During FY 2021, we continued to enhance and expand the capabilities of SAFTI and CAROL, incorporating feedback from internal and public users.
- Using the capabilities and data provided by SAFTI, we developed a library of dashboards for monitoring investigation tasks, staffing workload, and performance metrics.
- We initiated a data analytics pilot project to design and implement new enterprise technology infrastructure and procedures to combine data from disparate sources into a managed NTSB data warehouse that incorporates data governance tools and processes, ensuring the security, accuracy, and availability of agency data while expanding accessibility for analysis. This will further enhance our ability to track agency performance metrics and manage data models useful for business intelligence, predictive analytics, and machine learning applications.

APPENDIX B: MOST WANTED LIST

The NTSB's Most Wanted List (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 if acted upon 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 safety management system (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 do not have an SMS in place or have an ineffective one.

In 2015, the FAA required Part 121 air carriers to develop a comprehensive SMS to improve safety for the flying public; however, the FAA has not required other revenue passenger-carrying operators to have one.

Although we have seen some voluntary adoption of SMS programs, a vast majority of 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 there's technology available today that would give us the answers. The bad news is that the FAA has not mandated that aircraft operators install the technology, citing privacy, security, cost, and other concerns.

Commercial airliners are required only to have flight data recorders and cockpit voice recorders, 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. Operators should also have programs in place that analyze the data derived from these devices. Recorders and flight data management programs would not only help investigators

solve accidents, but would also 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 REDUCE 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 2009 and 2018, speeding-related crashes resulted in nearly 100,000 fatalities—that's close to one-third of all traffic fatalities in the United States.

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

Speed-limiters on large trucks, automated enforcement, 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—vulnerable road users (VRUs). As a result, dangers to this population are increasing and we're seeing too many accidents 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 even 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 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. For example, in 2019, one in four traffic fatalities resulted from crashes involving

alcohol-impaired drivers. Further, many impaired-driving crashes involve drivers who both drink and use other drugs (legal, illicit, or over the counter). Complicating matters, each year, more states pass laws allowing the use of medical and recreational marijuana.

Impaired driving is 100-percent preventable. We know a per-se blood alcohol concentration of .08 g/dl is too high. States need to lower per-se blood alcohol concentration to .05 percent, an action only Utah has taken. Too many alcohol-impaired crashes have occurred involving drivers previously been convicted of drunk driving. States need to require all drivers convicted of alcohol-impaired driving to use an ignition interlock device that will prevent future impaired driving.

We have investigated many crashes involving drug-impaired drivers, but we don't really know how extensive the problem is because, unlike for alcohol, no standardized drug-testing protocols exist. There is no established limit or threshold to determine impairment by drugs other than alcohol. Additionally, evaluating the impact of other drugs on drivers is challenging because many 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

A large percentage of highway crashes are caused by distracted or inattentive drivers. Collision-avoidance and connected-vehicle technologies can address the human error that can lead to crashes—saving thousands of lives on the nation's roads.

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. Unfortunately, most passenger 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 Traffic Safety Administration has not developed comprehensive performance standards for these technologies, nor does it effectively evaluate them and include this information in its vehicle safety ratings.

Additionally, we were alarmed by the recent regulatory decision by the Federal Communications Commission to substantially shrink the communication spectrum dedicated to connected-vehicle technology. If this decision is not reversed, safety progress could be hindered.

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 one of 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 focus cognitive attention on only 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 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 DC 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 DC 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 range in size from small charter vessels to large cruise ships and include unique operations like amphibious passenger vessels (DUKW, or "duck" boats). The number of passengers and crew, level of training, and applicability of safety regulations for these vessels vary; however, all passenger vessels should have safety management systems, enforced roving patrols, adequate fire-detection and extinguishing systems, and enhanced emergency egress options.

At the same time, the commercial fishing industry, which remains largely uninspected, consistently tops the list of most deadly occupations. To change that statistic, operators need to improve crew training as well as their vessels' watertight integrity and stability. Many of our recommendations call for regulatory action, but passenger and fishing vessel associations, training centers, and marine safety advocacy groups should also promote awareness and encourage operators to take voluntary measures to improve safety on their vessels, even in the absence of federal regulations.

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 Pipeline and Hazardous Materials Safety Administration 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

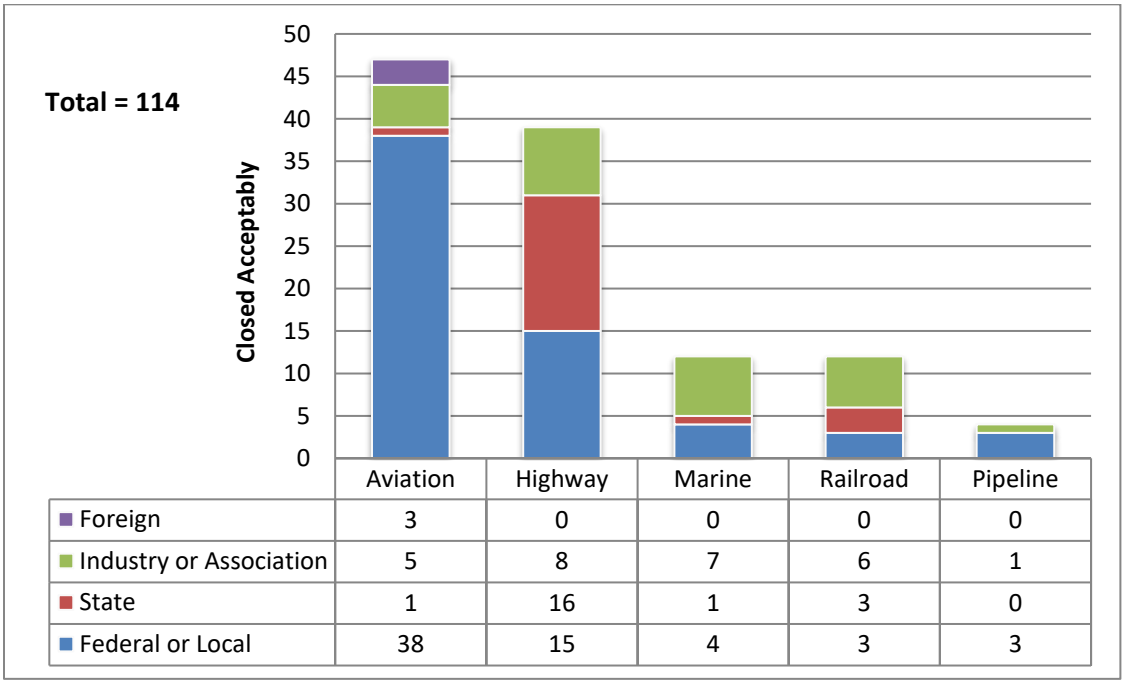
We continue to see too many preventable accidents that result in rail worker fatalities. In the last 5 years, the NTSB has completed five railroad and transit investigations of accidents that resulted in seven fatalities. Thirty-seven recommendations were made from these investigations. We have four more pending investigations into accidents that resulted in four fatalities and have numerous potential recommendations. We are particularly concerned about operations crew and roadway worker safety. However, federal regulators have failed to enact our recommendations regarding rail worker safety, and industry seems to be becoming complacent about it.

We have recommended that the Federal Railroad Administration and the Federal Transit Administration examine current regulations pertaining to equipment, job briefings, and risk assessment to improve areas that are deficient. The FRA and FTA also need to require railroads to implement technology as a redundant protective measure. Industry needs to ensure that job briefings are done correctly and that procedures are in place to audit those briefings, and that watchmen/lookouts are properly trained, have the proper equipment, and have the training to know how to do their jobs correctly.

APPENDIX C: STATUS OF SAFETY RECOMMENDATIONS

Recommendations Closed

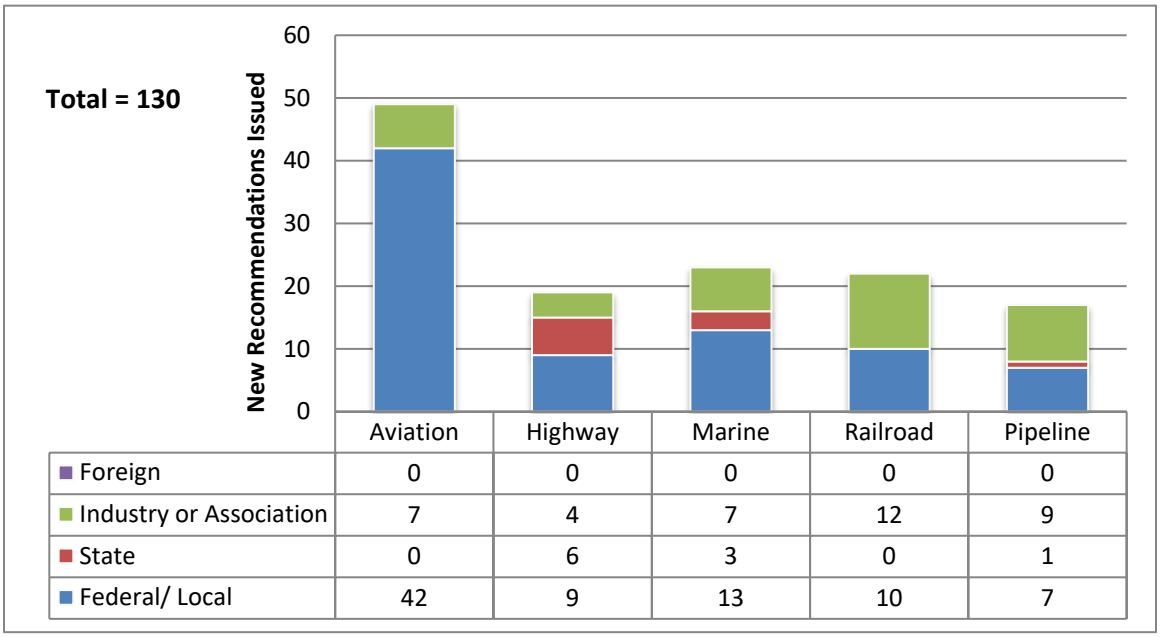
The chart below shows the distribution by mode of the 114 NTSB safety recommendations closed *acceptable* from October 1, 2020, through September 30, 2021.



	Aviation	Highway	Marine	Railroad	Pipeline
Foreign	3	0	0	0	0
Industry or Association	5	8	7	6	1
State	1	16	1	3	0
Federal or Local	38	15	4	3	3

New Recommendations Issued

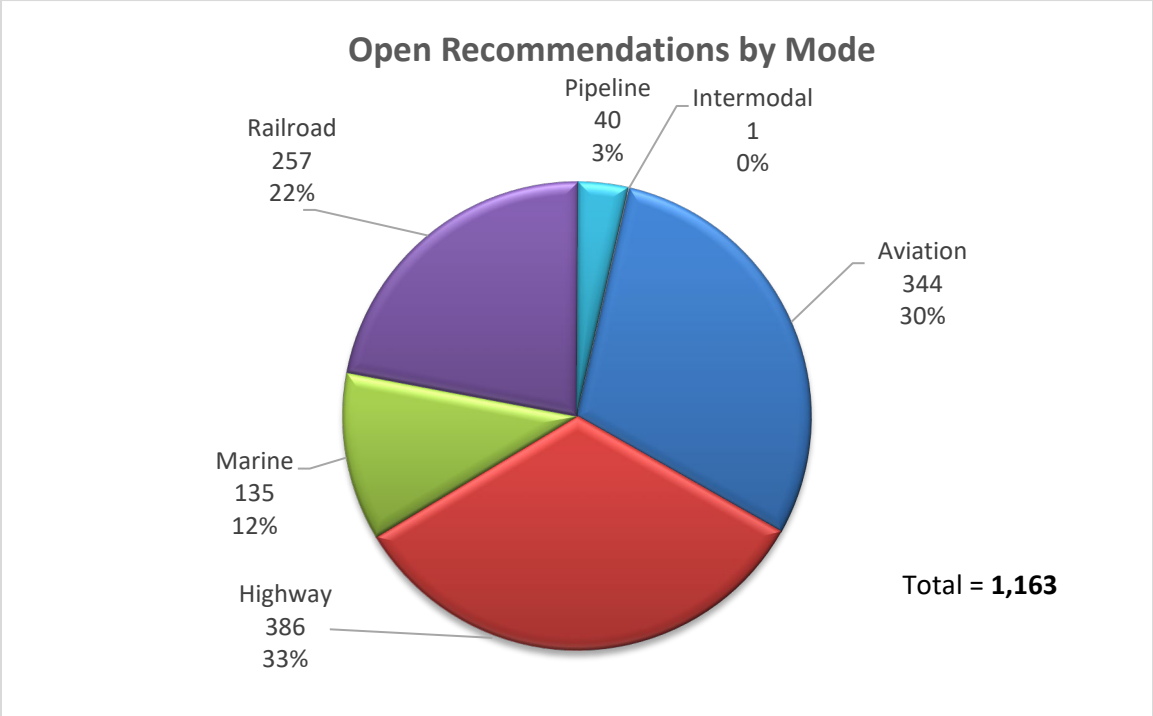
The chart below shows the distribution by transportation mode of the 130 safety recommendations issued by the NTSB from October 1, 2020, through September 30, 2021.



	Aviation	Highway	Marine	Railroad	Pipeline
Foreign	0	0	0	0	0
Industry or Association	7	4	7	12	9
State	0	6	3	0	1
Federal/ Local	42	9	13	10	7

Open Recommendations

The chart below displays the distribution by transportation mode of the 1,163 safety recommendations open as of September 30, 2021.



APPENDIX D: TRANSPORTATION DISASTER ASSISTANCE

Significant Activities in FY 2021

Transportation Disaster Assistance Support for Accident Investigations – Offering information and offering disaster assistance services to approximately 3,000 accident survivors, family member and family contacts associated with NTSB investigations:

Launches:	**5**
Aviation Safety	2
Marine Safety	1
Highway Safety	1
Rail Safety	1
Other investigations supported:	**619**
Domestic aviation accidents	542
International aviation accidents	7
Rail accidents	25
Highway accidents	31
Pipeline accidents	5
Marine accidents	9

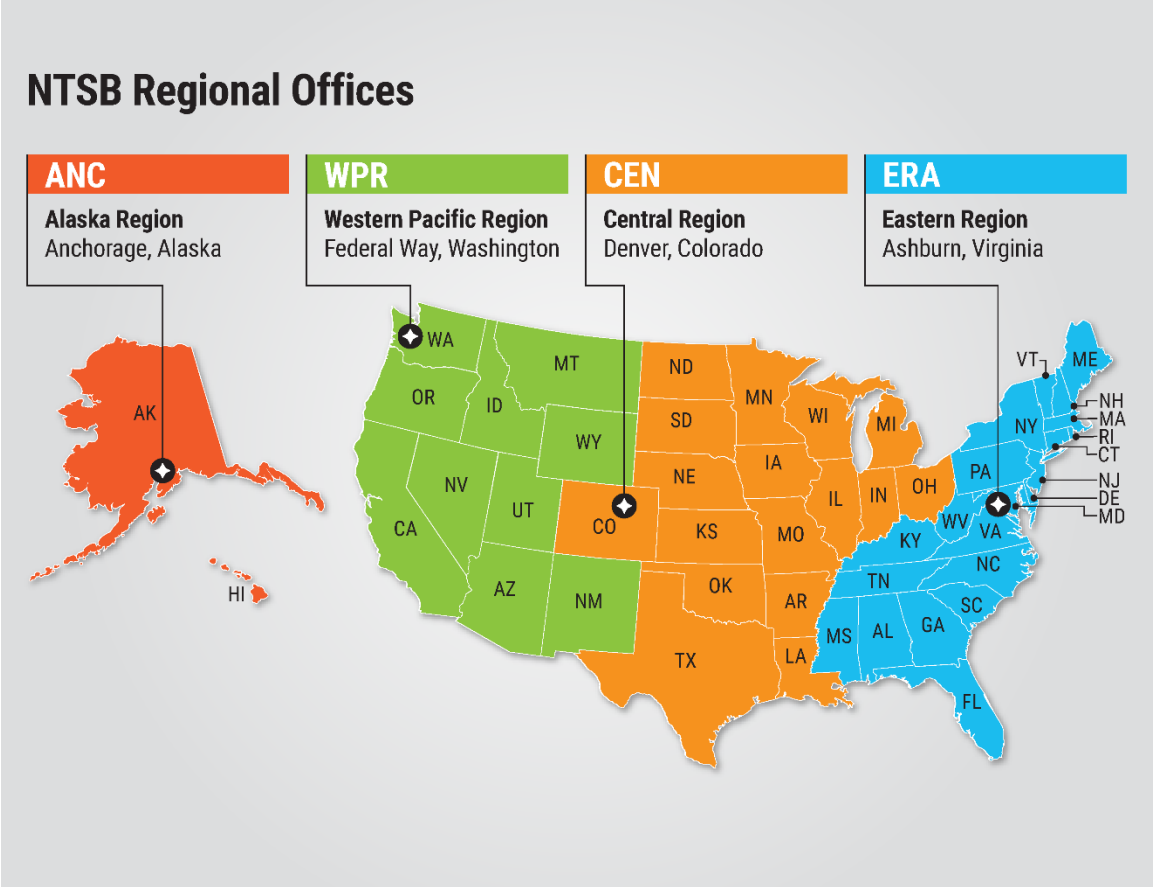
Division Outreach and Training Activities

- Staff participated in 55 outreach events, resulting in direct contact with 3,432 participants; additionally, staff responded to inquiries from 286 agencies and organizations.

- Staff developed and delivered several training programs for NTSB Board Members and accident investigators focused on enhancing communications with accident survivors and the family members and friends of those involved in transportation accidents. Additionally, staff successfully deployed a survey to Office of Aviation Safety regional investigators designed to learn more about the investigators' perspectives of the agency's family assistance program, to inform how we can administer the program in a more efficient and effective manner, to evaluate services we offer to our investigators, and to identify training opportunities. Survey results were shared with Office of Aviation Safety management and outcomes were discussed with regional investigators.

- Staff continue to engage in a collaborative effort to enhance the Employee Assistance, Critical Incident Stress Awareness, and Peer Support Programs.

APPENDIX E: 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	Ohio, Michigan, Indiana, Wisconsin, Illinois, Minnesota, Iowa, Missouri, Arkansas, Louisiana, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, and Colorado	Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Delaware, Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Mississippi, Alabama, Georgia, and Florida, as well as the District of Columbia, Puerto Rico, and the US Virgin Islands

APPENDIX F: 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

* 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 Chairman	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 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, NY
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

FTE Staffing at Year End by Headquarters and Field Offices

FY	Headquarters	Regional	Total
2000	346	81	427
2001	345	71	416
2002	337	89	426
2003	329	98	427
2004	314	107	421
2005	308	109	417
2006	286	101	387
2007	292	85	377
2008	286	102	388
2009	293	100	393
2010	283	101	384
2011	296	107	403
2012	304	108	412
2013	307	105	412
2014	299	103	402
2015	307	111	418
2016	304	115	419
2017	299	115	414
2018	291	112	403
2019	287	112	399
2020	292	108	400
2021	295	104	399

FTE Staffing by State and Region
FY 2021

Location	Administration	Administrative Law Judges	Aviation Safety	Highway Safety	Information Technology & Services	Marine Safety	Policy & Direction	Railroad, Pipeline & Hazardous Materials	Research & Engineering	Safety Recommendations & Communications	Training Center	Total
Alaska			4									4
Colorado			11	1				2				14
Illinois			5		1			1				7
Indiana								1				1
Minnesota			2									2
Missouri			1									1
Texas			6	7								13
Wisconsin			1									1
Tennessee				1								1
Ohio			1									1
Utah			1									1
Connecticut			1									1
Florida			4							1		5
Georgia			4				1					5
New Hampshire			1									1
New Jersey			1									1
New York			1									1
North Carolina			3									3
Virginia			8					2			4	14
Washington, DC	25	8	41	17	26	20	60	22	47	29		295
Arizona			3									3
California			5	1				2				8
Montana			1					1				2
Oregon			2	1								3
Washington			9	1								10
Wyoming				1								1
Grand Total	**25**	**8**	**116**	**30**	**27**	**20**	**61**	**31**	**47**	**30**	**4**	**399**

*Regions:

Alaska
Central
Eastern
Western

Training Center Costs and Revenues

	FY 2019	FY 2020	FY 2021
Earned revenue	$1,133,921	$681,560	$657,679
Subleases	$0	$0	$0
Total revenue	$1,133,921	$681,560	$657,679
Costs:			
Pay	$654,678	$640,512	$749,148
Travel	$75,593	$8,184	$822
Contracts	$392,599	$116,360	$68,650
Supplies	$2,468	$11,004	$299
Equipment	$0	$0	$187
Costs before space rental	$1,125,338	$776,060	$819,106
Space rental	$2,626,073	$2,653,865	$2,658,650
Total operating costs	$3,751,411	$3,429,925	$3,477,756
Deficit	$2,617,490	$2,748,365	$2,820,077

International Investigations

*Total International Accident Investigation Costs by Fiscal Year 2012 - 2021**

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

* 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 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 2021 Investigation Costs by Accident**

Description	Location	Amount
A Sriwijaya Air #182 B737-500 crashed into Jakarta Bay after rapid descent several minutes after takeoff.	Jakarta, Indonesia	$ 347,609
A Sikorsky S61 loss control during landing.	Camp Dwyer, Afghanistan	$ 137,969
An Envoy Air #4194 experienced runway excursion and gear collapse after all MLG tires locked-up during landing.	Freeport, Bahamas	$ 63,525
A Boeing 737 overran a runway during landing.	Kozhikode, India	$ 55,373
An enroute-cruise Boeing 777 experienced engine failure.	Naha, Japan	$ 42,012
During the landing, the left main landing gear of a Boeing 767 broke.	Bucharest, Romania	$ 40,145
A B3203 experienced a dual cockpit display malfunction during landing.	New Chitose Airport (RJCC), Japan	$ 33,870
A Boeing 747 lost partial engine power during initial climb.	Maastricht, Netherlands	$ 19,005
An Airbus A220-300 experienced a No. 1 (left) engine failure during cruise.	Bordeaux, France	$ 18,066
An Airbus A300 rejected takeoff due to an uncontained engine failure.	Bogota, Colombia	$ 17,122
A Boeing 747 experienced engine fire on initial climb out.	Hone Kong, China	$ 16,853
An enroute-descent Sikorsky S92 experienced engine failure.	Sola, Norway	$ 16,569
While maneuvering to land, a Bell 212 helicopter loss control in flight and collided with terrain.	Evansburg, Canada	$ 12,413
A Honda HA-420 jet overshot a landing area.	Kohnan, Japan	$ 11,626
A Boeing 737-401 right main landing gear collapsed during touch-down.	Bogota, Colombia	$ 10,917
An Airbus BD-500 experienced uncontained engine failure during enroute-change of cruise level.	Paris, France	$ 10,570
An Airbus A320 experienced flight control system failure during enroute-cruise.	Lima, Peru	$ 10,233
An undetermined Sikorsky S76C accident occurred.	Oak Cheon Goon, Republic of Korea	$ 9,936

Description	Location	Amount
During the landing phase, a Boeing 737-824 runway excursion over the safety strip of grass, also colliding with approximately 4 runway edge lights.	San Jose, Costa Rica	$ 8,233
An Airbus A321 experienced high pressure turbine disk rupture and subsequent uncontained engine failure during takeoff.	Tan Son Nhat International Airport, Vietnam	$ 7,471
A Piper PA-31-350 aircraft experienced loss of engine power during initial climb.	South Bimini, Bahamas	$ 6,680
A Bell 204 helicopter loss partial engine power during landing.	Hyogo Prefecture, Japan	$ 6,552
An Ethiopian Airlines Boeing 777 caught fire and burned while parked at the airport.	Shanghai China	$6,133
A TVS-2MS airplane powered by a Honeywell TPE331-12UHR-702H crashed after an aborted takeoff.	Naryan-Mar, Russia	$ 5,878
An N210BA aircraft experience engine failure and collided with ground.	Moruya, Australia	$ 5,329
An enroute-cruise Airbus A330 experienced engine failure.	Keflavik, Iceland	$ 5,263
An Icelandair Boeing 757 had a right-hand main landing gear collapse on landing.	Keflavik, Iceland	$ 5,205
A Pakistani International Airlines Boeing 777-200ER right hand engine caught fire while in flight.	Lahore, Pakistan	$ 5,014
Grand Total		**$ 935,571**

* Report includes accidents, whether occurring in the current year or previously, with more than $5,000 in FY21 expenses and is cumulative through September 30, 2021. 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[b]
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	Yes	
Maryland	Yes	Yes	Partial	Partial	Yes	Partial
Massachusetts	Yes		Partial	Partial	Yes	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	Partial
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[b]
Pennsylvania	Yes		Partial	Partial		
Rhode Island	Yes	Yes	Yes	Partial	Yes	
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	Partial
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 = 35 + DC	Yes = 12 Partial = 6 + 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.

(b) A state's law is marked "yes" only if its requirement specifies that a helmet must be FMVSS-compliant.

US Transportation Fatalities, 2019 – 2020

Highway:	Passenger cars	12,355	13,472
	Light trucks [2]	10,017	10,352
	Pedestrians	6,272	6,516
	Motorcycles	5,044	5,579
	Pedalcycles [3]	859	938
	Large trucks [4]	893	831
	Buses and other occupants [5]	626	881
	Other non-occupants [6]	289	255
	Total Highway Fatalities	**36,355**	**38,824**
Rail:	Freight, passenger, and commuter rail [7]	863	752
	Rail Transit [8]	173	179
	Total Rail Fatalities	**1,036**	**931**
Marine:	Recreational boating	613	767
	Cargo transport	10	7
	Commercial fishing [9]	40	33
	Commercial passenger	44	44
	Total Marine Fatalities	**707**	**851**
Aviation:	General aviation	414	332
	Airlines	4	0
	Air taxi	32	21
	Commuter	2	5
	Total Aviation Fatalities [10]	**452**	**349**
Pipeline:	Gas	11	10
	Liquids	0	5
	Total, Pipeline	**11**	**15**
	Total [11]	**38,433**	**40,876**

1 Numbers for 2020 are preliminary estimates. Aviation data is from the NTSB; marine data is reported by the US DHS; all other data is reported by the US DOT.
2 Light trucks are defined as trucks of 10,000 pounds gross vehicle weight rating or less, including pickups, vans, truck-based station wagons, and utility vehicles.
3 Pedalcycles include bicycles and other cycles.

4 Large trucks are defined as trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.
5 Bus occupants and occupants of other or unknown vehicle types.
6 Other or unknown non-occupants of motor vehicles (excluding pedestrians and pedalcyclists).
7 Freight, passenger, and commuter rail data are reported by the FRA. The FRA includes trespassers but does not include suicides.
8 Rail transit data are reported by the FTA and include fatalities (including suicides) involving heavy rail, light rail, cable car, inclined plane, monorail/automated guideway, streetcar rail, and hybrid rail.
9 *Commercial fishing* refers to operational fatalities.
10 Total aviation fatalities may not equal the sum of each category because accidents may involve multiple categories. In addition, foreign-registered and unregistered aircraft involved in accidents in the United States are not included in this total.
11 To reduce double counting, the Bureau of Transportation Statistics excludes railroad fatalities involving motor vehicles at public highway-rail grade crossings and transit fatalities involving non-rail modes from the overall total fatalities. In these categories, there were 128 fatalities in 2019, and 94 fatalities in 2020. These counts were subtracted for consistency with Bureau of Transportation Statistics total fatalities for 2019 and 2020.

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 accidents in other modes of transportation—highway, marine, railroad and pipeline. The NTSB determines the probable cause of the accidents and issues safety recommendations aimed at preventing future accidents. For more information, visit **www.ntsb.gov**

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