

National Transportation Safety Board

# ANNUAL REPORT

*to Congress*



**2006 ANNUAL REPORT**

NTSB/SPC-07/01



**NATIONAL  
TRANSPORTATION  
SAFETY BOARD**



## Foreword

The National Transportation Safety Board (NTSB) is an independent agency charged with determining the probable cause of transportation accidents and promoting transportation safety. The Safety Board investigates accidents, conducts safety studies, evaluates the effectiveness of other government agencies' programs for preventing transportation accidents, and reviews the appeals of enforcement actions involving aviation and seaman certificates issued by the Federal Aviation Administration (FAA) and the U.S. Coast Guard and the appeals of civil penalty actions taken by the FAA.

To help prevent accidents, the NTSB develops safety recommendations based on its investigations and studies. These are issued to Federal, State, and local government agencies and to industry and other organizations in a position to improve transportation safety. Recommendations are the focal point of the NTSB's efforts to improve the safety of the nation's transportation system.

The NTSB's origins can be found in the Air Commerce Act of 1926, in which the U.S. Congress charged the U.S. Department of Commerce with investigating the causes of aircraft accidents. Later, that responsibility was given to the Civil Aeronautics Board's Bureau of Aviation Safety.

In 1967, Congress consolidated all transportation agencies into a new U.S. Department of Transportation (DOT) and established the NTSB as an independent agency placed within the DOT for administrative purposes. In creating the Board, Congress envisioned that a single organization with a clearly defined mission could more effectively promote a higher level of safety in the transportation system than the individual modal agencies working separately. Since 1967, the Board has investigated accidents in the aviation, highway, marine, pipeline, and railroad modes, as well as accidents related to the transportation of hazardous materials.

In 1974, Congress reestablished the NTSB as a completely separate entity, outside the DOT, reasoning that "...No Federal agency can properly perform such (investigatory) functions unless it is totally separate and independent from any other...agency of the United States." Because the DOT is responsible for both the regulation and promotion of transportation within the United States and accidents may suggest deficiencies in the transportation system, the Board's independence was deemed necessary for proper oversight. The NTSB, which has no authority to regulate, fund, or be directly involved in the operation of any mode of transportation, seeks to conduct investigations and to make recommendations from a totally objective viewpoint.

In 1996, Congress assigned the Safety Board the additional responsibility of coordinating Federal assistance to the families of aviation accident victims. In 2000, the Board embarked on a major initiative to increase employee technical skills and make its investigative expertise more widely available to the transportation community by establishing the NTSB Academy. The George Washington University Virginia campus was selected as the Academy's home. The NTSB took occupancy of its new facility in August 2003. On October 1, 2006, the name of the NTSB Academy was changed to the NTSB Training Center to better reflect the internal training aspects of the facility.

*Since its inception, the Safety Board has investigated more than 128,000 aviation accidents and thousands of surface transportation accidents. To date, the Board has issued over 12,500 safety recommendations pertaining to the various transportation modes to more than 2,200 recipients.*

Since its inception, the Safety Board has investigated more than 128,000 aviation accidents and thousands of surface transportation accidents. On call 24 hours a day, 365 days a year, NTSB investigators travel throughout the country and to every corner of the world to investigate significant accidents and develop factual records and safety recommendations with one aim—to ensure that such accidents never happen again.

To date, the NTSB has issued over 12,500 safety recommendations pertaining to the various transportation modes to more than 2,200 recipients. Because the Safety Board has no authority to regulate the transportation industry, its effectiveness depends on its reputation for conducting thorough and accurate investigations and for producing timely, well-considered recommendations to enhance transportation safety.

In 2006, the Safety Board continued to push for safety improvements as 89 recommendations were taken off its books after being implemented. This includes 30 aviation, 14 highway, 24 marine, 7 railroad, 10 pipeline and hazardous materials, and 4 intermodal safety advances recognized by the Board as meeting our recommendations in the past 12 months. They were officially closed “acceptable action” or “acceptable alternate action.” The overall acceptance rate for safety recommendations was about 82 percent.

Another 163 recommendations were issued in 2006: 87 aviation, 29 highway, 23 railroad, 5 pipeline, 17 marine, and 2 intermodal.

2006 Annual Report

# National Transportation Safety Board

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## Most Wanted Safety Recommendations

In September and November 2006, the Safety Board updated its Most Wanted list of transportation safety improvements that highlights actions needed by the U.S. Department of Transportation modal administrations, the U.S. Coast Guard, and the States. Actions by Federal agencies are ranked according to timeliness. Issue areas on the list are color-coded: green -- acceptable response, progressing in a timely manner; yellow -- acceptable response, progressing slowly; and red -- unacceptable response. (On the following pages, the Federal agency issues are color-coded as indicated in the brackets.)

Two issue areas were added to the list: asking the Federal Aviation Administration (FAA) to require commuter and on-demand air taxi flight crews to receive crew resource management training, and asking the National Highway Traffic Safety Administration (NHTSA) to devise new standards to protect school bus passengers from being thrown out of their seats or ejected when a school bus sustains a front, side, or rear impact or rolls over.

In early 2006, the Safety Board closed seven of eight recommendations to the U.S. Coast Guard as acceptable because the U.S. Coast Guard has issued a final rule that requires chemical testing following serious marine incidents.

A recommendation to the Pipeline and Hazardous Materials Safety Administration was also closed as acceptable because the agency had published an advisory bulletin aimed at preventing the hazards caused by human fatigue in pipeline control rooms.

### 2006 Most Wanted List

#### *Actions Needed by Federal Agencies*

#### **AVIATION**

##### *The Federal Aviation Administration should act to:*

##### **Reduce Dangers to Aircraft Flying in Icing Conditions [Red]**

- Use current research on freezing rain and large water droplets to revise the way aircraft are designed and approved for flight in icing conditions.
- Conduct additional research with the National Aeronautics and Space Administration to identify realistic ice accumulation and incorporate new information into aircraft certification and pilot training requirements.

##### **Eliminate Flammable Fuel/Air Vapors in Fuel Tanks on Transport Category Aircraft [Yellow]**

- Implement design changes to eliminate the generation of flammable fuel/air vapors in all transport category aircraft.

**Stop Runway Incursions/Ground Collisions of Aircraft [Red]**

- Give immediate warnings of probable collisions/incursions directly to flight crews in the cockpit.

**Improve Audio and Data Recorders/Require Video Recorders [Red]**

- Require cockpit voice recorders to retain at least 2 hours of audio.
- Require back-up power sources so cockpit voice recorders collect an extra 10 minutes of data when an aircraft's main power fails.
- Install video recorders in cockpits to give investigators more information to solve complex accidents.
- Install dual combination recorders.
- Expand parameters recorded on Boeing 737 airplanes.

**Reduce Accidents and Incidents Caused by Human Fatigue [Red]**

- Set working hour limits for flight crews and aviation mechanics based on fatigue research, circadian rhythms, and sleep and rest requirements.

**Improve Crew Resource Management [Red]**

- Require commuter and on-demand air taxi flight crews to receive crew resource management training.

**RAILROAD***The Federal Railroad Administration should act to:***Implement Positive Train Control Systems [Yellow]**

- Prevent train collisions and overspeed accidents by requiring automatic control systems to override mistakes by human operators.

**PIPELINE***The Pipeline and Hazardous Materials Safety Administration should act to:***Reduce Accidents and Incidents Caused by Human Fatigue [Yellow]**

- Set working hour limits for pipeline controllers based on fatigue research, circadian rhythms, and sleep and rest requirements.

**HIGHWAY***The Federal Motor Carrier Safety Administration should act to:***Improve the Safety of Motor Carrier Operations [Red]**

- Prevent motor carriers from operating if they put vehicles with mechanical problems on the road or unqualified drivers behind the wheel.

### **Prevent Medically Unqualified Drivers from Operating Commercial Vehicles [Red]**

- Establish a comprehensive medical oversight program for interstate commercial drivers.
- Ensure that examiners are qualified and know what to look for.
- Track all medical certificate applications.
- Enhance oversight and enforcement of invalid certificates
- Provide mechanisms for reporting medical conditions.

*The National Highway Traffic Safety Administration should act to:*

### **Enhance Protection of Motorcoach Passengers [Yellow]**

- Redesign motorcoach window emergency exits so passengers can easily open them.
- Issue standards for stronger bus roofs and require them in new motorcoaches.
- Devise new standards to protect motorcoach passengers from being thrown out of their seats or ejected when a bus sustains a front, side, or rear impact or rolls over.

### **Enhance Protection for School Bus Passengers [Yellow]**

- Devise new standards to protect school bus passengers from being thrown out of their seats or ejected when a bus sustains a front, side, or rear impact or rolls over.

## **MARINE**

*The U.S. Coast Guard should act to:*

### **Reduce Accidents and Incidents Caused by Human Fatigue [Yellow]**

- Set working hour limits for mariners based on fatigue research, circadian rhythms, and sleep and rest requirements.

## **INTERMODAL**

*The U.S. Department of Transportation should act to:*

### **Reduce Accidents and Incidents Caused by Human Fatigue [Yellow]**

- Set working hour limits for transportation operators based on fatigue research, circadian rhythms, and sleep and rest requirements.

## *Action Needed by the States*

## **HIGHWAY**

### **Improve Child Occupant Protection**

- Enact State laws requiring booster seats for young children.



**Enact Primary Seat Belt Enforcement Laws**

- Increase the number of people who wear seat belts through stronger enforcement laws.

**Promote Teen Highway Safety**

- Enact graduated driver licensing legislation.
- Restrict the number of teen passengers traveling with young novice drivers.
- Prohibit use of wireless communications devices by young novice drivers.

**Eliminate Hard Core Drinking Driving**

- Enact State legislation and take other actions that are proven to reduce crashes involving those who repeatedly drink large amounts of alcohol and drive including:
  - Frequent, statewide sobriety checkpoints
  - Legislation to create stricter sanctions for those arrested for the first time with a high blood alcohol concentration of 0.15 or higher.
  - Zero blood alcohol requirement for convicted driving while intoxicated (DWI) offenders when they get their license back.
  - Administrative rather than court-based license revocation for refusing to take or failing the sobriety test.
  - Vehicle sanctions for DWI offenders.
  - Eliminate plea-bargaining DWI offenses and programs that divert offenders and purge the offense record.
  - Retain DWI offense records for at least 10 years to identify and prosecute repeat offenders.
  - Develop and operate special sanction court-based programs for hard core DWI offenders.

**Improve School Bus/Grade Crossing Safety**

- Install stop signs at passive crossings.
- Upgrade school bus railroad crossings that only have warning signs to crossings with lights and gates.
- Install switches on new buses that allow drivers to turn off radios and other devices that mask the sound of train warning horns.
- Enhance bus driver training and evaluation.
- Include grade crossing questions on commercial driver's license exams.

**MARINE****Enhance Recreational Boating Safety**

- Require mandatory education of boat operators.
- Require use of life jackets by children.
- Require safety instruction prior to personal watercraft rental.

## The NTSB and Congress

The National Transportation Safety Board (NTSB) provided testimony to congressional committees several times during calendar year 2006. Below is a summary of testimony provided by Members and staff of the Safety Board. Complete copies of NTSB testimony are available on the Board's website (<http://www.nts.gov/speeches>).

Then-Acting Chairman Mark V. Rosenker testified before the U.S. House of Representatives, Committee on Transportation and Infrastructure, Subcommittee on Aviation, on March 8, 2006, regarding the reauthorization of the NTSB. His testimony included a brief overview of the Board's accomplishments since its previous reauthorization in 2003.

Then-Acting Chairman Rosenker presented testimony to the U.S. House of Representatives, Committee on Appropriations, Subcommittee on Transportation, Treasury, HUD, the Judiciary, District of Columbia, and Independent Agencies, on April 14, 2006, regarding the Safety Board's 2007 appropriation needs and its refocusing on improving the leadership and mission of the Board.

Then-Acting Chairman Rosenker testified before the U.S. Senate, Committee on Commerce, Science and Transportation, Subcommittee on Aviation, on May 24, 2006, regarding the reauthorization of the NTSB. The testimony included a brief overview of what the Board had accomplished since its last reauthorization in 2003.

Then-Acting Chairman Rosenker testified to the U.S. Senate, Committee on Appropriations, Subcommittee on Transportation, Treasury, the Judiciary, HUD, and Related Agencies, on May 31, 2006, regarding the Safety Board's 2007 appropriation needs and the progress it had made in improving the mission focus of the Board.

Then-Acting Chairman Rosenker testified before the U.S. Senate, Committee on Commerce, Science and Transportation, on June 8, 2006, regarding his confirmation hearing to become Chairman of the NTSB.

Mr. Robert L. Sumwalt, III, testified before the U.S. Senate, Committee on Commerce, Science and Transportation, on July 27, 2006, regarding his confirmation hearing to become a Member of the Safety Board.

Mr. Steven R. Chealander testified before the U.S. Senate, Committee on Commerce, Science and Transportation, on December 5, 2006, regarding his confirmation hearing to become a Member of the Safety Board.

Mr. Thomas Haueter, Deputy Director, Office of Aviation Safety, testified before the U.S. House of Representatives, Committee on Transportation and Infrastructure, Subcommittee on Aviation, on September 20, 2006, about aviation safety.

Mr. Robert Chipkevich, Director, Office of Railroads, Pipeline and Hazardous Materials Investigations, testified before the U.S. House of Representatives, Committee on Transportation and Infrastructure, Subcommittee on Highways, Transit and Pipelines, on March 16, 2006, about pipeline safety and the progress made by the Pipeline and Hazardous Materials Safety Administration since its last reauthorization.

Mr. Chipkevich testified before the U.S. House of Representatives, Committee on Energy and Commerce, Subcommittee on Energy and Air Quality, on April 27, 2006, regarding progress made since the enactment of the Pipeline Safety Improvement Act of 2002.

Mr. Chipkevich testified before the U.S. House of Representatives, Committee on Transportation and Infrastructure, Subcommittee on Railroads, on June 13, 2006, about the current issues on the transportation of hazardous materials by rail.

Mr. Chipkevich testified before the U.S. House of Representatives, Committee on Transportation and Infrastructure, Subcommittee on Railroads, on July 25, 2006, about human factors issues in rail safety.

Additionally, the Government and Industry Affairs Office sent 425 responses to letters received from members of Congress and congressional committees; responded to over 1,500 congressional staff inquiries and numerous requests for Member and staff briefings; forwarded 45 updates on accident investigations to congressional staff; sent 23 final accident reports to members of Congress; and forwarded the Safety Board's 2007 Most Wanted list of transportation safety improvements to all members and staff on the House Transportation and Infrastructure Committee, the Senate Commerce, Science and Transportation Committee, the House Appropriations Committee, and the Senate Appropriations Committee and Subcommittees.

## State and Local Government Outreach

In 2006, progress was made on some of the Safety Board's most important recommendations to the States.

- Four States enacted booster seat legislation that fully implemented the Board's recommendation, and one State enacted legislation that partially implemented the recommendation.
- Three States enacted primary enforcement, and one State, which already had primary enforcement, applied its seat belt law to all seating positions.
- Two States enacted passenger restriction legislation for young novice drivers.
- Two States enacted legislation establishing a graduated licensing law that fully satisfies the Board's recommendation.
- Two States enacted legislation prohibiting young drivers from using cell phones while driving.
- Four States implemented elements of the Safety Board's hard core drinking and driving recommendation.
- Two States developed and implemented a program of initiatives for passive grade crossings traversed by school buses that includes the Board's recommended elements.
- One State and one Territory enacted legislation mandating personal floatation device use by children.
- Three States and one Territory enacted legislation mandating boating safety education.
- One State and one Territory enacted legislation mandating pre-rental instruction for personal watercraft operators.

This year, 2006, was the first year in which the Safety Board centralized its advocacy initiatives to more precisely target safety opportunities and track our progress. In 2006, Board staff and Board Members were involved in 26 conferences and 74 meetings, testified at 9 legislative hearings, and participated in 6 press events in 24 States and Canada -- all advocating the Board's recommendations. This count does not include numerous telephone calls, letters of support for legislation, and e-mails from Board Members and Board staff.

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## Office of Aviation Safety

The Federal Aviation Act of 1958, as amended, and the Independent Safety Board Act of 1974 placed the responsibility for investigating and determining the probable cause for all civil aviation accidents within the National Transportation Safety Board. Subsequent legislation also authorized the Board to investigate accidents involving public-use aircraft, except those operated by the armed forces and intelligence agencies.

Within the Safety Board, the Office of Aviation Safety has the responsibility for investigating aviation accidents and incidents (about 2,000 annually) and for proposing probable causes for the Board's approval. In conjunction with other offices within the Board, the office also works to formulate recommendations to prevent the recurrence of similar accidents and incidents and to improve aviation safety. Board investigations routinely examine all factors surrounding an accident or series of accidents or serious incidents, thereby ensuring that regulatory agencies and the industry are given a thorough and objective analysis of actual, as well as potential, deficiencies in the transportation system. Only then can solutions be proposed to correct deficiencies that may have caused an accident.

The Office of Aviation Safety also manages the Safety Board's international aviation affairs program. Given the international nature of the air transportation industry and the leading role of the United States in the development of aviation technologies, the Board's investigations of domestic accidents and participation in foreign investigations are essential to the enhancement of aviation safety worldwide. The Board's major aviation accident reports, safety recommendations, and accident statistics are disseminated worldwide and have a direct influence on safety policies domestically and abroad, helping to ensure the safe transportation by air of U.S. citizens and other travelers around the world.

The Safety Board fulfills U.S. obligations to foreign accident investigations, established by treaty under the auspices of the International Civil Aviation Organization (ICAO), by sending accredited representatives and technical advisors from airframe and engine manufacturers to participate in investigations that involve U.S. interests. The office also maintains liaison and coordination with other governments through the U.S. Interagency Group on International Aviation and the ICAO.

The headquarters for the Office of Aviation Safety is in Washington, D.C., with 10 regional offices: Parsippany, New Jersey; Atlanta, Georgia; Miami, Florida; West Chicago, Illinois; Arlington, Texas; Denver, Colorado; Seattle, Washington; Gardena, California; Anchorage, Alaska; and Ashburn, Virginia. Seven divisions comprise the headquarters office and reflect the organization of the Safety Board's investigative process: Major Investigations, Regional Operations and General Aviation, Operational Factors, Human Performance, Aviation Engineering, Survival Factors, and Report Writing and Editing.

For most of the nearly 2,000 commercial and general aviation accident/serious incidents investigated each year, a regional investigator, from one of the 10 Safety Board regional offices, serves as the investigator-in-charge. However, when the Board is notified of a major aviation accident, it launches a go-team from headquarters; the go-team varies in size depending on the severity of the accident and the complexity of the issues involved. The go-team normally consists of an investigator-in-charge from the Major Investigations division and staff specialists in as many as 14 specialties. Additional specialty areas may be

*The Office of Aviation Safety has 80 investigators and 41 support staff, which consists of managers, technical writers, aviation accident analysts, and administrative staff. In 2006, it launched on three major domestic investigations and seven foreign accident investigations. The office completed 10 major reports and continued work on 8 other major reports.*

added as required by the investigation. Each staff expert leads a group of other specialists from Government agencies, the industry, and first-response teams as information is collected and analyzed. Board staff members are designated as group chairmen to coordinate information for their part of the investigation, from on-scene activities through adoption of the final report.

Operational Factors specialists in three disciplines—air traffic control, operations, and weather—support major investigations with intensive work in those areas. Aviation Engineering specialists provide technical skills in the areas of powerplants (engines), structures, systems, and maintenance. Human Performance specialists review the background and performance of those associated with an accident. Survival Factors specialists investigate circumstances that affect the survival of people involved in accidents, including causes of injuries and fatalities.

The participation of operators, manufacturers, labor, and regulators augments the Safety Board's resources and allows first-hand access to specialized information. For example, an aircraft manufacturer is the best source of information on the design of the specific aircraft being investigated. The Board also makes use of outside laboratories and research facilities whenever needed.

A public hearing may be convened, generally within a year of an accident, or depositions may be taken to collect additional information and review the investigation's progress. As an investigation is completed, a detailed narrative report is prepared. This report analyzes the investigative record and identifies the probable cause of the accident.

Safety recommendations resulting from major investigations are generally included in the final accident report, although recommendations can be issued at any time during the course of an investigation. Regional investigations will frequently identify safety issues that need to be corrected before they result in other accidents.

## Completed Major Aviation Investigations

### *Helicopter Crash off Coast of Galveston, Texas*

On March 23, 2004, a Sikorsky S-76A twin-engine turbine-powered helicopter (N579EH), operated by ERA Aviation, Inc., crashed in the Gulf of Mexico. The aircraft, chartered by Unocal of Houston, Texas, had departed Scholes International Airport near Galveston, Texas, for the High Island A-557 refueling platform and then an offshore drilling ship. The two crewmembers and eight passengers were killed. The Safety Board adopted the report on March 7, 2006.

### *Convair 589 Cargo Plane Crash Near Cincinnati, Ohio*

On August 13, 2004, Air Tahoma flight 185, a Convair 580 cargo airplane (NV586P), crashed near Cincinnati, Ohio. The flight crew had reported engine trouble before crashing onto a golf course short of runway 36R at the Cincinnati/Northern Kentucky International Airport. One crewmember was killed; the other was seriously injured. The Safety Board adopted the report on May 2, 2006.

### *Jetstream 32 Accident in Kirksville, Missouri*

On October 19, 2004, a British Aerospace Jetstream 32, operating as American Connection flight 5966, crashed on approach to Kirksville Regional Airport in Kirksville, Missouri. The

aircraft carried 2 crewmembers and 13 passengers; there were 2 survivors. The Safety Board adopted the report on January 24, 2006.

### *Business Jet Services Accident in Houston, Texas*

On November 22, 2004, a Gulfstream G-1159A (G-III), N85VT, operated by Business Jet Services, crashed while on approach to Houston Hobby Airport in Houston, Texas. The airplane had been on an instrument landing system approach to the runway when it struck a light pole adjacent to a roadway and crashed into a field. The two pilots and one flight attendant were killed. The aircraft was arriving in Houston to pick up former President Bush for a flight to South America. The Safety Board adopted the report on November 2, 2006.



### *Presidential Airways, Inc., Turboprop Crash Near Bagram, Afghanistan*

On November 27, 2004, a CASA 212 twin-engine turboprop airplane, operated by Presidential Airways, Inc., of Melbourne, Florida, was destroyed when it crashed about 80 miles west of Bagram, Afghanistan. The certificated airline transport pilot and copilot, flight mechanic, and three passengers were killed.

On December 4, 2004, the Transitional Islamic Government of Afghanistan requested through the Embassy of the United States that, in accordance with Annex 13 to the Convention on International Civil Aviation, the Safety Board be delegated to conduct the investigation. Parties to the investigation were the Federal Aviation Administration, the U.S. Air Force Safety Center, the U.S. Army Safety Center, and Presidential Airways, Inc. The Board adopted the report on November 8, 2006.

### *Bombardier Challenger CL-600 Crash in Teterboro, New Jersey*

On February 2, 2005, a Bombardier Challenger CL-600 corporate jet, N370V, operated by Platinum Jet Management, Fort Lauderdale, Florida, struck a fence, two cars, and a warehouse off the departure end of a runway during an aborted takeoff from Teterboro Airport in Teterboro, New Jersey. A postcrash fire ensued. The pilot and copilot sustained nonlife-threatening serious injuries. A flight attendant on board sustained minor injuries. All eight passengers also survived the accident with minor injuries. Two occupants of the cars suffered serious injuries. The Safety Board adopted the report on October 31, 2006.



### *Learjet 35A Crash Into Mountainous Terrain Near San Diego California*

On October 24, 2004, about 12:25 a.m. Pacific daylight time, a Learjet 35A, N30DK, registered to and operated by Med Flight Air Ambulance, Inc., crashed into mountainous terrain shortly after takeoff from Brown Field Municipal Airport near San Diego, California. The captain, the copilot, and the three medical crewmembers were killed, and the airplane was destroyed. The Safety Board adopted the report on May 23, 2006.

### *Learjet 24B Departure From Controlled Flight Near Helendale, California*

On December 23, 2003, about 9:13 a.m. Pacific standard time, a Learjet 24B, N600XJ, registered to and operated by Pavair, Inc., of Santa Monica, California, crashed near Helendale, California. The captain and the first officer were killed, and the airplane was destroyed. The Safety Board adopted the report on May 23, 2006.

### *Global Aviation Canadair CL-600 in Montrose, Colorado*

On November 28, 2004, about 9:58 a.m. mountain standard time, a Canadair, Ltd., CL-600-2A12, N873G, registered to Hop-a-Jet, Inc., operated by Air Castle Corporation, and doing business as Global Aviation Glo-Air flight 73, crashed during takeoff at Montrose Regional Airport in Montrose, Colorado. Of the six occupants on board the on-demand charter flight, the captain, the flight attendant, and one passenger were killed; the first officer and two passengers were seriously injured. The Safety Board adopted the report on May 2, 2006.

### *Beech King Air Accident in Stuart, Virginia*

On October 24, 2004, about 12:35 p.m. eastern daylight time, a Beech King Air 200, N501RH, operated by Hendrick Motorsports, Inc., crashed in mountainous terrain in Stuart, Virginia, during a missed approach to the Martinsville/Blue Ridge Airport in Martinsville, Virginia. The plane had been transporting Hendrick Motorsports employees and others to a NASCAR race in Martinsville. The two flight crewmembers and eight passengers were killed. Impact forces and postcrash fire destroyed the airplane. The Safety Board adopted the report on February 7, 2006.

## Ongoing Major Aviation Investigations

### *Pinnacle Airlines Crash in Jefferson City, Missouri*

On October 14, 2004, a Pinnacle Airlines Canadair CL-600-2B19 regional jet crashed in a residential area in Jefferson City, Missouri. Impact forces and a postcrash fire destroyed the airplane. The two crewmembers were killed.

### *Crash of Cessna Citation 560 in Pueblo, Colorado*

On February 16, 2005, a Cessna Citation 560, N500AT, crashed while on approach to Pueblo Memorial Airport in Pueblo, Colorado. The two flight crewmembers and six passengers were killed. Impact and a postcrash fire destroyed the airplane. The accident site was an open field approximately 4 miles east of the runway. The airplane had been owned and operated by Circuit City Stores, Inc., of Richmond, Virginia, which was using the aircraft management services of Martinair.



### *Runway Overrun by Southwest Airlines Flight 1248 in Chicago, Illinois*

On December 8, 2005, Southwest Airlines flight 1248, a Boeing 737-700, overran the runway at Chicago Midway Airport in Chicago, Illinois. The airplane rolled through a blast fence and a perimeter fence and onto a roadway. The airplane came to a stop after striking two automobiles. Of the 98 passengers and 5 crewmembers on board, 5 occupants sustained minor injuries. Of the occupants of the two automobiles, one person was killed.



### *Chalks Ocean Airways Crash Off Coast of Miami, Florida*

On December 19, 2005, about 2:39 p.m., a Grumman Mallard G73T (N2969), operated by Flying Boat, Inc., as Chalks Ocean Airways flight 101, had an in-flight separation of its right wing from the airframe and crashed into a shipping channel adjacent to the Port of Miami shortly after taking off. The aircraft, a seaplane, had departed from the Miami Seaplane Base and taken off from the shipping channel with two crewmembers and 18 passengers (including 3 infants). The plane had been destined for Bimini, Bahamas. All 20 occupants suffered fatal injuries. The right wing root showed indications of a fatigue crack in the aft wing lower spar cap.



### *United Parcel Service Cargo Fire in Philadelphia, Pennsylvania*

On February 7, 2006, a United Parcel Service DC-8 made an emergency landing at Philadelphia International Airport after the flight crew reported a cargo smoke indication. The three flight crewmembers sustained minor injuries, and the airplane and its cargo were destroyed by fire.

### *Comair Bombardier CRJ-100 Crash in Lexington, Kentucky*

On August 27, 2006, about 6:07 a.m., Comair flight 5191, a Bombardier CRJ-100, N431CA, crashed upon takeoff from Blue Grass Airport in Lexington, Kentucky. The airplane ran off the end of runway 26 and was destroyed by impact forces and postcrash fire. The flight had been cleared to takeoff from runway 22. Of the 47 passengers and 3 crewmembers onboard, only 1 (the first officer) survived, although with serious injuries.

### *Cirrus SR-20 Crash in New York, New York*



On October 11, 2006, about 2:42 p.m., a Cirrus SR-20, N929CD, crashed into an apartment building in New York City. Both people on board the airplane were killed, and impact forces and postcrash fire destroyed the airplane. No fatalities occurred on the ground. Several of the apartments were damaged substantially. The plane had taken off from Teterboro Airport in New Jersey and appeared to be sightseeing around Manhattan.

### *Bali Hai Helicopter Tours, Inc., Bell 206B Crash Near Kalaheo, Hawaii*

On September 24, 2004, a Bell 206B helicopter, operated by Bali Hai Helicopter Tours, Inc., encountered instrument meteorological conditions and crashed into mountainous terrain near Kalaheo, Hawaii, on the island of Kauai. The commercial pilot and four passengers were killed, and impact forces and postimpact fire destroyed the helicopter.

## Regional Aviation Operations

Regional accident and serious incident investigations are handled much like major investigations; but, because a regional investigation is typically smaller in scope, a single regional investigator usually conducts them. The investigator, working with representatives from other parties, ensures the investigation includes all the relevant facts, conditions, and circumstances needed to determine the cause of the accident and identify any safety issues. The factual reports of the accidents/serious incidents conducted by the regional investigators are published on the Safety Board's website. A brief report, including the probable cause of the accident, also is available once the probable cause has been determined.

## Completed Regional Aviation Investigations

### *In the Alaska Region*

#### *de Havilland DHC-2 Air Tour near Talkeetna, Alaska*

On March 7, 2005, a de Havilland DHC-2, operated by Fly Denali, of Talkeetna, Alaska, experienced in-flight flutter of the wings, which damaged the airframe. The plane landed successfully, but subsequent examination disclosed that a catastrophic failure of the wing was imminent. Prior to the event, the pilot had been taking a digital video with audio through the window of the airplane. The video and audio were analyzed in the Safety Board's laboratory.

The Safety Board determined that the probable cause was aerodynamic flutter of the ailerons during normal cruise flight due to their improper maintenance/balancing, which resulted in structural damage to the airplane's wings.

### *MD-11 In-flight Smoke in Cockpit*

On April 28, 2005, a McDonnell Douglas MD-11, operated by World Airways, was en route to Seattle, Washington, from South Korea when the crew decided to divert to Anchorage due to an electrical smell and smoke in the cockpit. During an inspection of the aircraft by a regional investigator, it was discovered that the recently mandated hardened cockpit entry door from the cabin was not functioning correctly. The investigator found burnt and melted wires adjacent to the door's locking solenoid, indicating that the solenoid was overheating and that the wiring bundles were installed improperly. Discussions among the Safety Board investigator, the door manufacturer, and the operator have resulted in modified installation procedures and inspections.

The Safety Board determined that the probable cause was the incorrect installation of the cockpit security door-locking device, which resulted in smoke in the cockpit during normal flight and a precautionary landing. A factor associated with the incident was the manufacturer's insufficiently defined installation instructions.

### *Taylorcraft F-19 Crash near Fairbanks, Alaska*

On April 30, 2005, a Taylorcraft F-19 crashed at Chena Marina Airport in Fairbanks, Alaska, following a loss of engine power and subsequent loss of control. The pilot was killed, and the sole passenger sustained serious injuries. During the investigation, it was discovered that the pilot's shoulder harness had failed where the V portion of the shoulder webbing was sewn to the single attachment/anchor strap. The investigation led the Federal Aviation Administration (FAA) to review other shoulder harness/seat belt installations in older aircraft, and, in conjunction with the Safety Board, the FAA is researching the extent of seat and shoulder harness failures and installation procedures in older aircraft.



The Safety Board determined that the probable causes were the pilot's failure to maintain a minimum airspeed during a low-altitude turn to return to the airport and his improper in-flight decision to initiate a steep, low-altitude turn, which resulted in an inadvertent stall/spin and a collision with terrain. Contributing to the accident was the loss of engine power for undetermined reasons.

### *In the Mid-Atlantic Region*

#### *Beech A36 Crash on Approach to Airport in Pikeville, Kentucky*

On October 7, 2005, a Beech A36 single-engine airplane struck mountainous terrain during its approach to Pike County Airport in Pikeville, Kentucky. All three occupants on the airplane were killed, and the airplane was destroyed.

The Safety Board determined that the probable cause was the pilot's failure to follow the published instrument approach, which resulted in controlled flight into terrain. A contributing factor was the low ceiling.

### *Flight Control Malfunction on Beech 1900D Commuter Flight*

On August 2, 2005, a Beech 1900D commuter airplane operated by Colgan Air, Inc., and doing business as US Airways Express, had a flight control malfunction en route to Rockland, Maine. The airplane was able to land safely at its destination with no damage. The two pilots and seven passengers were not injured. The captain reported that, during the takeoff, he pulled the yoke with both hands, but it did not move. The captain then pulled significantly harder, and the yoke moved quickly aft. During cruise flight, everything was normal except that the elevator trim moved slowly nose up, which required an input of 1/2-unit nose-down trim every 1 to 2 minutes. The subsequent examination of the airplane revealed that the left elevator could be moved around by hand. Further examination revealed that seven rivets were loose, and one rivet was missing near the left side elevator outer hinge-point attach bracket. An inspection of Colgan Air's aircraft and the same make and model aircraft of other operators revealed that some of the airplanes had loose rivets on the elevator hinge-point attach brackets. The suspect rivets and elevator were replaced on the incident airplane, and the anomaly did not reoccur.

The Safety Board determined that the probable cause was a loose elevator attachment, which resulted in a partial elevator binding during takeoff and uncommanded elevator movement during cruise.

### *In the Southeast Region*

#### *Commander 114-B Crash in Gulf of Mexico*

On March 30, 2006, a Commander 114-B single-engine airplane (N60204) crashed in the Gulf of Mexico, southwest of the departure end of runway 22 at Venice Municipal Airport in Venice, Florida, in night visual meteorological conditions. Both people on board were killed. Witnesses said that they heard the engine operating overhead and that the airplane had banked and descended rapidly, striking the water while the engine was operating.

The Safety Board determined that the probable cause was the pilot's in-flight loss of control during takeoff/initial climb over the water at night due to spatial disorientation.

#### *Cirrus SR22 Airplane Strikes House Near Coconut Creek, Florida*

On January 15, 2007, a Cirrus Design Corporation SR22 single-engine airplane (N889JB) struck a house near Coconut Creek, Florida. The pilot, who was the sole occupant, was killed. The pilot had taken off in instrument meteorological flight conditions and, shortly thereafter, mistakenly followed air traffic control instructions given to another airplane. The airplane subsequently descended nose down, out of clouds, and struck a house and terrain. The airplane was equipped with a primary flight display (PFD) but had a history of PFD failures; it also was equipped with separate backup instruments in case the display failed.

The Safety Board determined that the probable cause was the pilot's failure to maintain aircraft control, which resulted in an uncontrolled descent to the ground. Factors included an avionics failure, pilot disorientation, and instrument meteorological conditions. A factor in the severity of the impact was the pilot's failure to deploy the airplane's onboard parachute system.

### *In the Central Mountain Region*

#### *Twin-Engine Cessna Strikes Terrain on Approach Near Lone Tree, Colorado*

On August 13, 2005, a Cessna 425 twin-engine airplane (N425SG) struck terrain near Lone Tree, Colorado, and was destroyed. All four people on board were killed. After approaching the terminal area, the pilot had received radar vectors to intercept the localizer for the runway 35R instrument landing system approach. The pilot's keying of the microphone and the timing of his speech had exhibited decreased coordination during the approach phase of flight.

The Safety Board determined that the probable cause was the pilot's failure to properly execute the published instrument approach procedure, which resulted in controlled flight into terrain.

#### *Air Ambulance Encounters Ice Near Steamboat Springs, Colorado*

On January 26, 2005, a Beech BE-90 twin-engine airplane (N41WE), operated as an air ambulance struck mountainous terrain approximately 2.5 nautical miles east-northeast of the Rawlins Municipal Airport/Harvey Field (RWL). Three people were killed, and one person sustained serious injuries. The airplane had been dispatched from Steamboat Springs, Colorado, to pick up and transport a patient in serious condition from RWL to Casper, Wyoming. The airplane, configured for landing, had struck the terrain wings level, in a 45° nose-down dive, consistent with impact following an aerodynamic stall.

The Safety Board determined that the probable cause was the pilot's inadvertent flight into adverse weather (severe icing), resulting in an aerodynamic stall impact with rising, mountainous terrain during approach. A factor contributing to the accident was the pilot's inadequate planning for the forecasted icing. The Board issued several recommendations related to air ambulance flight dispatching, operating requirements, and risk assessment.

### *In the Southwest Region*

#### *Firefighting Lockheed P-3B Crash Near Chico, California*

On April 20, 2005, a Lockheed P-3B air tanker airplane (N926AU), owned and operated by the Aero Union Corporation of Chico, California, crashed during training for firefighting operations. All three crewmembers were killed, and fire and impact forces destroyed the airplane. During the last 36 seconds of the flight, the airplane began to deviate toward the rising terrain on the eastern side of the valley. The Safety Board determined that the probable cause was the terrain clearance was not maintained while maneuvering.

#### *Aerospatiale AS350BA Sightseeing Helicopter Crash Near Haena, Kauai*

On September 23, 2005, an Aerospatiale AS350BA (N355NT), registered to Jan Leasing, LLC, of Las Vegas, Nevada, and operated by Heli USA Airways, struck the ocean about 600 yards off the coast near Haena, on the island of Kauai, Hawaii. Three passengers were killed; the commercial pilot and two passengers sustained minor injuries.

The Safety Board determined that the probable cause was the pilot's decision to continue flight into adverse weather conditions, which resulted in a loss of control due to an encounter with a microburst. Contributing to the accident were the heavy rain and microburst conditions. The Board adopted several recommendations related to water survival equipment.

### *Cessna T210L In-flight Breakup Near Tranquility, California*

On April 7, 2005, a Cessna T210L (N8126L), broke up in flight and struck terrain near Tranquility, California. The pilot and two passengers on board were killed, and the airplane was destroyed. Examination of the wreckage revealed permanent set deformation of the structural elements of the wings and horizontal stabilizers that were indicative of positive aerodynamic loading beyond the structure's yield point.

The Safety Board determined that the probable cause was the pilot's in-flight loss of control due to spatial disorientation and a likely accumulation of airframe ice that led to a high-speed descent and a structural breakup once the aerodynamic forces exceeded the strength limits of the structure. A factor in the accident was the pilot's lack of experience and training in instrument flight conditions.

### *Eurocopter AS 350BA Air Taxi Helicopter In-flight Separation of Tail Rotor System on Big Island, Hawaii*

On July 12, 2005, a Eurocopter AS350BA (N4064F), operated by Sunshine Helicopters, Inc., of Kahului, Hawaii, had a separation of its tail rotor blade assembly and gearbox during cruise flight. The accident occurred about 6 miles southeast of Kapaau, on the Big Island of Hawaii. The helicopter was substantially damaged, but the commercial pilot, who was the sole occupant, was not injured.

The Safety Board determined that the probable cause was the in-flight separation of the tail rotor system as a result of a loss of clamp force and fatigue fracturing of the attachment nut plates. The cause of the loss of clamp force was likely due to an inadvertent tail rotor blade strike during the previous landing, which resulted in an imbalance and a high-frequency vibration that both induced fatigue in the nut plates and caused one bolt to back out. The pilot's unfamiliarity with the landing area and his poor decision to land with the tail boom facing upstream were factors.

### *In the Northwest Region*

#### *Piper PA-28 Crash in Everett, Washington*

On October 15, 2005, a Piper PA-28-140 single-engine airplane (N5FN) crashed near Paine Field in Everett, Washington. The three people on board were killed. Video cameras at Paine Field show the airplane crossing the threshold of runway 16L, the right wing rising up, and the airplane touching down approximately 200 feet from the end of the runway.

The Safety Board determined that the probable cause was the pilot's inadequate airspeed during his aborted landing takeoff/climb, which led to a series of stalls/mushes and subsequent impact with trees. Contributing factors were the pilot's loss of aircraft control during his initial landing approach, his immediate departure from the runway after touching down, and his aborted landing, which led to the subsequent impact with an airport sign and trees.

#### *Midair Collision Over Renton, Washington*

On August 4, 2005, a Cessna 150 (N66234) and a de Havilland DHC-2 Beaver (N741DL) collided in flight while preparing to enter the downwind leg of the airport traffic pattern for runway 33 at Renton Municipal Airport in Renton, Washington. The certified flight instructor and student pilot aboard the Cessna 150M were killed; the pilot and four passengers aboard the DHC-2 Beaver were not injured. The Cessna's right wing had glanced off the Beaver's left

front float bow bumper before striking the forward inboard side of the right float as the Beaver's propeller had penetrated the upper outboard section of the right wing. A subsequent impact with the Cessna's empennage rendered the airplane uncontrollable, resulting in the plane taking a steep uncontrolled descent before striking a vacant school building. The pilot of the Beaver transmitted the collision information and subsequently landed with substantial damage to the airplane.

The Safety Board determined that the probable causes were the failure of the DHC-2 Beaver pilot to understand air traffic advisory information and the failure of the Cessna pilot to maintain visual separation. A factor contributing to the accident was the inadequate traffic advisory information provided by the air traffic controllers.

### ***In the South Central Region***

#### ***Diamond DA-20-C1 Airplane Strikes Power Line Near Pleasanton, Texas***

On September 21, 2005, a Diamond DA-20-C1 airplane crashed near Pleasanton, Texas. Both occupants were killed. The flight instructor had been demonstrating a forced landing by simulating a loss of engine power when the single-engine airplane struck unmarked power lines approximately 30 feet above the ground.

The Safety Board determined that the probable cause was the flight instructor's failure to maintain clearance from an unmarked transmission line. A contributing factor was the low-altitude flight.

#### ***Bell 206 Helicopter Operated by U.S. Forest Service Crashes Near Shelbyville, Texas***

On March 10, 2005, a Bell 206B-3 helicopter lost control and struck heavily wooded terrain near Shelbyville, Texas, while on a U.S. Forest Service (USFS) fire mission. All three people on board were killed. According to USFS operating procedures, these missions are typically flown between 50 and 300 feet above the top of the highest vegetation at airspeeds between 20 and 40 knots.

The Safety Board determined that the probable cause was the pilot's failure to maintain altitude and clearance for undetermined reasons.

#### ***Bell 206 Helicopter on Air Ambulance Flight Crashes in Gentry, Arkansas***

On February 21, 2005, a Bell 206 helicopter, operated as an air medical transport, crashed after taking off from the front lawn of a private residence in Gentry, Arkansas. The patient who was being transported was killed; the pilot, flight nurse, and paramedic were seriously injured.

The Safety Board determined that the probable causes were the pilot's improper decision to maneuver in an environment conducive to a loss of tail rotor effectiveness and his failure to properly execute an autorotation, which resulted in a hard landing. A contributing factor was the prevailing crosswind.

### ***In the North Central Region***

#### ***Regional Jet Veers Across Field and Runway in Milwaukee, Wisconsin***

On March 11, 2005, a Bombardier CL-600-2B19 (N8932C), operated by Pinnacle Airlines as Flagship 2823, was substantially damaged when it veered off the left side of runway 1L (9,690 feet by 200 feet; concrete) at the Milwaukee/General Mitchell International Airport in Milwaukee, Wisconsin. The captain, first officer, flight attendant, and nine passengers were uninjured.

The Safety Board determined that the probable causes were the captain's failure to adequately compensate for the crosswind and his failure to maintain directional control during landing. Contributing factors include the captain's failure to land at the nearest suitable airport after an in-flight mechanical problem, the airport operation's failure to conduct runway friction tests and to issue notices to airmen in accordance with existing regulations, the crosswind, the snow-covered runway, the runway sign, and night conditions.

### *Piper PA-46-310P Strikes Ground after Loss of Power in Grand Rapids, Minnesota*

On July 4, 2005, in Grand Rapids, Minnesota, a Piper PA-46-310P (N4386G) was destroyed on impact with terrain during a forced landing following an observed in-flight loss of engine power after takeoff. The pilot, who was the sole occupant, was killed. A witness stated that, when the plane was about halfway down the runway during takeoff, it emitted a sound like a rapid misfire, a pop, and then no more audible engine sounds. He said that the airplane had turned right then turned left to a bank where the wing was straight down. The airplane's wings then leveled, the airplane descended, and it struck the ground. An examination of the turbocharger system's exhaust bypass valve assembly revealed its butterfly valve was stuck (bound) in the extended closed position.

The Safety Board determined that the probable causes were the loss of engine power due to the bound/jammed turbocharger wastegate during takeoff, the pilot not maintaining airplane control, and the stall he inadvertently encountered. A factor was the maintenance personnel not replacing the turbocharger wastegate bypass valve assembly during the last annual inspection, which had 8.7 hours of operation before the accident. An additional factor was the manufacturer's insufficiently defined inspection conditions for the bypass valve's proper operation.

## Ongoing Regional Aviation Investigations

### *In the Alaska Region*

### *Vintage Surplus Jet Fighter Crashes in Ketchikan, Alaska*

On January 25, 2006, an Aero Vodochody L-39MS, N104XX, which is a surplus military warbird built in the Czech Republic, struck the ground and an occupied trailer home during



an instrument approach/circle to land at Ketchikan International Airport in Ketchikan, Alaska. The pilot, who was the sole occupant, was killed, and five people on the ground sustained minor injuries. The airplane, operated by Air USA Inc. of Quincy, Illinois, was destroyed by the impact and subsequent fire.



### *Cessna 170B Collides in Midair with Cessna 172 Over Chugiak, Alaska*

On April 23, 2006, a wheel-equipped Cessna 170B, N4488B, and a wheel-equipped Cessna 172 airplane, N5049A, collided in midair, approximately 7 miles north-northwest of Chugiak, Alaska. The pilot and the three passengers aboard the Cessna 170B were killed; the pilot, who was the sole occupant, of the Cessna 172 also was killed. Both airplanes were destroyed during the midair collision, uncontrolled descent, and subsequent collision with tidal mud flats.



### *Eurocopter AS350 Operated by U.S. Geological Survey Crashes Near Nuiqsut, Alaska*

On August 21, 2006, a Canadian-registered Eurocopter AS350 B2 helicopter, C-FYUN, was destroyed when it struck terrain during an external load operation about 20 miles west of Nuiqsut, Alaska. The U.S. Geological Survey in Reston, Virginia was operating the helicopter under contract from Prism Helicopters of Wasilla, Alaska. The pilot, who was the only occupant, was killed.



### *Piper PA-32 Hits Ground During Scheduled Commuter Flight to King Salmon, Alaska*

On December 14, 2006, a wheel-equipped Piper PA-32-301, N8361Q, was destroyed when it struck remote, snow-covered terrain about 15 miles northeast of Port Heiden, Alaska. The certificated commercial pilot and the one passenger sustained fatal injuries. Peninsula Airways, Inc., of Anchorage, Alaska, operated the airplane.

#### ***In the Central Mountain Region***

### *Beech 35 Strikes Mountain in Cruise Flight Near Telluride, Colorado*

On September 15, 2006, a Beech 35-C33, N5893J, piloted by a commercial pilot was destroyed during cruise flight when it struck mountainous terrain 9 miles southwest of Telluride, Colorado. The commercial pilot and the three passengers were killed.

### *In the South Central Region*

#### *Mechanic Dies During Maintenance on B737 Jet Engine in El Paso, Texas*

On January 16, 2006, Continental Airlines flight 1515, a Boeing 737-524 airplane, N32626, was preparing for departure from El Paso International Airport in El Paso, Texas, when a mechanic was killed while performing a maintenance troubleshooting procedure for a suspected engine oil leak on the number 2 engine. The 5 crewmembers and 114 passengers were not injured.

#### *Twin-Engine Aero Commander 690A Breaks Up In Flight Near Antlers, Oklahoma*

On October 15, 2006, an Aero Commander 690A twin-engine turboprop airplane, N55JS, was destroyed during an in-flight breakup near Antlers, Oklahoma. The pilot, co-pilot, and both passengers were killed.

### *In the North Central Region*

#### *Piper Seneca Collides With Building in Branson, Missouri*

On March 20, 2006, a Piper PA34-200T Seneca II, N21RR, was destroyed when it crashed into a building and burned in Branson, Missouri. The pilot and three passengers were killed.

#### *Business Jet Crashes Attempting to Land on Short Runway Near Cresco, Iowa*

On July 19, 2006, a Cessna 560, N636SE, struck a cornfield while landing on runway 33 at Ellen Church Field Airport in Cresco, Iowa. The pilot and copilot were killed, and the two passengers sustained serious injuries.

#### *Six People Killed in Skydiving Flight During Takeoff Near Sullivan, Missouri*

On July 29, 2006, a de Havilland DHC-6-100, N203E, crashed during takeoff from runway 24 at Sullivan Regional Airport near Sullivan, Missouri. The pilot and five passengers were killed; two passengers sustained serious injuries. Witnesses observed flames emerging from the right engine during the takeoff. A witness stated that the airplane had been flying low and straight and level toward her and that it had nosed over. The airplane struck trees and terrain behind a residence and came to rest vertically nose down against a tree about a 1/2 mile northwest of the end of runway 24.

#### *Twin-Engine Cessna Hits Ground Near Rolling Prairie, Indiana*

On November 13, 2006, a Cessna T303, N611BB, crashed in a cornfield near Rolling Prairie, Indiana, following a loss of control. The pilot and four passengers were killed, and the airplane was destroyed.

### *In the Northeast Region*

#### *Columbia 400 Airplane Impacts Trees Near Stafford, Virginia*

On February 22, 2006, a Lancair Company LC41-550FG (Columbia 400), N400WX, was destroyed when it struck trees and terrain at Stafford Regional Airport in Stafford, Virginia. The certificated private pilot, a pilot-rated passenger, and two additional passengers were killed.

#### *Beech C24R Airplane Crashes in Residential Area Near Norfolk, Virginia*

On July 11, 2006, a single-engine Beech C24R airplane, N78MB, collided with trees and terrain following a loss of control while it attempted to return to land on runway 32 at Norfolk International Airport near Norfolk, Virginia. The private pilot, the passenger, and two dogs were killed; the airplane was substantially damaged.

#### *Cirrus SR-22 Destroyed After Aborted Landing Near Edgewater, Maryland*

On July 11, 2006, a Cirrus SR-22, N8163Q, was destroyed when it struck a tree and terrain during a go-around after an attempted landing on runway 30 at Lee Airport in Edgewater, Maryland. The pilot sustained serious injuries.

#### *Twin-Engine Cessna Hits Mountains Near Whick, Kentucky*

On August 28, 2006, a Cessna 401, N408JC, was destroyed when it struck a mountain near Whick, Kentucky. The pilot and six passengers were killed.

#### *Piper PA-46 Crashes After Pilot Told to Land in Odenton, Maryland*

On October 19, 2006, a Piper PA-46-310P, N9130N, was destroyed when it struck trees and terrain during an approach to landing at Tipton Airport in Odenton, Maryland. The pilot/owner and the passenger were killed. The pilot had contacted the Potomac Terminal Radar Approach Control to get instrument flight rules clearance to Brookeridge Airpark. Subsequently, the controller informed the pilot that he was violating the Washington, D.C., Air Defense Identification Zone and that he needed to land at Tipton Airport immediately; the pilot agreed.



#### *Light Sport Airplane Crashes Near Mountain Resort Near Basye, Virginia*

On November 11, 2006, a Czech Aircraft Works CH 601 XL RTF, N601VA, was substantially damaged when it struck trees following a loss of engine power while maneuvering near Sky Bryce Airport in Basye, Virginia. The pilot was killed.

### *In the Southeastern Region*

#### *U.S. Department of Agriculture Involved in Beech 65 Accident Near Tampa, Florida*

On June 12, 2006, a Beech 65-A90-1, N7043G, registered to Dynamic AvLease, Inc., and operated by the U.S. Department of Agriculture, crashed during a forced landing at Peter O'Knight Airport in Tampa, Florida. The commercial-rated pilot was killed, and the pilot-rated crewmember was seriously injured; the impact and a postcrash fire destroyed the airplane.

#### *Mitsubishi MU-2B Encounters Storms Near Bunnell, Florida*

On August 25, 2006, a Mitsubishi MU-2B-40, N171MA, was destroyed during an in-flight break-up and struck the ground near Bunnell, Florida. The pilot and passenger were killed. According to preliminary data from the Federal Aviation Administration, the accident airplane had been in radar and radio contact with an air traffic controller at the Air Route Traffic Control Center (ARTCC) in Jacksonville, Florida. Because of thunderstorms, the pilot and controller discussed a course deviation. The initial review of ARTCC procedures revealed that traffic separation was a controller's primary duty and that weather information was to be provided when workload permitted. The Safety Board formed a group to further examine the ARTCC services provided to the accident pilot.

#### *Mitsubishi MU-2B Encounters Storms Near Argyle, Florida*

On September 1, 2006, a Mitsubishi MU-2B-35 twin-engine turboprop airplane, N6569L, was destroyed when it struck the ground near Argyle, Florida. The pilot, who was the sole occupant, was killed. The airplane was registered to Intercontinental Jet Incorporated of Tulsa, Oklahoma, and operated by Berg Steel Pipe Corporation of Panama City, Florida. According to preliminary air traffic control information, Tyndall Air Force Base's north approach cleared the pilot to descend at the pilot's request; the pilot acknowledged the transmission. No further communications were received from the pilot.

#### *Cirrus SR-22 Airplane Strikes Trees on Approach to Statesville, North Carolina*

On October 27, 2006, a Cirrus SR22, N969ES, registered to a private owner, was substantially damaged when it struck trees and the ground while maneuvering near Statesville Regional Airport in Statesville, North Carolina. The pilot and one passenger sustained serious injuries; the two remaining passengers were killed. The plane had been en route to Lake Norman Airpark in Mooresville, North Carolina, and had been diverted to Statesville, North Carolina, due to the weather.

### *In the Southwest Region*

#### *Business Jet Crashes During Aborted Landing in Carlsbad, California*

On January 24, 2006, a Cessna Citation 560, N86CE, struck the localizer antenna platform during an apparent aborted landing on runway 24 at McClellan-Palomar Airport in Carlsbad, California. The two pilots and two passengers were killed; the aircraft, owned by GOSHIP AIR, LLC, of Ketchum, Idaho, was destroyed by impact and postcrash fire.

### *Surplus Vintage Jet Fighter Crashes While Maneuvering Near California City*

On February 26, 2006, an Aero Vodochody L39, N39DE, struck hilly terrain while performing a low-altitude course reversal maneuver about 6.4 nautical miles northwest of California City, California. Both pilots were killed, and impact and a postcrash fire destroyed the airplane. The experimental category turbojet airplane was registered to Mach 1 Aviation of Universal City, California.

### *Twin-Engine Air Ambulance Crashes in Kahului, Hawaii*

On March 8, 2006, a Cessna 414A, N5601C, operated by Hawaii Air Ambulance, Inc., crashed while maneuvering approximately 1 mile west of the airport in Kahului, Hawaii, on the island of Maui. The pilot and two medical flight attendants were killed. Witnesses said that they had observed the wings wobble and then watched the airplane drop straight down out of the sky and hit a BMW automobile dealership. A postimpact fire destroyed the airplane and 10 automobiles.

### *Turboprop Airplane Crashes in Mountain Pass Near Oak Glen, California*

On March 28, 2006, a Cessna 208B, N208WE, owned and operated by Cessna Aircraft Company, descended into mountainous terrain while maneuvering near Oak Glen, California. Both pilots, who were the only occupants, were killed; the airplane was destroyed.



### *Bell 412SP Air Ambulance Crashes in Mountain near Hesperia, California*

On December 10, 2006, a Bell 412SP helicopter, N410MA, crashed into a mountain near Hesperia, California. LifeNet, Inc., doing business as Mercy Air Services, Inc., was operating the helicopter. The pilot and two medical crewmembers were killed; the helicopter was destroyed.

### *In the Northwest Region*

#### *Air Taxi Flight Crashes Into Trees Near Mullan, Idaho*

On June 8, 2006, a Cessna TU206G, N5136X, registered to and operated by Majestic Alliance of Everett, Washington, crashed into trees and terrain near Mullan, Idaho. Both occupants (the pilot and one passenger) were fatally injured; the aircraft was substantially damaged.

#### *Turboprop Airplane Crashes During Instructional Flight in Big Timber, Montana*

On June 24, 2006, Pilatus PC-12/47, N768H, was destroyed when it crashed into the ground following a loss of aircraft control after it took off from Big Timber Airport in Big Timber, Montana. The certified flight instructor and student pilot were killed. The physical

evidence at the accident site revealed that the airplane had hit a fence approximately 10 inches above the ground. Subsequently, the airplane's right wing tip and engine struck terrain approximately 300 feet from the fence. A postimpact fire consumed the airplane.

### *Commercial Cargo Flight Crashes Near Easton, Washington*

On July 10, 2006, a Piper PA-31-350, N40ST, operated by AirPac Airlines, struck a tree about 1/2 mile east of Easton State Airport in Easton, Washington. The commercial pilot, who was the sole occupant, was fatally injured, and the aircraft was destroyed by impact and postcrash fire. According to the controller at Seattle Air Route Traffic Control Center, at 8,000 feet above sea level, the pilot had reported that he did not have enough power to maintain his assigned altitude and soon thereafter had stated that he did not have enough power to make it over the Cascade Mountains. The aircraft then began to descend, and the pilot transmitted that he was going to go to Easton. When the aircraft was about 1/2 mile from the end of runway 27 at Easton, it struck a conifer tree about 20 feet from its top and fell to the ground.

### *Prototype Very Light Jet Crashes on Takeoff in Spanish Fork, Utah*

On July 25, 2006, a Spectrum 33 experimental twin-engine jet airplane, N322LA, hit the ground following a loss of control during its initial climb after taking off from runway 30 at Spanish Fork-Springville Airport in Spanish Fork, Utah. The two pilots were fatally injured; impact forces destroyed the airplane, which was registered to and operated by Spectrum Aeronautical LLC. Witnesses said that the airplane had entered a right roll almost immediately after takeoff. The roll continued to about 90° right wing down; then the right wingtip struck the ground. An examination of the translation linkage on the aft side of the aft pressure bulkhead revealed that it was connected in a manner that reversed the roll control. Specifically, the linkage was connected such that left roll input from the side sticks would have deflected the ailerons to produce right roll of the airplane, and right roll input from the side sticks would have deflected the ailerons to produce left roll of the airplane.

## International Aviation Accident Investigations

The Safety Board assists other nations with aircraft accidents that occur outside the United States. The following are examples of ongoing investigations.

### *Sudanese Airways Boeing 737 Crash in Port Sudan, Sudan*

On July 8, 2003, a Boeing 737-200, operated as Sudanese Airways flight 139, crashed in open terrain during an instrument approach to Port Sudan Airport in Port Sudan, Sudan. The 2 flight crewmembers, 9 cabin crewmembers, and 105 passengers were killed; 1 passenger was seriously injured. The flight had departed Port Sudan for Khartoum but was returning to land after the pilot reported that one of the two engines had lost power. After Sudanese officials traveled to the United Kingdom to read the flight data recorders, they requested the Safety Board's on-site assistance; a team led by a Board accredited representative assisted for 5 days.

### *Lion Air MD-82 Crash in Solo, Java, Indonesia*

On November 30, 2004, a McDonnell Douglas MD-82 airline jet, operated by Lion Air as flight JT538, crashed during landing at Adi Sumarmo Airport in Solo, Java, Indonesia.

Of the 146 passengers and 7 crewmembers aboard, 31 passengers and 1 pilot were killed; more than 100 passengers and crewmembers were injured, some seriously. Heavy rain and winds prevailed at the time of the accident, which occurred during the night. The plane had departed from Jakarta (about 310 miles northwest of Solo), with an en route stop in the town of Surabaya before heading to Solo.

### *Air Transat Airbus A310 Accident Near Veradero, Cuba*

On March 6, 2005, an Airbus A310-308 (C-GPAT), operated by Air Transat, safely returned to Cuba after losing most of its rudder while en route from Veradero, Cuba, to Quebec City, Quebec, Canada. There were no fatalities. The Safety Board is assisting the Transportation Safety Board of Canada in its investigation, and on March 24, 2006 issued two safety recommendations to the FAA calling for inspections of certain Airbus A300 rudders.



### *Air France Airbus 340 Crash in Toronto, Canada*

On August 2, 2005, an Airbus A340, operated by Air France, crashed while landing at Pearson Airport in Toronto, Canada. There were no fatalities. The airplane did not stop before the end of the runway; instead, it slid into the Etobicoke Creek ravine, which is on the western edge of the airport, and caught fire. A Safety Board accredited representative led a team of specialists to assist in the investigation; the team included Board specialists in aircraft engines and survival factors, and an investigator from the Federal Aviation Administration.

### *Malaysian Airline System Boeing 777 Sudden Pitchup and Loss of Control*

On August 2, 2005, a Boeing 777-200, registered in Malaysia as 9M-MRG and operated by Malaysian Airline System, experienced a pitchup about 1/2 hour after taking off from Perth, Australia. The flight crew regained control of the airplane, and the plane landed uneventfully back at Perth. The event occurred as the plane was climbing above 36,000 feet and while it was on autopilot. During the pitchup, the aircraft climbed to 41,000 feet, and the indicated airspeed dropped from 270 knots to 158 knots. The stick shaker and the stall-warning indicator activated. The Safety Board assigned an accredited representative, a systems engineer, and a system safety engineer to the investigation.

On August 29, 2005, the Federal Aviation Administration issued emergency Airworthiness Directive 2005-18-51, which superseded an earlier airworthiness directive. It stated that, within 72 hours, Boeing 777 operators should install a previous software version in their aircraft. It also stated that faulty data could cause anomalies in Boeing 777 primary flight controls, autopilot, pilot displays, autobrakes, and autothrottles.

### *Sikorsky S-76 Helicopter Crash off Coast of Tallinn, Estonia*

On August 10, 2005, a Sikorsky S-76 helicopter crashed into the Baltic Sea off the coast of Tallinn, Estonia. The 2 crewmembers and 14 passengers, including 2 Americans, were killed. The Safety Board dispatched a team to assist the Aircraft Accident Investigation Department of Estonia in the investigation. The four-member team included a Safety Board accredited representative, Board specialists in operations and engineering, an investigator from the Federal Aviation Administration, and the aircraft manufacturer.

### *West Caribbean Airways MD-82 Crash in Venezuela*



On August 16, 2005, a McDonnell Douglas MD-82, operated by West Caribbean Airways, crashed near Machiques, Venezuela. The 8 crewmembers and 152 passengers were killed, and the airplane was destroyed. The airplane was being operated as a charter flight from Panama City, Panama, to Fort de France, Martinique. A Safety Board accredited representative, three Board technical specialists, and

representatives from the Boeing Company and Pratt & Whitney responded to the crash.

### *Mandala Airlines Boeing 737 Accident in Medan, Sumatra, Indonesia*

On September 5, 2005, a Boeing 737-200, operated by Mandala Airlines, crashed into an urban residential area after taking off from runway 23 at Medan-Pollonia Airport in Medan, Sumatra, Indonesia. The 5 crewmembers, 96 passengers, and 44 people on the ground were killed; 16 passengers survived. The flight had been destined for Soekarno-Hatta International Airport in Jakarta, Indonesia. The Safety Board dispatched a team to assist in the investigation; the team included a Safety Board accredited representative, Board technical advisors in powerplants and airworthiness, and advisors from airframe and engine manufacturers.

### *Bellview Airlines Boeing 737 Crash in Lagos, Nigeria*

On October 22, 2005, a Boeing 737-200, operated by Bellview Airlines, crashed in Lagos, Nigeria. The 6 crewmembers and 111 passengers were killed. The Safety Board dispatched a team to assist in the investigation; the four-member team was headed by a Board accredited representative and included investigators from the aircraft manufacturer, the Boeing Company, and the engine manufacturer, the Pratt & Whitney Company.

### *Transmile Airlines Airplane Explosion on Ramp in Bangalore, India*

On May 4, 2006, a Boeing 727-200C cargo airplane, operated by Transmile Airlines, experienced an explosion in a fuel tank during ground maintenance in Bangalore, India. No one was injured. The plane was being prepared to be towed following its maintenance to correct a reported fuel leak. When the electrical power was applied, an explosion occurred in the right wing fuel tank. During the investigation, major fuel system components were



removed for laboratory examination. An engineering assessment continues, and a final report will come from the government of India. A Safety Board accredited representative and advisors from the Federal Aviation Administration and the Boeing Company responded to the event.

### *Sibir Airlines Runway Overrun Accident in Irkutsk, Siberia, Russia*

On July 9, 2006, an Airbus A310-300, operated by Sibir Airlines, crashed after overrunning a runway at Irkutsk Airport in Irkutsk, Russia. Of the 203 people on board, 124 were fatally injured, 59 were seriously injured, and 17 had no injuries. The airplane struck airport buildings off the side and end of the runway and caught fire. The investigation, aided by the flight recorders, has centered on the plane's failure to stop due to inappropriate/ineffective selection of reverse thrust after touchdown and during the landing rollout. A Safety Board accredited representative and an advisor from the engine manufacturer, Pratt & Whitney Company, responded to the crash.

### *Excelaire Collision With Gol Airlines Over Brazilian Amazon Jungle*

On September 29, 2006, an Embraer Legacy 600 executive jet, owned and operated by Excelaire of Long Island, New York, collided midair over the Amazon jungle with a Boeing 737-800, operated by Gol Airlines of Brazil. The Legacy airplane with 7 people on board landed safely at a nearby military airstrip; however, the Boeing 737 crashed in the jungle, and all 148 passengers and 6 crewmembers were killed. Because the transponder in the Legacy airplane had not been functioning, the traffic collision avoidance system of both airplanes had not alerted the crews and, thus, prevented the crash. The nonfunctioning transponder also had confused the air traffic control operators, resulting in a conflicting altitude assignment. A Safety Board accredited representative and advisors from the Federal Aviation Administration and the Boeing Company led a major team effort to assist in the Brazilian air safety investigation.

### *Aviation Development Company Crashes During Departure In Abuja, Nigeria*

On October 29, 2006, a Boeing 737-200, operated by Aviation Development Company Airline, crashed at Nnamdi Azikwe International Airport in Abuja, Nigeria, shortly after takeoff. All 96 passengers and 8 crewmembers on board were killed. The airplane had departed in weather conditions that included the possibility of wind shear, and it crashed within the airport property. The flight data recorder recovered from the crash contained a record of wind shear warnings and indicated that the crew actions resulted in an aerodynamic stall. A Safety Board accredited representative and advisors from the Federal Aviation Administration and the Boeing Company responded to the crash.

## Public Hearings and Forums

### *Runway Overrun by Southwest Airlines Flight 1248*

On June 20, 2006, the Safety Board began a 2-day public hearing as part of its ongoing investigation of the December 8, 2005, accident involving Southwest Airlines flight 1248, a Boeing 737. The plane had departed the end of the runway at Chicago Midway Airport in Chicago, Illinois, rolled through a blast fence and a perimeter fence and onto a roadway, and struck two automobiles before coming to a stop, killing an automobile occupant. Parties to

the hearing included the Southwest Airlines Company, Southwest Airlines Pilots Association, the Boeing Company, the City of Chicago, and the Federal Aviation Administration. The safety issues addressed during the hearing included the measurement of runway friction and the methods used to relay runway friction estimates to landing flight crews, runway safety areas at Midway Airport and other airports with land use constraints, and Boeing 737 landing data that take into account the use of thrust reversers.

### *United Parcel Service Cargo Fire*

On July 12, 2006, the Safety Board convened a 2-day hearing as part of its ongoing investigation of the February 7, 2006, cargo fire on board a UPS DC-8 at the Philadelphia International Airport in Philadelphia, Pennsylvania. Parties to the hearing were the Federal Aviation Administration, the United Parcel Service (UPS), the Boeing Company, and the Independent Pilots Association. Issues addressed in the hearing included airport rescue and firefighting response to the UPS accident; the design, testing, and recalls of lithium batteries; regulations concerning the shipping of lithium batteries; and aircraft fire detection and suppression systems.

## Office of Highway Safety

Highway transportation accidents have a significant impact on American society. The Federal Highway Administration reported that vehicle miles traveled increased in 2005 to 2.99 trillion, up from 2.96 trillion in 2004. According to the National Highway Traffic Safety Administration (NHTSA), a total of 43,443 people died in highway crashes in 2005, a 1.4 percent increase over 2004 (42,836). In addition, the fatality rate per 100 million vehicle miles traveled increased to 1.47 in 2005, up from 1.45 in 2004, the first increase since 1986. NHTSA estimates the economic cost of an average roadway fatality at about \$977,000 and the cost associated with a critically injured crash survivor at about \$1.1 million. Consequently, the economic impact of motor vehicle crashes on America's roadways is about \$231 billion a year, or an average of \$820 for every person living in the United States.

The Safety Board is charged with reducing the toll through accident investigations. Changes in highway or vehicle design, driver training, occupant protection, and regulatory oversight are frequently recommended. In 2006, the Board did important work regarding automatic slack adjusters on large trucks, highway median barriers, toll plaza designs, collision warning systems, vehicle incompatibility, highway construction oversight, and cell phone use by bus drivers.

### Completed Major Highway Investigations

#### *Overweight Truck Brake Failure in Glen Rock, Pennsylvania*

On April 11, 2003, about 3:36 p.m., in the Borough of Glen Rock, Pennsylvania, a 1995 Ford dump truck owned and operated by Blossom Valley Farms, Inc., was traveling southbound on Church Street, a two-lane, two-way residential street with a steep downgrade, when the driver found that he was unable to stop the truck. The truck struck four passenger cars, which were stopped at the intersection of Church and Main Streets, and pushed them into the intersection. One of the vehicles struck three pedestrians (a 9-year-old boy, a 7-year-old boy, and a 7-year-old girl) who were on the sidewalk on the west side of Church Street. The truck continued across the intersection, through a gas station parking lot, and over a set of railroad tracks before coming to rest about 300 feet south of the intersection. As a result of the collision, the driver and an 11-year-old occupant of one of the cars sustained fatal injuries, and the three pedestrians who were struck sustained minor-to-serious injuries. The six remaining car occupants and the truckdriver were not injured.

The Safety Board determined that the probable cause of the accident was the lack of oversight by Blossom Valley Farms, Inc., which resulted in an untrained driver improperly operating an overloaded, air brake-equipped vehicle with inadequately maintained brakes. Contributing to the accident was the misdiagnosis of the truck's underlying brake problems by mechanics involved with the truck's maintenance; also contributing was a lack of readily available and accurate information about automatic slack adjusters and inadequate warnings about the safety problems caused by manually adjusting them. During the investigation, the Board identified the following major safety issues:

- Maintaining air brakes equipped with automatic slack adjusters,
- Knowledge and skills needed to drive air brake-equipped vehicles, and
- Motor carrier oversight.

*In 2006, the Office of Highway Safety's 28 staff members initiated 26 investigations, completed 27 dockets, issued 5 major reports, and continued work on 18 investigations.*

The Safety Board made 11 recommendations to the Federal Motor Carrier Safety Administration, the 50 States and the District of Columbia, the Commercial Vehicle Safety Alliance, manufacturers and marketers of automatic slack adjusters, manufacturers of vehicles equipped with air brakes, the National Institute for Automotive Service Excellence (ASE), and publishers of ASE certification test study guides. The Board adopted the report on February 7, 2006.

### *Alcohol Impaired Driver/Median Crossover in Linden, New Jersey*



On May 1, 2003, about 2:11 a.m., a 1998 Mercedes Benz CLK320, driven by a 34-year-old off-duty police officer, was traveling southbound on U.S. Route 1 through Linden, New Jersey. The vehicle was traveling in the right lane of a six-lane divided highway. The weather was clear, and the roadway was dry, except for a puddle of water adjacent to a service station on the west side of the roadway.

Near milepost 41.4, the Mercedes, traveling 48 to 62 mph, hit the curb on the west side of the road and swerved to the left. The Mercedes crossed the other two southbound lanes; mounted and crossed a 6-inch raised concrete curb median that was 11 1/2 feet wide; and entered the northbound lanes, where it collided head on with a 1986 Ford Taurus traveling in the left northbound lane. The Mercedes rolled up and over the Ford and landed on its roof. The Mercedes slid approximately 80 feet across the northbound lanes and struck a wooden utility pole next to the east side of the roadway, where it came to rest straddling the right northbound lane and the grassy area to the east of the roadway. Following the collision, the Ford remained upright, rotated about 163° counterclockwise, and slid about 50 feet, where it came to rest in the right northbound lane.

A 33-year-old driver and four passengers ranging in age from 18 to 31 occupied the Ford. The drivers of both vehicles and three of the four Ford Taurus passengers died at the scene. The fourth Ford passenger died several hours later in a hospital.

The Safety Board determined that the probable cause of the accident was the Mercedes driver's loss of control of the vehicle due to alcohol impairment. Contributing to the severity of the accident was the lack of barriers separating traffic in the northbound and southbound traffic lanes and the failure of the Mercedes driver to wear his seat belt.

Major safety issues identified in this accident were:

- alcohol impairment,
- speed enforcement, and
- evaluative criteria for median barrier installation.

The Safety Board made four safety recommendations to the Federal Highway Administration, the city of Linden, and the American Association of State Highway and

Transportation Officials. The Board also reiterated a recommendation to the State of New Jersey. The Board adopted the report on February 7, 2006.

### *Traffic Slowed for Toll Booth Accident Near Hampshire, Illinois*

On October 1, 2003, about 2:57 p.m., a multi-vehicle accident occurred on the approach to an Interstate 90 (I-90) toll plaza near Hampshire, Illinois. A 1995 Freightliner tractor-trailer chassis and cargo container combination unit was traveling eastbound on I-90, approaching the Hampshire-Marengo toll plaza at milepost 41.6, when it struck the rear of a 1999 Goshen GC2 25-passenger specialty bus. As both vehicles moved forward, the bus struck the rear of a 2000 Chevrolet Silverado 1500 pickup truck, which was pushed into the rear of a 1998 Ford conventional tractor-box trailer. As its cargo container and chassis began to overturn, the Freightliner also struck the upper portion of the pickup truck's in-bed camper and the rear left side of the Ford trailer. The Freightliner and the bus continued forward and came to rest in the median. The pickup truck was then struck by another eastbound vehicle, a 2000 Kenworth tractor with a Polar tank trailer. Eight bus passengers were killed, and 12 passengers sustained minor-to-serious injuries. The bus driver, the pickup truckdriver, and the Freightliner driver sustained minor injuries. The Ford driver and codriver and the Kenworth driver were not injured.



The Safety Board determined that the probable cause of the accident was the failure of the Freightliner truckdriver, who was operating his vehicle too fast for traffic conditions, to slow for traffic. Contributing to the accident was the traffic backup in a 45-mph zone, created by vehicles stopping for the Hampshire-Marengo toll plaza. The structural incompatibility of the Freightliner tractor-trailer and the bus contributed to the severity of the accident. The following safety issues were identified:

- Toll plaza design and the lack of National standards for toll plaza design,
- Federal Motor Carrier Safety Administration (FMCSA) oversight of passenger motor carriers operating on revoked authority,
- Collision warning system performance standards and requirements for new commercial vehicles, and
- Vehicle incompatibility and heavy truck aggressivity.

As a result of this accident investigation, the Safety Board made nine recommendations to the U.S. Department of Energy, the U.S. Department of Transportation, the FMCSA, the Federal Highway Administration, the American Association of State Highway and Transportation Officials, and the International Bridge, Tunnel and Turnpike Association. The Board also reiterated two recommendations to the National Highway Traffic Safety Administration. The Board adopted this report on April 18, 2006.

### *Inadequate Bracing and Construction Oversight Caused Highway Bridge Girder Collapse in Golden, Colorado*

On May 15, 2004, about 10:04 a.m., a 2002 Dodge Durango sport utility vehicle (SUV) driven by a 34-year-old man eastbound on Interstate 70 (I-70) approached the Colorado State Route 470 (C-470) overpass. The driver's 37-year-old wife and their 2-year-old child were also in the SUV. The interchange of I-70 and C-470 was in a temporary traffic control zone for a highway construction project, during which an additional entry ramp and two additional lanes were being constructed for the overpass.

As the SUV approached the overpass, a fabricated steel girder line composed of two joined sections, which had been erected parallel to the existing overpass as a part of the bridge-widening project, rotated toward the overpass and sagged into the I-70 eastbound lanes. The girder struck the SUV about half way between the front end and the windshield and sheared off the top. The lower portion of the SUV continued east for 818 feet, coming to rest in the grassy median of I-70. The three occupants were killed.

The Safety Board determined that the probable cause was the failure of the girder's temporary bracing system due to insufficient planning by Ridge Erection Company, Inc., Asphalt Specialties, Inc., and the Colorado Department of Transportation, which were responsible for putting the girder and its bracing in place, and due to deficiencies in the installation of the girder and the bracing, so that the bracing ultimately failed to adequately secure the out-of-plumb girder to the existing bridge deck. Contributing to the accident was the lack of uniform, consistent bracing standards and the Colorado Department of Transportation's narrow definition of *falsework*, which did not include lateral bracing. Also contributing to the accident was the failure of the Colorado Department of Transportation to effectively oversee safety-critical contract work for the project. The Board adopted the report on May 31, 2006.

### *NTSB Recommends Ban on Cell Phone Use by Bus Drivers*

On November 14, 2004, about 9:30 a.m., a 44-year-old bus driver departed the Baltimore/Washington International Thurgood Marshall Airport, operating a 2000 Prevost (58-passenger motorcoach) and heading to Mount Vernon, Virginia, approximately 60 miles away. The vehicle occupants were the bus driver, an adult chaperone, and 27 high school students. The vehicle was the second one of a two-bus team. The motor carrier, Eyre Bus Service, Inc., (Eyre), operates on the route frequently, and the accident bus driver had driven the route on one previous occasion 9 days earlier.

About 10:40 a.m., the bus was traveling southbound in the right lane of the George Washington Memorial Parkway in Alexandria, Virginia, at an electronic control module-recorded speed of approximately 46 mph. As the bus approached the Alexandria Avenue bridge, the driver passed warning signs indicating that the bridge had a 10-foot 2-inch clearance in the right lane. Nonetheless, the driver remained in the right lane and drove the 12-foot bus under the bridge, colliding with the underside and side of the overpass. At the time of the accident, the left lane, which had a 13-foot 2-inch clearance, was available to the bus; the lead Eyre bus was in the left lane ahead of the accident bus. The accident bus came to a final stop in the right lane about 470 feet beyond the bridge. Witnesses and the bus driver himself reported that he was talking on a hands-free cellular telephone at the time of the accident.

Of the 27 student passengers, 10 sustained minor injuries, and 1 sustained serious injuries. The bus driver and chaperone were uninjured. The bus's roof was destroyed.

The Safety Board determined that the probable cause of the accident was the bus driver's failure to notice and respond to posted low-clearance warning signs and to the bridge due to cognitive distraction resulting from conversing on a hands-free cellular telephone while driving. Contributing to the accident was the low vertical clearance of the bridge, which does not meet National Park Service road standards or American Association of State Highway and Transportation Officials guidelines.

Major safety issues identified in the accident include low bridge clearance, cellular telephone use while driving, and collection of adequate cellular telephone accident data. As a result of the accident, the Safety Board made recommendations to the Federal Motor Carrier Safety Administration, the 50 States and the District of Columbia, the American Bus Association, the United Motorcoach Association, the Community Transportation Association of America, the American Public Transportation Association, the National Association for Pupil Transportation, the National School Transportation Association, the National Association of State Directors of Pupil Transportation Services, the International Brotherhood of Teamsters, and the Amalgamated Transit Union. The Safety Board also reiterated Safety Recommendation H-03-09 to the 20 States that do not yet have driver distraction codes on their traffic accident investigation forms. The Board adopted this report on November 21, 2006.

## Ongoing Major Highway Investigations

### *Rear-End Collisions in Traffic Slowed by Prior Accident Near Sulphur Spring, Texas*

The Safety Board continues to investigate a collision that occurred in June 2004 near Sulphur Springs, Texas. The accident involved a tractor double-trailer that collided with the rear of a sport utility vehicle (SUV) that was stopped in the right-hand traffic lane in a queue of vehicles on Interstate 30. Traffic had slowed and stopped at that location after troopers of the Texas Department of Public Safety detoured traffic around the site of a fatal accident that had occurred an hour and a half earlier and was under investigation. The force of the collision pushed the SUV forward, into and under the rear of the trailer of another truck, which was in turn pushed forward into the rear of a second SUV and then another truck. A fire erupted involving the first SUV and one of the trucks. All four occupants of the first SUV and the driver of the first tractor double-trailer were killed. The occupants of the other vehicles sustained minor injuries.

### *Motorcoach Fire in Wilmer, Texas*

The Safety Board is investigating a fire on a motorcoach carrying elderly evacuees away from the predicted path of Hurricane Rita on September 23, 2005. The 1998 MCI 54-passenger motorcoach, operated by Global Limousine, Inc., was traveling north on Interstate 45 when it became engulfed in flames in Wilmer, Texas. The motorcoach was carrying 44 passengers and the



driver. The passengers were from an assisted-living facility in Bellaire, Texas, and many needed to be carried or helped onto the motorcoach by firefighters and nursing staff. The driver, six nursing-staff passengers, the parent of one of the nursing staff, and 14 patient-passengers escaped the fire. Twenty-three patients, most of whom were not ambulatory, died in the fire.

### *Median Crossover Accident in Sherman, Texas*

The Safety Board continues to investigate a September 2004 collision on U.S. Highway 75 in Sherman, Texas. The accident involved a tractor-trailer that veered left, crossed a 30-foot earthen median, and entered the opposing lanes, where it collided with a sport utility vehicle (SUV) and a pickup truck. After the collision, the truck and the SUV came to rest in the grass on the far side of the roadway, and a fire ensued, engulfing the truck and the SUV. The pickup remained in the travel lanes. The driver and four occupants of the SUV and the driver and four occupants of the pickup truck were killed. Two passengers in the pickup truck sustained serious injuries, and the truckdriver sustained minor injuries.

### *Collision of School Bus and Trash Truck Kills Two students in Arlington, Virginia*

On April 18, 2005, about 8:40 am, in Arlington, Virginia, a 52-passenger school bus, transporting 15 elementary-school children, collided with a 2003 Mack trash truck traveling in the opposite direction. The collision involved a slight overlap of the front left corners of both vehicles and a sideswipe. Neither driver appeared to have applied brakes or attempted to maneuver to avoid the other vehicle. The school bus sustained impact damage on its left front side, which continued along the left side of the bus to near the sixth passenger row behind the driver's seat, approximately 20 feet rearward from the front bumper, to a depth of about 6 1/2 inches. One student died on the scene, and one student died 3 days later in the hospital. The truckdriver, school bus driver, and 1 other student on the bus sustained serious injuries; the remaining 12 students sustained minor injuries.

### *Tanker Truck Falls off Overpass, Killing Four in Elkridge, Maryland*

On January 13, 2004, in Elkridge, Maryland, a fully loaded gasoline tank truck was southbound on Interstate 895. As the tanker reached the overpass bridge at Interstate 95, it left the right side of the highway, mounted the right bridge rail, and plunged 30 feet to the roadway below. As the tanker hit the median and northbound travel lanes of Interstate 95, an explosion and large fire ensued. Several vehicles traveling northbound on Interstate 95 drove into the fire. When the fire was extinguished, two tractor semitrailers, a passenger car, and a pickup truck were observed in their final rest positions at the accident scene. The 64-year-old driver of the tank truck and three other drivers were killed.

### *Construction Zone Accident in Chelsea, Michigan*

The Safety Board continues to investigate a collision that occurred in July 2004 in Chelsea, Michigan, involving two tractor-trailers and an automobile in a construction zone on Interstate 94. One of the tractor-trailers and the automobile were moving slowly as part of a line of vehicles slowed by an earlier minor traffic accident in a highway construction zone. Another tractor-trailer failed to slow in time for the traffic ahead, swerved to the right, and struck the first tractor-trailer, which then struck the automobile. The driver of the tractor-trailer that failed to slow was killed. The other drivers sustained minor injuries. The collision



occurred in a 25-mile highway construction zone, where construction was occurring at several bridges, spaced miles apart. This was the fourth fatal collision in 4 months (one each month) since April 2004 in this construction zone.

### *School Bus Accident in Liberty, Missouri*

The Safety Board continues to investigate a May 9, 2005, school bus accident in Liberty, Missouri. A 2000 Thomas 83-passenger school bus, driven by a 45-year-old female with 53 elementary school-aged children onboard, was traveling southbound on State Highway 291 on a descending grade approaching the intersection with State Highway 152. The speed limit was 45 mph, dropping to 40 mph on the descending grade to the intersection. The driver reported losing braking ability on the bus and began to swerve between lanes trying to avoid a collision with other southbound vehicles. The bus eventually left the roadway, ran onto the right shoulder, and struck a light pole. The bus continued south through a right-turn-only lane, crossed the westbound lanes on Highway 152, and entered the eastbound lanes, striking a 2003 Lincoln and a 2001 GMC pickup truck. The bus struck the Lincoln on the driver's door, pushing it into the GMC. The three vehicles moved in a southerly direction together into a drainage ditch on the southwest corner of the intersection. The collision resulted in fatal injuries to the drivers of the Lincoln and the GMC. Forty-eight children and the bus driver sustained injuries ranging from minor to critical.

### *Highway/Rail Grade Crossing Accident in Elmwood Park, Illinois*

The Safety Board is investigating a highway/rail grade crossing accident that occurred on November 23, 2005, in Elmwood Park, Illinois. A Metra commuter train was traveling northbound approaching the railroad grade crossing at West Grand Avenue in Elmwood Park, Illinois. The train, which had departed about 20 minutes earlier from Union Station in Chicago, was composed of a locomotive and six passenger cars and was on an express run to Antioch, Illinois, traveling at a speed of 70 mph. The railroad grade crossing at West Grand Avenue contains three tracks and is situated so that the tracks cross the four-lane roadway diagonally, at an angle of about 29°. The crossing is protected by a combination of gates and cantilever mounted flashing warning lights; it also has signs warning motorists with the message "Long Crossing Do Not Stop On Tracks." The train's engineer reported that as the train neared the crossing, he observed multiple vehicles stopped on the tracks in front of him. He put the train into an emergency stop but collided with six of the stopped vehicles. One of the vehicles became engulfed in a postcrash fire. Secondary impacts resulted from the first six vehicles being displaced by the impact with the train and colliding with other vehicles on the roadway. In all, 17 vehicles were involved in the crash. Three train passengers reported injuries, and seven vehicle occupants sustained injuries ranging from critical to minor.

### *Tunnel Collapse in Big Dig Construction in Boston, Massachusetts*

The Safety Board is investigating the circumstances of the July 10, 2006, ceiling collapse of the Interstate 90 connector tunnel in Boston, Massachusetts. A portion of the ceiling in the tunnel's east portal collapsed onto a passing automobile, killing the passenger and injuring the driver. On July 10, 2006, about 11:00 p.m., a 1991 Buick passenger car was traveling eastbound in the Interstate 90 connector tunnel to the Ted Williams Tunnel in Boston, Massachusetts. A 46-year-old male driver and a 38-year-old female passenger occupied the vehicle. A portion of the tunnel's ceiling structure collapsed and struck the Buick. As a result, the female passenger occupying the front right seat was fatally injured and the male driver sustained minor injuries. Following the accident, the tunnel was closed to allow inspections of the ceiling structure and roadway pavement.

### *Truck Pushes Passenger Car Into School Bus Killing Seven in Lake Butler, Florida*

The Safety Board is investigating the January 25, 2006 accident between a truck and a passenger car. All seven occupants of a passenger car were fatally injured when a combination vehicle pushed their car into the rear of stopped school bus. The driver of the combination vehicle, and the 10 occupants of the school bus were also injured.

### *Motorcoach Accident Near Osseo, Wisconsin*

The Safety Board is investigating two separate accidents that occurred about 2:00 a.m. on October 16, 2005, on Interstate 94 near Osseo, Wisconsin. The first accident was a single-vehicle rollover involving a truck tractor-semitrailer combination unit. The combination unit was traveling at a driver-reported speed of 66 mph, when the unit departed the right-hand travel lane and paved shoulder at an approximate 3° angle. The shoulder was grooved with rumble strips. The unit entered the earthen, sloped roadside and traveled approximately 535 feet. Next, the driver steered to the left, and the combination unit reentered the lane, overturned onto its right side, and slide to a stop, where it blocked both lanes and shoulders of westbound Interstate 94.

The second accident involved a motorcoach that collided with the wreckage of the first accident. The motorcoach was carrying a group of marching-band members returning from a competition and had completed approximately 195 miles of the return trip. The accident bus was westbound in the right-hand lane traveling at highway speed when it came over a rise and collided with the wreckage from the first accident. There were no precrash skid marks. At the time of the accident, the weather was clear, there was no highway lighting, and the pavement was dry. Both vehicles sustained extensive damage. The bus driver and four passengers were killed. Thirty occupants sustained minor to serious injuries, and 10 occupants were not injured. The truckdriver sustained minor injuries.

### *Motorcoach Rollover Near Turrell, Arkansas*

The Safety Board continues to investigate a single-vehicle motorcoach rollover accident that occurred in October 2004 on Interstate 55 near Turrell, Arkansas. The accident involved a 47-passenger motorcoach driven by a 67-year-old male, transporting 29 passengers to a casino in Tunica, Mississippi. Witnesses following the vehicle before the incident estimated that the motorcoach had been traveling about 70 mph. At exit 23A, the vehicle veered right and entered a grassy area between the exit and entrance ramps. The motorcoach began to rotate clockwise, striking an exit sign. It overturned, slid, struck an earthen drainage ditch, and rolled over.

The roof of the vehicle separated from the body on the left side, remaining connected (hinged) on the right side. As the vehicle began to roll over, the roof opened up, allowing passengers to be thrown from the now open-topped vehicle. The vehicle traveled 67 feet after striking the drainage ditch and came to rest upside down, with the roof lying on the ground (top side down) and still hinged on the right side of the vehicle. The vehicle had no passenger seat belts, and the driver was not wearing his seat belt. Fourteen passengers and the driver were killed; 15 others were injured.

### *Motorcycle Broadsides Minivan, Killing Five in Linden, Pennsylvania*

On June 11, 2006, about 3:15 p.m., a 20-year-old male was operating a 2003 Kawasaki “ninja” style motorcycle northbound on State Route 220 approaching the intersection with Pine Run Road near Linden, Pennsylvania, at witness-estimated speeds in excess of 125 miles an hour. At the same time, a 37-year-old female was driving a 1993 Plymouth Voyager van with three passengers southbound on State Route 220. Roadway signs in the center median of the intersection partially obscured a portion of the northbound traffic lanes for drivers in the southbound left-turn lane. As the Plymouth began to negotiate a left turn onto Pine Run Road, it was struck by the motorcycle at the right-front passenger’s door. There was no evidence of pre-impact braking on the part of the motorcycle. The motorcycle embedded itself in the side of the van; the impact caused the van to roll onto its left side with the motorcycle still attached. A fire ignited shortly after the vehicles came to rest, engulfing both of them. All four occupants of the van and the operator of the motorcycle sustained fatal injuries. The right-front van passenger was ejected from the vehicle. Evidence suggests that only the driver of the van was wearing a seat belt. The operator of the motorcycle was wearing a helmet.

### *Adult Day Care 15-Passenger Van Strikes Tree, Killing Five in Queens, New York*

On July 12, 2006, about 3:07 p.m., a 55-year-old male driver was operating a 1995 Ford E-350 15-passenger van, serving as an ambulette, northbound on Cross Bay Boulevard north of Broad Channel in Queens, New York. The driver reported that he was traveling 45 to 50 mph; the posted speed limit was 40 mph. He was transporting nine elderly and mentally disabled passengers from the adult day care program run by the Peninsula Center for Extended Care and Rehabilitation to the Brooklyn Adult Care Center in east New York City. He stated that he had been traveling in the left-hand lane of the three northbound lanes when a passenger vehicle swerved from the right into his lane and began slowing down. He stated that he began braking, but the brakes on his van failed, so he swerved to the right to avoid the car. The van crossed the center and right lanes of traffic, crossed the roadway shoulder, bike path, and concrete curb, departed the paved surface, and collided with a 17-inch-diameter tree. One witness stated that the van had been cut off by another vehicle. Three witnesses stated that the van driver had lost control during a lane change maneuver and had not been cut off by other traffic. A fire began inside the passenger compartment after the collision. Five passengers were fatally injured, the driver and three passengers sustained serious injuries, and one passenger sustained minor injuries.

### *Motorcoach Rollover Causes Five Fatalities Near Westport, New York*

On August 28, 2006, about 6:40 p.m., a 2000 MCI 55-passenger motorcoach with 52 passengers was traveling northbound on Interstate Highway 87 near the town of Westport, New York. The motorcoach, driven by a 52-year-old male, was descending a 5-percent grade in the left lane about 75 miles per hour, passing a tractor-semitrailer in the right lane. The left front tire on the motorcoach failed, and the vehicle veered sharply to the left. The motorcoach went off the pavement, through a three-cable median barrier, and down a dirt-and-grass depressed center median. The motorcoach struck several large rocks in the median and rolled over, coming to rest on its roof. As a result, five people, including the driver, were killed, and 48 passengers were injured to varying degrees.

### *School Bus Falls Off Overpass, Killing Four Students in Huntsville, Alabama*

On November 20, 2006, about 10:10 a.m., a 44-year-old driver was transporting 40 high school-aged students on a 2006 International 71-passenger school bus in the left lane on the Interstate Highway 565 transition ramp near the Exit 19A exit ramp in Huntsville, Alabama. A 17-year-old driver of a 1990 Toyota Celica was traveling next to the school bus in the right lane. The driver of the Toyota said that he lost control of the car and it swerved into the right front wheel of the school bus. The impact caused the school bus to move left and strike a 32-inch cement bridge rail. The bus driver, who was not wearing his seat belt, was thrown from the bus and came to rest on the roadway. The bus continued climbing the bridge rail, moved along the top of the rail for about 117 feet, and then rolled over, falling about 30 feet to the dirt-and-grass area beneath the bridge. The front of the bus landed on the ground, bounced, and came to rest upright. The Toyota also struck the bridge rail, but was redirected westbound and remained on the upper roadway. It curved to the north and came to rest against the north bridge rail. Four students were killed. The rest of the students sustained minor to critical injuries. The bus driver sustained serious injuries. The driver and 18-year-old passenger in the Toyota were not injured.

### *Two Tanker-Truck Rollover Accidents*

The Safety Board continues to investigate and uncover the similarities between two similar accidents involving tanker trucks carrying gasoline on exit/entrance ramps.

One accident occurred on December 22, 2004, in Arlington, Virginia, when a 2001 Freightliner tractor in combination with a 9,200-gallon-capacity tanker semitrailer carrying approximately 8,500 gallons of gasoline failed to negotiate the curve on an exit ramp on Interstate 395. At the time of the accident, the driver was en route to make a local gasoline delivery. The tractor and semitrailer rolled over on their right sides and released the cargo of gasoline, which ignited. The postcrash fire consumed them and fatally injured the driver. No other people were injured in the accident.

The other accident occurred on February 11, 2005, in Davie, Florida, when a tanker truck with 9,000 gallons of gasoline overturned on an entrance ramp to the Florida Turnpike. The ramp has an increasing radius curve, which means the curve of the ramp got tighter and sharper as the driver progressed through the turn. The truck rolled onto a Mercury Sable station wagon with four occupants, and both vehicles slid into the outside guardrail next to the left shoulder. The cargo tank was breached and a fire ensued, eventually burning both vehicles completely. The truckdriver exited the vehicle but was burned when the fire ignited. After the fire started, the right front passenger of the Mercury exited the vehicle and was on fire. He ran to a pond on the outside of the guardrail and jumped in. As a result of the collision and fire, all four occupants of the Mercury were fatally injured and the truckdriver was severely injured.

## Public Hearings/Forums

### *Two-Day Hearing on Bus Fire in Wilmer, Texas*

On September 23, 2005, a 1998 MCI 54-passenger motorcoach operated by Global Limousine, Inc., based in Pharr, Texas, was traveling northbound on Interstate 45 with

44 passengers and the driver as part of an emergency evacuation ordered by the Governor of Texas in anticipation of Hurricane Rita. The passengers were from the Sunrise Nursing Home in Bellaire, Texas, near Houston. It took 2 hours to board the passengers because many needed to be carried or assisted onto the motorcoach by firefighters and nursing staff. When close to Wilmer, Texas, the bus caught fire after 15 hours en route. Twenty-three of the passengers were fatally injured.

As part of the continuing fact-finding phase of this investigation, the NTSB held a public hearing on August 8 and 9, 2006, to examine several issues. Topics included:

- the scope of the bus fire problem
- the source of the Wilmer motorcoach fire
- fire propagation and fire detection and suppression
- planning for and transporting people with special needs
- motorcoach evacuations
- Government oversight of motor carriers and bus brokers
- vehicle inspections
- driver training

### *Two-Day Public Forum on Motorcycle Safety*

On September 12 and 13, 2006, the Safety Board held a public forum on motorcycle safety. Data indicate that increases in fatalities among motorcycle riders far exceeded those of any other form of transportation. In 2005, 4,315 motorcyclists died in crashes, and the rate of motorcycle fatalities has increased more than 25 percent since 1997. At a time when highway fatalities have been decreasing, fatalities involving motorcycles have continued to increase, both in overall number and as a percentage of highway fatalities. Therefore, the goal of the public forum was to gather information about ongoing motorcycle safety research and initiatives, as well as safety countermeasures that may reduce the likelihood of motorcycle accidents and fatalities. Topics included:

- trends and safety statistics
- vehicle design
- rider protective equipment
- training and licensing
- public education/awareness
- rider impairment
- future directions in motorcycle safety

## Office of Marine Safety

Under regulations prescribed jointly by the Safety Board and the U.S. Coast Guard, the Board investigates major marine accidents (except accidents involving only public vessels) on the navigable waters or territorial sea of the United States or involving a vessel of the United States. A major marine accident involves the loss of six or more lives; the loss of a self-propelled vessel of over 100 gross tons; property damage over \$500,000; or a serious threat to life, property, or the environment from hazardous materials. The Safety Board also investigates certain accidents involving public and nonpublic vessels; accidents that involve significant issues related to Coast Guard marine safety functions; accidents that are catastrophic; and accidents indicating recurring safety issues in areas where the States have primary jurisdiction, such as accidents involving recreational or commercial boats that operate solely in State waters.

Given the international nature of the marine transportation system and the number of foreign-flag cruise and cargo ships operating from U.S. ports, the Safety Board's investigation of accidents involving both domestic and foreign-flag vessels contributes to the enhancement of marine safety worldwide. In the past, the Board has investigated marine accidents involving U.S.-flag ships as far away as the Persian Gulf and the South China Sea. In 2006, no overseas major marine accidents involving U.S.-flag ships required investigation by the Board. In its international role, the Board may participate in marine accident investigations involving foreign-flag vessels operating from U.S. ports. That role fulfills U.S. obligations with regard to foreign accident investigations established under the auspices of the International Maritime Organization. In 2006, the United Kingdom's Marine Accident Investigation Branch invited the Board to assist in its investigation of a fire on board the Bermuda-flag cruise vessel *Star Princess* off Jamaica, which resulted in the death of a U.S. passenger.

A staff of professional investigators at the Safety Board's Washington, D.C., headquarters investigates marine accidents. The staff includes Coast Guard-licensed master mariners, Coast Guard-licensed marine engineers, naval architects, and human performance and survival factors specialists. A marine accident report contains a detailed accident analysis, the accident's probable cause, and safety recommendations that seek to prevent similar accidents or that address major deficiencies in the marine transportation system. The Office of Marine Safety and the Office of Research and Engineering also undertake special studies of specific marine safety issues that generally yield recommendations to Federal and State agencies and to the maritime industry.

### Completed Marine Investigations

#### *Pontoon Water Taxi Lady D Capsizes in Baltimore Harbor, Maryland*



On March 6, 2004, the small pontoon passenger vessel, *Lady D*, a water taxi operating in Baltimore Harbor, encountered a rapidly developing storm with high winds. The vessel, carrying

*In 2006, the 15 members of the Office of Marine Safety investigated five new accidents, completed four reports, and continued work on five accident investigations.*

two crewmembers and 23 passengers, began to roll in the waves. The intensity of the rolling increased, and the vessel heeled to starboard and capsized. The vessel was destroyed, 5 passengers died, 4 passengers suffered serious injuries, and 10 passengers and 2 crewmembers sustained minor injuries.

Post accident stability tests revealed that the load carried by the *Lady D* on the day of the accident exceeded the vessel's safe capacity. Coast Guard data indicate that, nationwide, about 270 commercial pontoon vessels with a combined capacity of 9,000 occupants transport passengers on protected waters. The Safety Board determined that early action was warranted because the design of most small pontoon passenger vessels makes them particularly susceptible to capsizing when they are overloaded. Therefore, on December 20, 2004, the Board issued an advance safety recommendation urging the Coast Guard to take immediate action to restrict the possibility that occupant weight will exceed a vessel's safe capacity.

The Safety Board determined that the probable cause of the capsizing of the *Lady D* was its lack of intact stability, which was insufficient to withstand the strong winds and waves the boat encountered. Overloading caused the lack of intact stability.

The Safety Board issued five recommendations to the Coast Guard as a result of the *Lady D* accident: (1) Revise regulations to require that passenger capacity for domestic passenger vessels be calculated based on a statistically representative average passenger weight standard that is periodically updated. (2) Identify a method for determining the maximum safe load condition of a small passenger vessel at the time of loading, such as a mark on the side of the hull, and require that the vessel owners implement that method. (3) Revise the stability criteria for small passenger pontoon vessels for all passenger-loading conditions to minimize the potential for capsizing in wind and waves. (4) Until such time as the Coast Guard revises the passenger weight standard as requested in the first recommendation and the stability criteria used to evaluate small passenger pontoon vessel safety as requested in the third, develop interim pontoon passenger vessel stability guidance based on static and dynamic intact stability considerations. (5) Establish limiting environmental conditions, such as weather, in which pontoon vessels may safely operate, and list those limiting conditions on the vessel's certificate of inspection. The Board adopted the report on the *Lady D* accident on March 7, 2006.

### *Engine Fire Destroys Passenger Vessel Express Shuttle II in Port Richey, Florida*

On October 17, 2004, the small passenger vessel *Express Shuttle II*, with three crewmembers on board, was returning from ferrying 78 passengers to an offshore casino vessel when the crewmembers saw smoke coming from the engine room. The vessel's fire detection system did not sound an alarm. The *Express Shuttle II* had just lost power to both engines, and the master was turning it toward the nearby shore, intending



to beach the vessel. Crewmembers then reported to the master that the fire was out of control. None of the crewmembers activated the vessel's fixed carbon dioxide fire suppression system, and their attempts to fight the fire with portable extinguishers were unsuccessful. As the crewmembers prepared to abandon ship, a passing recreational boat rescued them. One crewmember suffered smoke inhalation and was taken to a hospital for observation. Firefighters ran hoses from the shore to a sheriff's boat, which shuttled equipment and personnel to the burning vessel. The vessel, valued at \$800,000, was declared a total loss after the fire.

The Safety Board determined that the probable cause of the fire was a fractured, improperly installed fuel injection line on the inboard side of the vessel's starboard engine that allowed diesel fuel to spray onto the engine and ignite. Contributing to the cause of the fire was the failure of Paradise of Port Richey, the *Express Shuttle II's* owner, to have a preventive maintenance program, which could have identified the company's ongoing problem with the vessel's fuel lines before the failed line led to the fire. Contributing to the extent of the damage were the vessel's faulty fire detection system and the crew's failure to employ proper marine firefighting techniques.

As a result of the accident, the Safety Board recommended that the Coast Guard require firefighting training for crewmembers on all small passenger vessels and verify that small passenger vessels' fire detection systems meet Federal requirements. The Board also reiterated a previous recommendation to the Coast Guard that it require preventive maintenance programs on small passenger vessels and revise its Navigation and Vessel Inspection Circular No. 1-91 to provide more in-depth guidance in training and drills for firefighting on board small passenger vessels. Recommendations were also issued to the vessel owner and to the engine manufacturer. The Board adopted the report on the *Express Shuttle II* accident on April 4, 2006.

### *Tour Boat Ethan Allen Capsizes on Lake George, New York*

On the afternoon of October 2, 2005, the New York State-certificated public vessel *Ethan Allen* capsized on Lake George in the Adirondack Mountains of upstate New York, claiming



the lives of 20 elderly passengers. The *Ethan Allen* had departed the Lake George marina for a cruise of the lake with a licensed operator and 47 passengers when, during a turn to the right, the vessel encountered a wave or waves generated by one or more vessels on its starboard side. Within a few seconds, the *Ethan Allen* had rolled to port and overturned; about 15 minutes later, it sank. Operators of recreational vessels nearby saw the accident, proceeded to the site,

and began rescuing survivors. The operator and 18 passengers escaped without injury; 3 passengers sustained serious injuries, and 6 sustained minor injuries.

The Safety Board determined that the probable cause of the capsizing of the *Ethan Allen* was the vessel's insufficient stability to resist the combined forces of a passing wave or waves, a



sharp turn, and the resulting involuntary shift of passengers to the port side of the vessel. The vessel's stability was insufficient because it carried 48 people; post accident stability calculations demonstrated that it should have been permitted to carry only 14. Contributing to the cause of the accident was the failure to reassess the vessel's stability after it had been modified because there was no clear requirement to do so.

The Safety Board issued a recommendation to the Coast Guard that it provide guidance to the States on Coast Guard standards for assessing the stability of small passenger vessels. The Board also made two recommendations to New York State: (1) Address the safety deficiencies identified in the investigation, and issue technical guidance to vessel owners on inspection requirements for modified vessels, stability assessments and criteria, means for determining maximum safe load condition, drug and alcohol testing, manning, and safety briefings. (2) Discontinue the use of capacity plate data associated with the Coast Guard's noncommercial boating standards for determining passenger loading on public vessels that carry more than six passengers and adopt the Coast Guard small passenger vessel inspection standards. The Board adopted the report on July 25, 2006.

### *Malaysian-Registered Freighter **Selendang Ayu** Grounds off Unalaska Island in the Aleutians*

On December 8, 2004, the Malaysian-registered bulk carrier *Selendang Ayu* was en route from Seattle, Washington, to Xiamen, China, when it lost propulsion in the Bering Sea about 100 miles northwest of Dutch Harbor, Alaska, in the Aleutian Islands. The freighter drifted for 2 days and then broke in half after grounding on the north shore of Unalaska Island. The vessel, which had a crew of 26, had taken on 60,000 metric tons of soybeans and 1,000 tons of heavy fuel in Seattle for the transit to China. Most of the fuel and cargo was lost in the days after the breakup. While conducting rescue operations, a Coast Guard helicopter crashed, killing six crewmembers from the freighter.

The Safety Board determined that the probable cause of the grounding of the *Selendang Ayu* was the failure of the main engine's No. 3 cylinder, which led the crew to shut down the engine; the freighter then drifted 100 miles and ran aground off Unalaska Island. Contributing to the cause of the grounding was the inability of the *Selendang Ayu* crew to restart the engine after it had been shut down, and the inability of the responding vessels to effect a tow or otherwise halt the freighter's drift in the extreme wind and sea conditions. The report was adopted on September 26, 2006.

## Ongoing Marine Investigations

### *Boiler Ruptures on Cruise Ship **Norway** in Miami, Florida*

The Safety Board continues to investigate the May 25, 2003, boiler rupture aboard the Norwegian Cruise Line passenger ship *Norway*. The boiler ruptured while the ship was moored in Miami, Florida, with 2,135 passengers and 911 crewmembers on board. Eight crewmembers were killed, and 19 others were injured in the accident. All passengers were safely evacuated.

At the time of the rupture, three of the *Norway*'s four main propulsion boilers were in normal-in-port operating status, supplying steam to electrical generators and auxiliary equipment. No maintenance was being carried out on any of the boilers. About an hour

after the ship docked, one of the operating boilers suddenly ruptured, sending hot water and steam into the engineroom, passageways, and cabins. The rupture caused extensive damage to the boiler, the boiler room, and to accommodation spaces three decks above the boiler. Issues of concern in the investigation include the adequacy of the maintenance, repair, and inspection of the boilers and the adequacy of surveys by the vessel's classification society.

### *Container Ship **New Delhi Express** Runs Aground in Kill Van Kull Waterway, New York Harbor*

The Safety Board is investigating the April 15, 2006, grounding of the Hong Kong-registered container ship *New Delhi Express* in the Kill Van Kull waterway of New York Harbor. The vessel was westbound in fog, carrying a master, 21 crewmembers, three passengers, and two pilots, when it struck a submerged ledge near buoy 14 and grounded in the waterway. Damages to the *New Delhi Express* were estimated at \$1.5 million. Two of the three tugs assisting the vessel were also damaged. No one was injured. Bridge resource management is being investigated as a safety issue in the accident.

### *Engineroom Fire Erupts Aboard Commuter Ferry **Massachusetts** in Boston Harbor, Massachusetts*

On June 12, 2006, the commuter ferry *Massachusetts*, a U.S. small passenger vessel carrying 65 passengers and four crewmembers, departed Rowe's Wharf in Boston Harbor for its first scheduled afternoon run to Hingham, Massachusetts. About 4:10 p.m., near Long Island Bridge, a fire was detected in the engine room. The master maneuvered the vessel into shallow water south of the bridge, anchored, and awaited shoreside assistance in combating the fire. Before a fireboat from the Boston Fire Department arrived, all the passengers safely transferred to the *Laura*, another commuter vessel in the vicinity. The fireboat extinguished the fire. Damage, estimated at \$800,000, was confined mostly to the engine room. The accident resulted in no fatalities or serious injuries. Fixed fire detection and suppression systems in the engine rooms of small passenger vessels are being investigated as safety issues.

### *Cruise Ship **Crown Princess** Heels off Port Canaveral, Florida*

On July 18, 2006, the Bermuda-registered cruise ship *Crown Princess*, a new vessel that had been in service for only a month, departed Port Canaveral, Florida, its last port of call on a 10-day round-trip voyage from New York. The vessel was on a heading to intersect its first plotted track to New York when its automatic steering system caused a high rate of turn to port. That event prompted the senior watch officer to take manual control of the steering system. The officer's manual steering commands ultimately caused the vessel to heel to starboard more than 15°, resulting in the injury of over 200 passengers and crewmembers. Procedures and training associated with integrated bridge systems are being investigated as safety issues in this accident.

### *Pipeline Explosion and Fire Destroy Construction Barge **Athena 106** in West Cote Blanche Bay, Louisiana*

On October 12, 2006, the uninspected towing vessel *Miss Megan* was pushing two barges in the West Cote Blanche Bay oil field in Louisiana. The construction barge *Athena 106* was secured along the port side of deck barge *IBR 234*, and the *Miss Megan* was secured to the stern of *IBR 234*, pushing both barges. The *Miss Megan* was crewed by one licensed master and one deckhand. The construction barge had six workers on board, consisting of one foreman, one crane operator, and four construction workers.

The *Miss Megan* deckhand left the towboat and joined the construction workers for lunch on the *Athena 106*. About 11:45 a.m., while the *Athena 106* was under way, the barge's aft spud (a vertical pipe extending through a well in the bottom of the barge and used for mooring) suddenly released from its fully raised position. The spud dropped into the water, striking and severing a submerged high-pressure 8-inch-diameter natural gas pipeline. The resulting gas release ignited and engulfed the towing vessel and both barges. The *Miss Megan* master and three barge workers were killed. One barge worker and one towboat deckhand survived, and two barge workers are missing and presumed dead.

## Public Hearings and Symposia

The Office of Marine Safety cosponsored, with the U.S. Coast Guard and the National Association of State Boating Law Administrators (NASBLA), a 2-day seminar dealing with passenger vessel safety on sole State (non-navigable) waters. The seminar was held on October 4 and 5, 2006, at the NTSB Training Center in Ashburn, Virginia. The purpose was to familiarize State officials with the Coast Guard's regulatory program for small passenger vessels.

The impetus for the exchange was the October 2, 2005, capsizing of the *Ethan Allen* on Lake George, New York, with the loss of 20 lives. The Safety Board's investigation identified a general lack of knowledge among the States about regulating small passenger vessel safety. The seminar attracted more than 60 participants and representation from 27 States and Puerto Rico. One result of the seminar is that NASBLA is helping the States improve their regulatory programs for commercial passenger vessels that operate solely in State waters. The U.S. Coast Guard and the Board continue to work with the States on small passenger vessel safety.

## Office of Railroad, Pipeline and Hazardous Materials Safety

### Railroad Safety

Railroads are one of the Nation's safest forms of transportation, but the potential for tragedy exists in railroad operations, as it does in every other mode of transportation. Millions of passengers travel each year on Amtrak and commuter rail systems, often over tracks owned by freight railroads. In addition, rail transit systems transport millions of commuters to and from major metropolitan areas each day.

Freight railroads own and maintain their own infrastructure, including 140,800 miles of track, with the associated bridges, buildings, repair shops, and switching facilities. Forty percent of the Nation's freight, more than by any other mode, moves by rail each year. Railroads move about 30 million carloads each year, including over 1.7 million carloads of hazardous materials. The amount of railroad freight, particularly intermodal, is continuing an upward trend.

Since 1967, Congress has assigned the primary responsibility for railroad accident investigation to the Safety Board. The Board performs in-depth analyses of selected rail accidents, determines the probable causes, and issues recommendations to make changes to prevent similar accidents. Because of its small staff and limited resources, the Railroad Division does not investigate every rail accident reported to the Federal Railroad Administration. To use its resources most efficiently, the Board has established accident investigation criteria that help highlight accidents that involve significant safety issues.

The Safety Board also conducts studies of significant railroad safety issues, often based on a set of accident investigations specifically undertaken as the basis for the study. In other cases, the studies may be based on analyses of regulations, railroad safety programs and procedures, audit reviews of management and operations practices, or other research. In addition, the Board investigates selected accidents involving specific life-saving issues.

### Completed Significant Rail Investigations

#### *Employee Fatality on the Union Pacific Railroad in San Antonio, Texas*

On December 7, 2003, a Union Pacific Railroad (UP) foreman was struck and killed by locomotives at the UP's East Yard in San Antonio, Texas. At the time of the accident, he was operating the locomotives via a remote control. On this night, a second crewmember was unavailable, and the foreman was working alone. He was in the foul of the track (within 4 feet of the rails) when he was struck. He was moving the locomotives to switch railroad cars. When the accident occurred, the locomotives, which were traveling about 11 mph, were moving back over the track they had just traversed, rather than over the route leading to the yard track. The Board adopted the report on May 23, 2006.

*In 2006, the Office of Railroad, Pipeline and Hazardous Materials Investigations had 37 staff members. The Office launched on 13 accidents, completed 12 accident reports, and continued work on 19 open investigations.*

### *Collision Between Two BNSF Freight Trains Near Gunter, Texas*

On May 19, 2004, two BNSF Railway Company freight trains collided head on near Gunter, Texas. The trains were traveling about 40 mph when the collision occurred. They were operating under track warrant control rules on non-sigaled single track. The collision resulted in the derailment of five locomotives and 28 cars. About 3,000 gallons of diesel fuel were released from the locomotives, which resulted in a fire. The southbound train engineer was killed, and the southbound train conductor was airlifted to a hospital in Dallas with serious burns. The crewmembers on the northbound train were admitted to a local hospital. Estimated property damages exceeded \$2 million. The Board adopted the report on June 13, 2006.



### *Collision Between Union Pacific Railroad Freight Train and BNSF Railway Company Freight Train Near Macdona, Texas*

On June 28, 2004, a westbound Union Pacific Railroad (UP) freight train traveling on the same main line track as an eastbound BNSF Railway Company (BNSF) struck the midpoint of the 123-car BNSF train as the eastbound train was leaving the main line to enter a parallel siding. The collision occurred on the UP's Del Rio Subdivision near Macdona, Texas, and derailed the four locomotives and 19 cars in the UP train and 17 cars in the BNSF train. A fire resulted, and a loaded tank car was breached, resulting in the release of chlorine, a toxic gas. The area within a 2-mile radius was evacuated. Three people, the UP conductor and two residents, died as a result of chlorine gas inhalation. The UP engineer, 23 civilians, and six emergency responders were treated for respiratory distress or other injuries. Preliminary property damages exceeded \$5.7 million; environmental cleanup costs were estimated to be \$150,000. On April 26 and 27, 2005, the Safety Board held a 2-day public hearing on this accident. The Board adopted the report on July 6, 2006.

### *Collision Between Two Washington Area Metropolitan Transit Authority Trains at Woodley Park-Zoo/Adams Morgan Station in Washington, D.C.*

On November 3, 2004, two Washington Metropolitan Area Transit Authority trains collided at the Woodley Park-Zoo/Adams Morgan station. The struck train, in revenue service, was discharging and loading passengers at the station; about 70 passengers were on board. The striking train, a six-car train that was not in revenue service, was traveling about 36 mph. There were 20 injuries. Estimated property damages were \$3,463,183. The Board adopted the report on March 23, 2006.

### *Two Union Pacific Trains Collide Near Shepherd, Texas*



On September 15, 2005, a southbound Union Pacific (UP) train struck a UP train that was parked on a siding track. The collision occurred in Shepherd, Texas, which is about 50 miles north of Houston. The engineer of the parked train was killed. The engineer and conductor on the striking train were injured. Estimated property damages were about \$1,514,000. The Board adopted the report on May 22, 2006.

### *Derailment of Amtrak Passenger Train No. 27 Near Home Valley, Washington*



On April 3, 2005, westbound Amtrak (National Railroad Passenger Corporation) passenger train No. 27, consisting of a single locomotive unit and four passenger cars, derailed at milepost 58.56 on the BNSF Railway Company's Northwest Division. The train was traveling 60 mph on single main line track when it derailed as it was traveling through a cut section of the Columbia River Gorge on the north side of the Columbia River near Home Valley, Washington.

The train remained upright; however, the cars came to rest leaning up to approximately 35° against the outside curved embankment. There were 106 passengers and 9 Amtrak employees on board. Thirty people (22 passengers and 8 employees) sustained minor injuries; 14 of those people were taken to local hospitals. Two of the injured passengers were kept overnight for further observation; the rest were released. Track and equipment damages, in addition to clearing costs associated with the accident, totaled about \$854,000. The Board adopted the report on October 18, 2006.

### *Collision of Two Union Pacific Railroad Freight Trains in Texarkana, Arkansas*

On October 15, 2005, a westbound Union Pacific Railroad (UP) train collided with the rear of a standing UP train in the UP rail yard in Texarkana, Arkansas. The collision resulted in the puncture of a railroad tank car containing propylene, a compressed flammable gas. Propylene, which is heavier than air, flowed near the ground into a nearby neighborhood. The flowing gas reached a house where an unknown ignition source ignited the gas, and the house exploded. The occupant was killed. The fire moved quickly along the flowing gas back to the punctured tank car. A second, unoccupied, home was destroyed in the fire, and

a wooden railroad trestle burned completely. Approximately 3,000 residents within a 1-mile radius of the punctured tank car were advised to evacuate the area. The two crews and the employees working at the Texarkana yard evacuated the area safely and were not injured. Total damage was \$2.4 million, including \$325,975 in equipment damage and \$2,053,198 in track damage. The Board adopted the report on October 17, 2006.

### *Collision of Two Union Pacific Railroad Trains in Carrizozo, New Mexico*

On, February 21, 2004, a Union Pacific Railroad (UP) eastbound freight train, consisting of 2 locomotives and 78 empty multi-level cars, struck a westbound UP freight train, consisting of 4 locomotives and 93 loaded covered hopper cars, in Carrizozo, New Mexico. The westbound train was struck about 25 hopper cars behind its locomotives, resulting in 11 derailed cars (the 26th through the 35th). On the striking train, two locomotives and the first 11 cars derailed. Both crewmembers of the striking train were killed. The crewmembers of the westbound train were unharmed. Diesel fuel released from the ruptured tanks of the striking train's locomotives caught fire, which was extinguished by the local fire department. There was no evacuation of the area. The estimated damage was \$1,964,543. The Board adopted the report on October 31, 2006.

### *Derailment of Virginia Railway Express Train Near Quantico, Virginia*

On January 5, 2006, a northbound Virginia Railway Express commuter train, 304-05, operating on CSX Transportation's RF&P Subdivision derailed three passenger cars and a locomotive at Possum Point near Quantico, Virginia. Seven passengers and two crewmembers required medical attention. The estimated damage was \$425,000. The Board adopted the report on November 20, 2006.

### *Derailment of Northeast Illinois Regional Commuter Railroad Corporation Train 504 in Chicago, Illinois*

On September 17, 2005, eastbound (inbound) Northeast Illinois Regional Commuter Railroad Corporation (Metra) train 504 derailed one locomotive and five cars at milepost 4.7, near West 47th and South Federal Street in Chicago, Illinois. The train was being operated in the push mode from a cab control car at the lead end. The train had departed Joliet, Illinois, at 7:24 a.m. en route to the LaSalle Street station in downtown Chicago. The train crew consisted of an engineer in the cab control car and a conductor, an assistant conductor, and a collector in the passenger cars. The train derailed as it traversed a crossover from track 2 to track 1 that had a prescribed maximum operating speed of 10 mph. The train was traveling 69 mph as it entered the crossover. The second through the fifth cars from the lead end of the train struck a steel girder that was part of a bridge that carried the tracks over 47th Street. Both turnouts of the crossover and one power switch machine were destroyed. Of the 185 passengers and 4 crewmembers who were on the train, 2 passengers were killed, and 109 passengers, 4 crewmembers, and 4 others were injured. Estimated property damage was \$6.35 million. The Board adopted the report on December 21, 2006.

### *Operation of Amtrak Passenger Train Over Misaligned CN Track Near Arcola, Louisiana*



On June 26, 2006, an Amtrak train en route from New Orleans, Louisiana, to Chicago, Illinois, and operating over CN railroad main line track, encountered a section of misaligned track near Arcola, Louisiana. The train was traveling about 67 mph, according to the engineer, when he saw that the track ahead was misaligned by about 2 feet to the east. He made an immediate full service brake application; and although the train negotiated the area without

derailing, the misaligned track caused passengers to be jostled about in the cars. Nine of the train's 104 passengers reported injuries at the scene, and 4 were transported to a local hospital, where they were treated and released. None of the 10 Amtrak employees aboard the train was injured. Estimated property damage was \$2,500. The Board adopted the report on December 21, 2006.

## Ongoing Rail Investigations

### *Collision of Two CN Freight Trains in Anding, Mississippi*

On July 10, 2005, two CN freight trains collided head on in Anding, Mississippi. The collision occurred on the CN Yazoo Subdivision, where the trains were being operated under a centralized traffic control signal system on single track. The collision resulted in the derailment of six locomotives and 17 cars. About 15,000 gallons of diesel fuel were released from the locomotives and resulted in a fire that burned for more than 12 hours. Two crewmembers were on each train; all four were killed. As a precaution, about 100 Anding residents were evacuated; they did not report any injuries. The estimated property damages exceeded \$10 million.

### *Collision of Two Norfolk Southern Freight Trains Near Lincoln, Alabama*

On January 18, 2006, eastbound Norfolk Southern (NS) freight train No. 226A117 collided with eastbound NS train No. 22R. The trains were operating under a centralized traffic control signal system. Three locomotives and 10 cars derailed. The collision occurred near Lincoln, Alabama. The three crewmembers were injured. As a result of the collision, 2 of the 12 intermodal containers carrying hazardous materials were breached. After the collision, a fire engulfed the autorack cars of train 22R. Property damages are estimated to be \$5.2 million.

### *Washington Metropolitan Area Transit Authority Train Strikes Automatic Train Control Employee in Washington, D.C.*

On May 14, 2006, southbound train 110 struck and killed a Washington Metropolitan Area Transit Authority automatic train control employee. The accident occurred in a tunnel near the Dupont Circle station in Washington, D.C.



### *Washington Metropolitan Area Transit Authority Train Struck Track Inspectors in Alexandria, Virginia*

On November 30, 2006, northbound train run 307 struck and killed two Washington Metropolitan Area Transit Authority track inspectors. This accident occurred near the Eisenhower Avenue station in Alexandria, Virginia.

### *Derailment of Chicago Transit Authority Train in Chicago, Illinois*

On July 11, 2006, northbound Chicago Transit Authority Blue Line train 220, which was an eight-car train, derailed its rear car. The car derailed in a tunnel beneath Clark Street and Lake Street in downtown Chicago, Illinois. Of the 1,000 passengers estimated to be on the train, 152 were injured.

### *Passenger Falls Between Train and Platform on Long Island Railroad in Queens, New York*

On August 5, 2006, westbound Long Island Rail Road passenger train No. 6113 stopped at the Woodside Station in Queens, New York, to discharge passengers. After the doors were closed, passengers told the conductor that a passenger was attempting to disembark at the station. The conductor re-opened the train's doors to let her disembark. As she disembarked, she fell between the train platform and the train's door and onto the ground beneath the platform. She crossed under the platform to get to the other side and was struck and killed by a train that was passing through the station.

### *Derailment of Norfolk Southern Train in New Brighton, Pennsylvania*

On October 20, 2006, eastbound Norfolk Southern train 68QB119, which was en route from Chicago, Illinois, to New Jersey, derailed 23 tank cars that were loaded with ethanol. The train derailed near a bridge that spans the Beaver River in New Brighton, Pennsylvania. The derailment resulted in the release of ethanol from several ruptured tank cars, and a fire erupted. Emergency response personnel evacuated the area. Several pieces of broken rail were shipped to the Safety Board's Materials Laboratory for examination and testing.

### *Derailment of a Rail Grinder on Union Pacific Railroad in Baxter, California*

On November 9, 2006, a Harsco Track Technologies (Harsco) rail grinder derailed on Union Pacific Railroad (UP) track as it descended a significant grade near Baxter, California. The rail grinder consisted of two locomotives and 11 specialized rail cars. Ten of the rail cars derailed. At the time of the accident, eight Harsco employees, one subcontractor, and one UP conductor-pilot were aboard. Two Harsco employees were killed. A fire began after the derailment. Property damages are estimated to be \$14.7 million.

## **Pipeline Safety**

The Safety Board is responsible for investigating pipeline accidents in which there is a fatality, substantial property damage, or significant environmental impact. The Board may also investigate additional selected accidents that highlight safety issues of national importance or involve a selected accident-prevention issue.

The United States has approximately 2.2 million miles of natural gas pipeline. In the United States, 892 transmission and gathering operators operate 325,235 miles of pipeline, while 1,313 distribution operators have 1,152,548 miles of mainline and 759,655 miles of service line. In addition, 264 operators manage approximately 168,992 miles of hazardous liquid pipelines.

In 2005, gas distribution operators reported 170 incidents, which, in total, caused 38 injuries, 14 fatalities, and property damages of \$497.8 million. Gas transmission operators reported 182 incidents, causing seven injuries and property damages of \$269.3 million. Hazardous liquid operators reported 137 accidents, causing two injuries, two fatalities, and \$94.8 million of property damage. In 2005, a total of 5.7 million gallons of product was spilled, resulting in a net loss of 1.9 million gallons.

## Completed Significant Pipeline Investigations

### *Natural Gas Pipeline Leak, Explosion, and Fire in DuBois, Pennsylvania*



On August 21, 2004, about 8:54 a.m., a natural gas explosion destroyed a residence in DuBois, Pennsylvania. The two residents were killed. Estimated property damages were \$800,000. The Board adopted the report on May 31, 2006.

## Ongoing Pipeline Investigations

### *Anhydrous Ammonia Pipeline Release in Kingman, Kansas*



On October 27, 2004, an 8-inch-diameter pipeline owned by Magellan Midstream Partners, L.P., and operated by Enterprise Products Operating, L.P., ruptured near Kingman, Kansas, and released approximately 4,858 barrels (204,000 gallons) of anhydrous ammonia. No deaths or injuries resulted from the release; however, the anhydrous ammonia migrated into a creek and killed more than 25,000 fish, including some

from threatened and endangered species. The cost of the accident was \$680,715, including \$459,415 for environmental remediation.

### *Gas Line Explosion and Fire Destroys Apartment Building in Bergenfield, New Jersey*

On December 13, 2005, an apartment building exploded in Bergenfield, New Jersey, after natural gas had migrated into the building from a damaged pipeline. The break occurred at an underground threaded tee connection downstream from where excavators were removing an oil tank that was buried under an asphalt parking lot adjacent to the building. Three residents of the apartment building were killed. Four residents and a tank removal worker were injured and transported to hospitals. The apartment building, which was a complete loss, was assessed at \$863,300.



## Hazardous Materials Safety

Chemicals affect every sector of the economy and make an essential contribution to the Nation's standard of living, because they are used in the production of synthetic fabrics, lifesaving medicines, packaging materials, adhesives and paints, automobile parts, composite materials for aircraft, and fertilizers, to name a few. A 1998 study by the Research and Special Programs Administration—the predecessor of the Pipeline and Hazardous Materials Safety Administration (PHMSA)—estimated that more than 800,000 shipments of hazardous materials enter the Nation's transportation system each day. The *Commodity Flow Survey*, published jointly by the U.S. Department of Commerce and the U.S. Department of Transportation, reported that over 1.5 billion tons of hazardous materials were shipped by truck, rail, water, and air in the United States during 2002.

The impact of the transportation of hazardous materials is reflected in the data from hazardous materials incident reports submitted to PHMSA. In 2006, the transportation modes reported 18,973 incidents involving the release of hazardous materials. The incidents resulted in 4 fatalities, 204 injuries, and \$57.7 million in damages. The number of reported incidents, fatalities, and injuries fluctuates from year to year. Reported damages have also fluctuated, but displayed a significant upward trend during the 10-year period from 1997 to 2006. The \$57.7 million in reported damages for 2006 is 72 percent more than the \$33.5 million in damages reported for 1997.

## Completed Hazardous Materials Investigations

During calendar year 2006, the Hazardous Materials Division helped complete two railroad accident investigations:

### *Collision Between Union Pacific Railroad Freight Train and BNSF Railway Company Freight Train in Macdona, Texas.*

(See the railroad section of this report for a summary.)

### *Collision of Two Union Pacific Railroad Freight Trains in Texarkana, Arkansas.*

(See the railroad section of this report for a summary.)

## Hazardous Materials Support of Ongoing Investigations

### *Motor Coach Fire near Wilmer, Texas*

See the highway section of this report for a summary.

### *Collision of Two CN Freight Trains in Anding, Mississippi*

See the railroad section of this report for a summary.

### *United Parcel Service Company Cargo Plane Fire in Philadelphia, Pennsylvania*

See the aviation section of this report for a summary.



### *Derailment of Norfolk Southern Train in New Brighton, Pennsylvania*

See the railroad section of this report for a summary.

## Office of Research and Engineering

As accident investigations become more complex, investigators must have technical support in a wide range of disciplines. To assist the investigators, technical specialists in the Office of Research and Engineering performed analyses of historic accident data, accident reconstructions, vehicle performance analyses, radar analyses, visibility calculations, simulations of vehicle motion, animations, data recorder readouts and analyses, medical factors analyses, materials failure examinations, structural failure analyses, and fire and explosion analyses. Additionally, the office conducted its own studies of safety issues.

### Significant Work Accomplishments

Significant Office of Research and Engineering technical support activities for investigations and safety studies are summarized below.

#### *Safety Studies/Reports Status*

The Safety Studies and Statistical Analysis Division completed a major safety report on aircraft certification that contained three recommendations to the Federal Aviation Administration (FAA). Staff initiated a new study of general aviation airbag effectiveness and investigated six accidents that will provide data for that study. The division also completed six annual aviation reviews, supported eight accident investigations with data analysis reports, and completed a package containing four recommendations on personal flotation devices used in recreational boating.

#### **Safety Report on Treatment of Safety-Critical Systems During the Federal Aviation Administration's Type Certification Process for Transport Category Airplanes.**

In a 5-year period starting in 1999, the Safety Board completed four major accident investigations in which the certification of a safety-critical system and continued airworthiness of transport-category airplanes were important issues: the rudder actuator in USAir flight 427, the center wing tank in TWA flight 800, the horizontal stabilizer jackscrew in Alaska Airlines flight 261, and the rudder system and vertical stabilizer in American Airlines flight 587. These four accidents resulted in 715 fatalities, accounting for 60 percent of the fatalities in air carrier operations that occurred between 1994 and 2001. Each of the investigations raised questions about the certification process the Federal Aviation Administration (FAA) uses to determine the airworthiness of the aircraft system. As a result, the Board has expressed its concern about the FAA's certification of safety-critical systems and suggested the need for a directed study of the certification process. The Board adopted this report on April 25, 2006.

**General Aviation Airbag Effectiveness.** A plan for evaluating the effectiveness of general aviation (GA) airbags was approved by the Safety Board in June 2006. Airbags are now becoming standard equipment on newly manufactured general aviation aircraft. In 2006, approximately 60 percent of newly manufactured GA aircraft were equipped with airbags. The effectiveness of those airbags has been evaluated in simulations and in sled tests. The purpose of the study is to examine accidents involving airbag-equipped GA aircraft to better understand the effects of airbag deployment in actual accidents. By examining this new technology, as it did with automobile airbags, the Board will be able to evaluate any

*In 2006, the Office of Research and Engineering's 40 staff members completed 1 major safety report, launched a major safety study, developed 6 annual reviews of accident data; completed 139 Materials Laboratory cases; examined 202 recordings, including 61 cockpit voice recorders, 68 flight data recorders, and 9 rail event recorders; and supported more than 250 accident investigations in all modes. In addition, staff developed 11 safety recommendations and provided technical support for another 7.*



The left forward seat airbag of a Cirrus SR22 involved in an accident in which airbags deployed. Investigators examined the airbag to gauge the force with which the occupant struck the airbag. Data from this examination will support the Safety Board's study on the effectiveness of airbags in general aviation aircraft.

unintended consequences that may result from the introduction of airbags and may be able to identify cases in which airbags are particularly effective at reducing injury. In 2006, staff investigated six accidents for inclusion in the study:

- Boyceville, Wisconsin, August 5, 2006, involving a Cirrus SR-22
- Indianapolis, Indiana, August 28, 2006, involving a Cirrus SR-22
- Owyhee Reservoir, Oregon, August 27, 2006, involving an Aviat Husky
- Rock Springs, Wyoming, September 15, 2006, involving a Cirrus SR-20
- Cambridge, Maryland, September 30, 2006, involving a Cessna 172S
- Ormond Beach, Florida, October 21, 2006, involving a Cessna 172S

The study will be completed in late 2007 or early 2008, depending on the frequency of accidents that meet the criteria for data collection.

**Motorcycle Safety Public Forum.** In September 2006, the Offices of Research and Engineering and Highway Safety convened a public forum to gather data regarding motorcycle safety and to promote an open and informative discussion of issues related to reducing the number of motorcycle accidents and fatalities in the United States. The number of motorcycle fatalities had increased each year through 2003 when 3,661 motorcyclists died in crashes. Additionally, the overall rate of motorcycle fatalities (measured in fatalities per registered vehicle) increased more than 25 percent between 1997 and 2003. The National Highway Traffic Safety Administration (NHTSA) has shown that motorcyclists are about 26 times more likely than passenger car occupants to die in a traffic crash and that motorcycle accidents are more likely to involve drivers who are speeding, have been drinking, and do not have a valid license. Forum participants included representatives from motorcycle manufacturers, safety equipment manufacturers, State motor vehicle departments, NHTSA, insurance associations, law enforcement, and academia.

**Recommendation Letters on Personal Flotation Devices in Recreational Boating.** Based on information presented at the public forum, *Personal Flotation Devices in Recreational Boating* (August 25, 2004) and on past Safety Board actions, staff developed two recommendations to the U.S. Coast Guard: develop a risk assessment program that would obtain data for evaluating the effectiveness of intervention strategies and for documenting better the boater educational experience to help States assess their own recreational boater education and licensing programs. An additional recommendation was proposed to the National Association of State Boating Law Administrators: modify the National Boating Education Standards. A recommendation was also proposed to the Marine Retailers Association of America and the National Marine Manufacturers Association to develop a marketing strategy that they promote the use of personal flotation devices.

**Annual Aviation Reviews for Air Carrier and General Aviation.** The Safety Board prepares annual statistical reports summarizing aviation accidents. The *Annual Reviews of Aircraft Accident Data* for commercial aviation and general aviation have graphic displays of the accident data and analyze the data. During 2006, annual reviews for calendar years 2001, 2002, and 2003 were developed for presentation to the Board. In addition to the summary of a year's accident data, the annual reviews include analyses of aviation topics of interest (for example, night flying, flights into instrument meteorological conditions, and landing accidents).

**Accident Data and Public Records.** In 2006, data specialists answered more than 350 requests for data analysis about aviation accidents. Some requests concerned the accident frequency of a particular aircraft model or air carrier, while others asked about particular types of accidents. The availability of accident data from 1962 to 1983 on the Safety Board website, combined with complete download and text search capabilities, now allows many outside researchers to do their own analyses, especially simple, straightforward analyses. The more complex requests for aviation accident data, however, continue to be handled by the division's data specialists. The division also published monthly and annual U.S. civil aviation statistical information on the Board's website.

### *Materials Laboratory*

In 2006, the Safety Board's Materials Laboratory received 143 requests for assistance in evaluating parts and wreckage from accidents in all transportation modes. During the evaluation of metallic components, the Materials Laboratory found 41 fatigue failures, of which each had led directly to an aviation accident. A variety of factors contributed to the fatigue failures, including mechanical damage, inadequate maintenance, thermal exposure, low hardness, and improper welding. Perhaps of equal importance, laboratory examinations also showed that many components fractured or failed because of the accident, and thus were ruled out as being related to the cause of the accident.

A large portion of the Materials Laboratory's 2006 effort was in support of aviation accident investigations. For example, staff extensively evaluated the structure from the Grumman G-73-T Mallard from which a wing separated just after the plane had taken off from Miami, Florida, on December 19, 2005. The photograph below shows an area of fatigue cracking in the right-wing rear-spar lower cap. In the area shown, the fatigue cracking initiated from a double-drilled rivet hole. In addition to the spar cap, laboratory staff found fatigue cracking in an internal wing stiffener and in the lower wing skin, all in areas with corrosion damage and a large preexisting crack that had been covered by internal and external doubler plates.

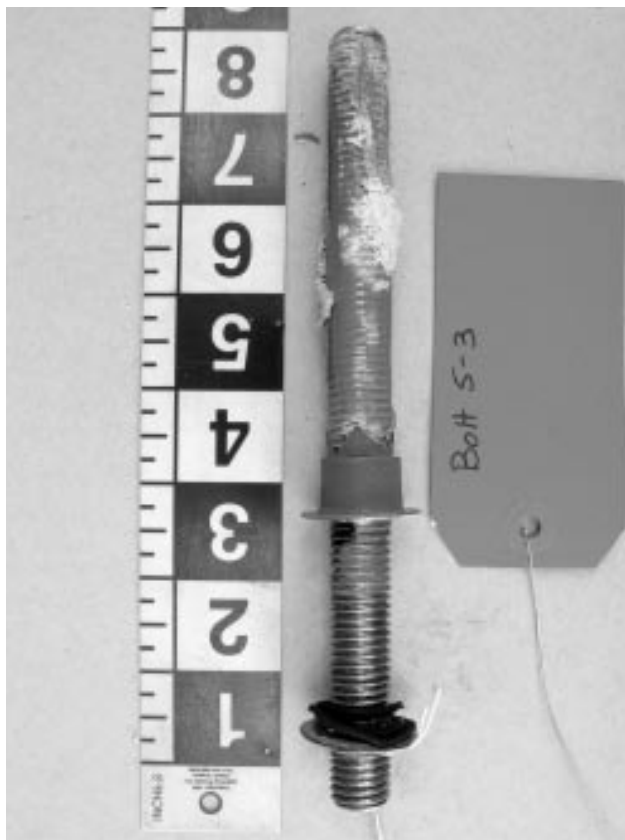


“Right-wing rear-spar lower cap fracture with fatigue cracking that initiated from a double-drilled rivet hole.”

In addition to supporting the investigation of aviation accidents that occurred in the United States, Materials Laboratory staff participated in the investigations of aviation accidents in Cuba, Estonia, Guyana, Peru, the Bahamas, Costa Rica, Japan, Uganda, Nigeria, Venezuela, the Netherlands, Russia, Ireland, Botswana, and France.

Materials Laboratory staff also expended significant effort to support major nonaviation accident investigations. For example, as part of the Safety Board’s investigation of the collapse of the ventilation duct in the Boston Big Dig (July 10, 2006), the laboratory is examining

the failed epoxy anchors (and other anchors) from the roof of the tunnel, overseeing anchor tests at the Federal Highway Administration, and performing chemical analysis and certification testing of the epoxy. The photograph below shows one of the anchors from the failure area.



“One of the adhesive anchors from the failure area of the Boston Big Dig tunnel ventilation duct. The smooth darker green areas above the red plastic cap are voids in the epoxy.”

Materials Laboratory staff also completed examinations of the failed pipeline from the Bergenfield, New Jersey, natural gas explosion (December 12, 2005) and continues to evaluate track structure from the Chicago Transit Authority derailment (July 11, 2006) and broken rail from the New Brighton, Pennsylvania, derailment (December 20, 2006).

### *Vehicle Performance Laboratory*

Performance engineers conducted studies and analyses supporting several major and field investigations. The analyses covered airplanes, marine vessels, trains, road vehicles, and vehicle occupants. The laboratory staff launched to aircraft accidents in Chicago, Illinois, and Lexington, Kentucky, and helped analyze the performance of planes involved in accidents in Canada, Estonia, Russia, and China.



In support of its vehicle performance efforts, the laboratory upgraded its aircraft simulation tool, which can now determine the aerodynamic effect of aircraft icing from an accident airplane's flight data recorder. The tool was upgraded during the Safety Board's participation in an accident investigation conducted by the Civil Aviation Administration of China.

**Sikorsky S-76 Helicopter Accident in Tallinn, Estonia.** The Sikorsky S-76 helicopter crashed during its flight to Tallinn, Estonia. The aircraft had a flight data recorder, and the Safety Board has provided performance and simulation modeling support to the study of the motion of the helicopter.

**Bombardier Challenger in Montrose, Colorado.** The airplane crashed during takeoff immediately after rotation. The airplane had not been de-iced; ground-icing conditions existed in the area. The Safety Board derived the flight path and timeline of the takeoff from ground scar and cockpit voice recorder data and determined that the aircraft's wings had been contaminated with ice and snow.

**Southwest Airlines 737 at Chicago Midway Airport.** The Southwest Airlines flight was landing at Midway Airport during a snowstorm, and after rollout, exited the runway and airport property, striking a car at an intersection. From the flight data recorder, radar data, ground scar measurements, and airplane simulations, the Safety Board derived the landing point, the deceleration of the aircraft, and the friction coefficients of the contaminated runway for the accident plane and for the plane that immediately preceded the accident plane.

**Bombardier Challenger in Teterboro, New Jersey.** The Challenger airplane departed the runway and the airport after an aborted takeoff, striking cars on the road and a warehouse. From on-scene evidence, cockpit voice recorder data, and flight data recorder, the Safety Board derived the time and distance of the airplane during the takeoff and the abort procedure and used aircraft simulations to examine alternative operational procedures.

**Gulfstream III in Houston, Texas.** This charter flight, which was scheduled to transport former President George H.W. Bush, crashed on approach to William P. Hobby Airport in Houston, Texas. The Safety Board derived the trajectory of the airplane, created a correlation between the cockpit voice recorder data and flight data recorder, and derived the position of the airplane relative to the instrument landing signal localizer and glideslope beams. The Board also examined the Federal Aviation Administration radar-based minimum safe altitude warning system and examined possible errors in its performance.

**Cessna 208 in Moscow, Russia.** A Cessna 208 with a flight data recorder crashed on its approach to Moscow International Airport in January 2006. The Safety Board analyzed the flight data recorder and the cockpit voice recorder data and determined that the plane had encountered icing that had hindered its performance and led to an aerodynamic stall during approach. Data from this accident and a similar accident in Winnipeg, Canada, led to the issuance of three recommendations for the Cessna 208 in icing conditions.

**Saab 340B in San Luis Obispo, California.** A Saab 340B, departing from San Luis County Regional Airport in San Luis Obispo, California, encountered icing conditions during the en route climb, departed controlled flight at an altitude of about 11,500 feet mean sea level (msl), and descended to an altitude of about 6,500 feet msl. The Safety Board determined from the flight data recorder and through the use of simulation tools that the icing had affected the performance and stability of the plane before the pilot lost control of it. As a result of the investigation, the Board issued three recommendations for the Saab 340B in icing conditions.

**Runway Incursion at Chicago O'Hare Airport.** On July 23, 2006, an Atlas Air Boeing 747 and a United Airlines Boeing 737 departed on intersecting runways at Chicago O'Hare International Airport in Chicago, Illinois. The Safety Board used flight recorder data and ground radar information to derive the relative locations and separation distances of the aircraft during the incident. The airplanes passed within 35 feet of each other. The Board created an animation of the incident.



"Animation frame showing United Airlines 737 passing over Atlas Air 747."

In addition to these major aviation accidents, the laboratory staff continues to provide technical support to Safety Board regional office investigations of general aviation aircraft accidents. Safety Board engineers also supported a number of highway and railroad vehicle accident investigations in 2006 by developing detailed vehicle and occupant simulations.

### *Vehicle Recorder Laboratory*

The Safety Board's Vehicle Recorder Division engineers extracted, formatted, and analyzed data from 61 cockpit voice recorders (13 were foreign), 68 flight data recorders (16 were foreign), 3 voyage data recorders, and 9 rail recorders during 2006; staff also recovered data from 19 damaged global positioning system units and 30 videos and digital cameras. The foreign recorders came from countries all over the world, including Nigeria, Brazil, Venezuela, Nicaragua, Bolivia, Panama, Colombia, and China. In addition, staff completed a letter to the Federal Aviation Administration with two recommendations that transport-category rotorcraft

be equipped with appropriate flight recorders and that such aircraft not be permitted exceptions or exemptions.



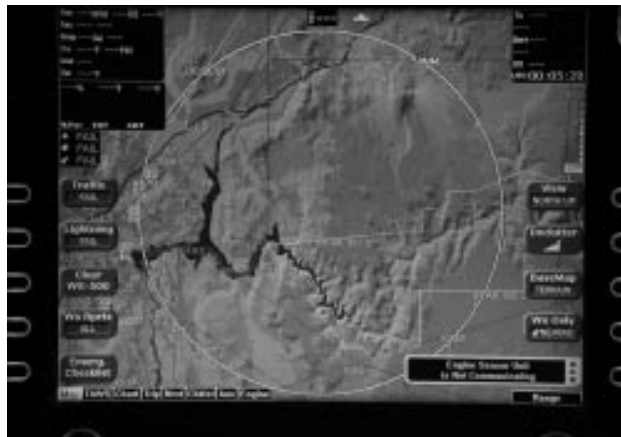
A damaged hand-held GPS unit received by the Safety Board's Vehicle Recorder Laboratory. (This type of unit frequently provides a time history of position, track, and groundspeed.) The laboratory expects the number of these devices that it will need to analyze to significantly increase in 2007, given one manufacturer's recent decision to withdraw readout and recovery support.

The Safety Board also began to recover flight data from additional sources of recorded information, primarily advanced aircraft displays and instruments. The recorded information is similar to that recorded on flight data recorders. From August through December 2006, the Board received 12 devices. Understanding the recording formats and data recovery techniques necessary to properly analyze the data required significant resources. Without

these devices, investigators would not have had any recorded information because the aircraft involved were not required to have either cockpit voice recorders or flight data recorders.

By the end of 2006, the laboratory had almost completed the 2-year development of the next-generation flight recorder readout software. This \$1.8-million contract will result in a government-owned software product that the Safety Board will use not only to read and analyze current aviation recorders, but also to process data from marine and surface vehicle accident event recorders. The development effort includes three distinct tasks: task 1, to develop the core data extraction, graphing, and analysis tool set; task 2, to write a common database storage solution that will organize and store all of the accident flight recorder and performance data; and task 3, to create tools that will enable staff to use advanced statistical data-mining processes across multiple accident scenarios looking for subtle common events or causes. This entire project is expected to be complete in early 2007.

During 2006, the Vehicle Recorder Division also integrated a new cockpit voice recorder (CVR) transcription tool into its CVR analysis routine. This software provides an easy-to-use tool for extracting the maximum amount of information from audio recordings. This \$600,000 development project was funded by the U.S. Department of Defense Technical Support Working Group (TSWG) counter-terrorism taskforce. Division staff continues to identify enhancements and improvements that can be made to the software tool, and the Board has funded several of these critical improvements. The TSWG has also agreed to fund a 12-month, \$400,000 effort to construct a user-friendly advanced digital signal processing toolset. Government labs will use the toolset to document the following from recorded sounds: human factor abnormalities, explosion signatures, and structural failures.



Cirrus display: Cirrus SR-22 multi-function display showing aeronautical chart information from the Meadview, Arizona, accident that occurred in October 2006.

The Safety Board also began a joint effort with the Marine Accident Investigation Branch in the United Kingdom to develop a voyage data recorder readout software suite. The Board committed money at the end of fiscal year 2006 to fund two of the project's first five requirements. The year 2006 marked the first year that voyage data recorders were available for the Board's marine accident investigations. The new software suite will provide a valuable and efficient tool for processing the significant amount of information recorded on these devices.

### *Medical Factors*

The Safety Board's Office of Research and Engineering medical staff provides medical consultations to accident investigators in all modes on about 100 accidents a year. Medical issues addressed in 2006 included, among others, various heart conditions, the use of illicit

substances, vision deficiencies, hypoxia, G-induced loss of consciousness, and the use of psychoactive prescription medications. In addition, staff helped modal survival factors investigators on investigations of accidents that had each caused more than one death, including a tour boat capsizing in Lake George, New York, a motorcoach accident in Wilmer, Texas, and a U.S. Department of Defense contract flight in Afghanistan.

The Office of Research and Engineering also supports the training of investigators, physicians, psychologists, and physiologists in the medical aspects of accident investigation and in 2006, made presentations to a variety of audiences, including Safety Board investigators, U.S. Air Force flight surgeons, military and civilian physicians undergoing specialty training in aerospace medicine, and undergraduate engineering students with career interests in human factors issues. Staff also developed formal guidance for investigators on collecting toxicology specimens from operators involved in accidents.

In 2006, medical staff helped other organizations and agencies progress on a number of issues of particular interest to the Safety Board:

- The Coast Guard published a draft Navigation and Vessel Inspection Circular (NVIC) dealing with medical qualifications of mariners. This NVIC resulted directly from recommendations developed during the investigation of the *Staten Island Ferry* accident in New York. The Safety Board commented positively on the draft.
- The Safety Board provided substantive input to a proposed rule on insulin-using diabetic drivers.
- As part of its response to Safety Board recommendations on the medical oversight of commercial drivers, the Federal Motor Carrier Safety Administration has established an ongoing informal, interagency forum on transportation medical issues; the Board's Office of Research and Engineering continues to participate in this information exchange.
- Medical staff is participating in a Railroad Safety Advisory Committee (RSAC) working group on medical standards, a group formed in response to recommendations arising from the Safety Board's investigation of a fatal rail accident in Clarkston, Michigan, involving two crewmembers with obstructive sleep apnea.
- Medical staff advised a joint group of the American College of Occupational and Environmental Medicine, the American College of Chest Physicians, and the National Sleep Foundation as they developed guidance on the identification, evaluation, and treatment of obstructive sleep apnea in commercial drivers.
- Medical staff worked with a variety of organizations, including the American Medical Association, the Association of American Medical Colleges, the Liaison Committee on Medical Education, the Donald W. Reynolds Foundation, and several schools of medicine to advance the education of physicians on the medical evaluation of noncommercial drivers consistent with Safety Board recommendations on that issue.

Finally, the medical staff regularly addresses internal occupational health issues as part of the Safety Board's Occupational Health and Safety Committee and in 2006 began evaluating the formalization of processes for safely handling composite materials during accident investigations and for ensuring the safest possible travel by Board employees who are supporting foreign accident investigations.

### *Fire and Explosion Factors*

Fire and explosion specialists supported marine, highway, rail, and general aviation accident investigations and participated in the investigation of three accidents in 2006: the United Parcel Service DC-8 in-flight fire, the Chicago Transit Authority subway derailment, and the M/S *Massachusetts* engineroom fire.

Staff investigators also supported the investigation of an engineroom fire on board a casino shuttle boat near Port Richey, Florida, which was considered in a Safety Board meeting on April 24, 2006, and the investigation of the motorcoach fire near Wilmer, Texas. Staff also participated in public hearings for the UPS in-flight fire accident investigation and the Wilmer motorcoach fire.



Investigators offload damaged cargo container during the on-scene investigation of the UPS in-flight fire.

In addition to providing direct support to accident investigations, fire and explosion staff continued to pursue the issues of fuel tank inerting, fire detection and suppression in aircraft cargo compartments, and fire detection and suppression on board marine passenger vessels.

### *Advanced Technology Staff*

The Safety Board's advanced technology staff members provide in-depth technical assessments in support of individual accidents or classes of accident investigations. Staff members also develop and implement new capabilities for use by Board investigators on future investigations.

Advanced technology staff presented the paper "Enhancements to the Kinematics Parameter Extraction Simulation Tool" to a meeting of the American Institute of Aeronautics and Astronautics Modeling and Simulation. The paper discussed enhancements to the Kinematics Parameter Extraction Simulation Tool, which was originally designed to extract control surface positions from aircraft motion.

In addition, advanced technology staff is participating in an international effort to develop a new set of worldwide simulation standards (ICAO 9625 revision). Staff is providing relevant feedback from accident investigations in the hope of developing a safer set of standards at the start of the process. In particular, staff is advocating ways of avoiding the negative training that Safety Board staff has observed in some training simulator programs.

Advanced technology staff also performed an extensive review and technical assessment of railroad hazardous materials tank car failures in 2006. As part of this activity, staff provided technical support to the Office of Railroad, Pipeline and Hazardous Materials Investigations on the Macdona, Texas, investigation and report, including activities in response to recommendations issued in the Minot, North Dakota, report and reiterated in the Graniteville, South Carolina, report. In addition, staff completed a comprehensive technical review of the ongoing Southwest Research Institute fracture toughness-testing program for the Federal Railroad Administration and of the Chlorine Institute initiative to design a puncture-resistant tank car. Staff conclusions and technical assessments have been accepted by all parties participating in these activities and have had a major impact on the direction taken in the Dow Chemical Next Generation Tank Car Project. Staff review of the Chlorine Institute Phase I report was used as the basis for evaluating and finalizing the Phase II activity on this program.

## Office of Administrative Law Judges

Since 1967, the Safety Board has served as the “court of appeal” for certificate holders such as airmen, mechanics, or mariners whenever the Federal Aviation Administration (FAA) or the U.S. Coast Guard takes a certificate action.

The Safety Board’s administrative law judges hear, consider, and issue initial decisions on appeals filed with the Board. Included are appeals from orders issued by the FAA’s Administrator that amend, modify, suspend or revoke, 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 qualification; appeals about FAA actions denying applications for the issuance or renewal of airman certificates; and appeals of certain FAA civil penalty orders issued by the FAA against pilots, flight engineers, mechanics, or repairmen where the amount in dispute is less than \$50,000. The judges also adjudicate claims for fees and expenses stemming from certificate and civil penalty actions under the Equal Access to Justice Act (EAJA).

The Safety Board currently has four administrative law judges. Two are based in Washington, D.C., and hold hearings primarily in the eastern half of the United States. The other two are based in Arlington, Texas, and Denver, Colorado, and hear cases primarily in the western half of the country.

Either the certificate holder or the FAA may appeal the judges’ decisions to the Safety Board. The Board’s review on appeal of its administrative law judges’ decisions is based on the record of the proceeding, which includes hearing testimony (transcript), exhibits, and the judge’s decision, as well as appeal briefs submitted by the parties.

A certificate holder can appeal the Safety Board’s decision to the U.S. Court of Appeals. The FAA also has the right to appeal the Board’s decisions to the U.S. Court of Appeals when it (the FAA) determines that the Board’s decision “will have a significant adverse impact” with on the FAA’s aviation safety duties and powers. Airmen and mechanics have the right to appeal all adverse Board decisions to the Court of Appeals.

Upon review of the Safety Board’s decision, the Court of Appeals has the power to affirm, modify, or set aside the decision in whole or in part—or, if need is found, to order further proceedings by the Board. The decision of the Court of Appeals is subject to review by the U.S. Supreme Court on writ of certiorari.

In April 2000, the U.S. Congress enacted Section 716 of the Aviation Investment and Reform Act for the 21st Century (Public Law 106-181). This Act expanded the Safety Board’s jurisdiction to include review of FAA designations of safety enforcement actions as emergencies, which require an order to be effective immediately, upon petition by the affected certificate holder. The Board has delegated its review authority to its administrative law judges. There is no administrative review of the administrative law judges’ decisions in these cases.

Marine certificate actions are heard first by the Coast Guard’s administrative law judges, and may be appealed to the Commandant of the Coast Guard. The ruling of the Commandant may then be appealed to the Safety Board. The Board then follows the same appellate process

There were 388 aviation certificate appeals filed with the Safety Board’s Office of Administrative Law Judges in 2006; 133 of these cases were from emergency orders. The Board’s judges held 82 hearings and closed 414 cases in 2006.

as it does in considering the initial decisions of its law judges in aviation cases. In 2006, the Board received one marine appeal and issued no rulings on marine cases.

There were 388 aviation certificate appeals filed with the Safety Board's Office of Administrative Law Judges in 2006; 133 of these cases were from emergency orders. The Board's judges held 82 hearings and closed 414 cases in 2006.

During 2006, 64 of the judges' decisions were appealed to the Safety Board. The Board decided 54 appeals, reversing the judges' decisions in four cases. Thirteen of the Board's decisions were appealed to the U.S. Courts of Appeals, which rendered 12 decisions in 2006. The Court affirmed the Board in six cases, reversed the Board in one case, and dismissed five cases for procedural reasons.

Four EAJA applications were filed with the Safety Board's administrative law judges in 2006, and the judges decided five EAJA cases. In 2006, two of the judges' EAJA decisions were appealed to the full Board, which issued rulings in two EAJA cases.



## NTSB Training Center

### Background

Since the NTSB Training Center became operational, the Safety Board has focused on improving and expanding the existing programs. The use of investigative resources clearly remains a concern of Congress, which believes that the functions of the Training Center should be secondary to the Board's core mission of accident investigation. As a result, the Board's goal was to hold workforce hours at the Training Center to the same level as in calendar year 2005 so that the Board's critical investigative responsibilities would not be negatively affected. The Board continues to be aggressive in recovering costs associated with the Training Center by imposing and collecting fees for the Training Center's services.

The Safety Board's management has significantly revised the philosophical approach of the NTSB Training Center and is developing a business plan that will concentrate on the Training Center's ability to sustain and develop innovative and state-of-the-art courses and programs while lessening the impact on Board investigative resources. Accordingly, the Training Center is supporting the accident investigation mission of the Board and promoting transportation safety by:

- Moving the management function for the NTSB Training Center into the Office of the Managing Director to provide for high-level attention to all aspects of the operation.
- Reducing the NTSB Training Center staff to four full time positions in 2006.
- Developing a new business plan during 2007 that relies more heavily on contracting out elements of course coordination, new course development, registration, marketing and administrative support on a fee-for-service basis, which will serve to reduce the full-time staff necessary to operate the NTSB Training Center.
- Improving the quality of Safety Board accident investigations through technical training and instruction.
- Increasing the numbers of seats available for students whenever feasible.
- Reducing production costs by transitioning to electronic delivery of course materials.
- Improving the effectiveness of Safety Board staff through workforce development courses, electronic learning, and Small Agency Council course offerings.
- Training our investigative and transportation safety and security partners. These training programs improve the efficiency and effectiveness of Safety Board accident investigations by communicating lessons learned, sharing accident investigation techniques, and fostering the exchange of new ideas and experience among organizations that participate in Board investigations as parties, as well as with the broader transportation safety and security community.

*In 2006, the NTSB Training Center delivered 29 courses, which were attended by a total of 1,259 people. Three new workforce development courses were presented in 2006: Conducting Effective Technical Presentations, Conducting Effective Meetings, Accident/Incident Report Writing for Safety Board staff. Two new Accident Investigation courses were also developed in 2006: Accident Investigation Orientation for Rail Professionals, and Passenger Vessel Safety on Sole State Waters.*

- Providing a forum for instruction, outreach, and advocacy on issues relevant to the transportation safety community.
- Providing a facility for laboratory and analysis activities.
- Using its high-quality training resources to facilitate Transportation Disaster Response programs, collaborative instruction with partner agencies, and other compatible activities.

Calendar year 2006 marked a peak in program offerings and in the use of the NTSB Training Center facility by outside organizations. The collection of tuition and fees for facility use made it possible for the Training Center to recoup expenses incurred in the development and delivery of programs, allowed for limited program modifications and improvements in the future, and offset portions of the building maintenance and equipment replacement costs that are anticipated within the next decade.

## Definitions

Some of the terms have broader meanings than are typical. Those terms are clarified below.

*Investigator*—Any Safety Board staff member performing inherently investigative duties at the Board *or* duties that directly affect the timeliness and efficiency of accident investigations. These duties include laboratory work, management of investigative processes, and report writing and editing.

*Investigative Resources*—Any contribution of work hours made by investigators, as defined above, to support NTSB Training Center programs.

*Program*—Any instructor-led course activity that is presented to an audience. Included within the scope of this description are training programs, educational courses, discussion forums, symposia, workshops, and all associated curricula.

*Module*—Any section or block within a program that requires an instructor. Typically, several modules are contained within any given program.

*Contract Instructors*—All instructors who receive fees for their instructional services.

*Volunteer Instructors*—All instructors who receive no fees for services but do receive travel reimbursement, if requested.

*Support Staff Instructors*—All Safety Board instructors who are not investigators (and do not fill any position that would affect the timeliness of an investigation).

## Programs

In 2006, a total of 1,259 individuals attended 29 NTSB Training Center programs. Several programs were offered more than once during the year.

<b>Title</b>	<b>Total Students</b>
<b>AVIATION</b>	
Aircraft Accident Investigation	69
Survival Factors in Aviation Accidents	27
Accident Inv. Orientation for Airline Professionals (offered twice)	112
<b>INTERMODAL</b>	
Cognitive Interviewing (offered twice)	81
Investigating Human Fatigue (offered twice)	83
Forensic Photography (Traumatic Injuries)	28
Photodocumentation Series (three courses below)	
- Technical Photography (offered twice)	48
- Adv. Accident Site Photography (offered twice)	50
- Digital Image Processing (offered twice)	53
Conducting Effective Technical Presentations	36
Conducting Effective Meetings	30
Accident/Incident Report Writing	30
<b>PUBLIC AFFAIRS</b>	
Media Training for Accident Investigators	27
Managing Communications During an Aircraft Disaster	68
<b>MARINE</b>	
Passenger Vessel Safety – Sole State Waters	58
<b>RAIL</b>	
Accident Inv. Orientation for Rail Professionals	58
<b>TRANSPORTATION DISASTER RESPONSE</b>	
Family Assistance (offered three times)	199
Advanced Transportation Disaster Assistance	93
Airport Preparedness Program	51
<b>PARTNERSHIPS</b>	
Managing & Directing Safety Investigations -NASA	33
Victim Assistance Rapid Deployment Team Training - FBI	25
<b>TOTALS</b>	<b>1,259</b>

## Partnerships

Furthering its commitment to meeting the training needs of those in other areas of the government and the transportation and emergency response communities, the NTSB Training Center continues to build upon the alliances and partnerships with Federal agencies and private organizations.

### *Federal Bureau of Investigation*

The NTSB Training Center, in partnership with the Federal Bureau of Investigation (FBI) Office for Victim Assistance, helps to support the training needs of the new FBI Victim Assistance Rapid Deployment Team (VARDT), a core disaster management team whose mission is to respond both internationally and domestically to acts of violent crime and

terrorism. These specialists assist families and victims affected by a criminal/terrorist mass fatality incident. The possibility of a violent crime that results in mass fatalities adds a new dynamic to these assistance operations, and this course, modeled on the Safety Board Family Assistance program, helps to prepare victim assistance specialists to work in this challenging environment.

### *National Aeronautics and Space Administration*

The NTSB Training Center continues to develop its relationship with National Aeronautics and Space Administration's (NASA's) investigative arm, the Engineering and Safety Center, which was established shortly after the Columbia space shuttle accident. The Training Center shared its resources and expertise through an updated presentation of the 4-day course in late April 2006. The Safety Board plans to work with NASA and the U.S. Department of Defense to present this course again in the spring of 2007.

### *Continuing Relationships*

Nongovernmental partnerships also have been developed, such as with the Airports Council International of North America and the Aviation Safety Alliance, in which each party contributed unique expertise to develop training targeted to specific operational demands.

The following is a list of the organizations that participated in alliances or partnerships with the NTSB Training Center during 2006:

- American Red Cross
- FBI Counter Terrorism Unit – Pan Am 103
- Armed Forces Institute of Pathology
- National Aeronautics and Space Administration (NASA)
- National Association of State Boating Laws Administrators (NASBLA)

### *Participants*

Participants (students) in NTSB Training Center programs include previous as well as potential future parties to Safety Board investigations, such as equipment manufacturers and unions; disaster relief agencies, including the American Red Cross; and representatives from local, State, and Federal law enforcement agencies.

Transportation safety is also a global endeavor, and some of the participants in NTSB Training Center programs are the Safety Board's foreign counterparts: transportation accident investigation agencies from around the world, including those from developing countries. The number of foreign investigators attending Training Center programs has increased in each of the past 4 years.

The following 61 foreign transportation accident transportation entities sent a combined total of 119 investigators and transportation professionals to NTSB Training Center programs in 2006:

- AIBN Accident Investigation Board Norway
- Air Accident Investigation Bureau of Singapore
- Air France, France
- Air Greenland, Denmark

- Air Jamaica Holdings Limited
- Air Jamaica Limited
- Aircraft Railway Accident Investigation Commission, Japan
- ALPA Colombia
- Aruba Airport Authority
- Autoridad de Aviacion Civil de El Salvador
- Aviation Safety Council, Taiwan
- Avior Airlines, Venezuela
- BEA, France
- Bermuda Police Service
- Cathay Pacific Airways
- China Airlines, Taiwan
- Civil Aviation, Bahamas
- DHL Aero Expreso, S.A., Panama
- Directorate Flight Safety Armed Forces Germany
- Directorate of Flight Safety Canada
- EAP Solutions, Republic of Ireland
- El Al Israel Airlines
- Emirates Airline
- Etihad Airways, United Arab Emirates
- EVA Air, Flight Safety Division
- Federal Ministry of Transport, Australia
- Flight Operations Iberia, Spain
- Gadair Airlines, Spain
- Grancolombiana, Colombia
- Harmony Airways, Canada
- Human Factors Group, Tokyo Electric Power Company, Japan
- KLM Royal Dutch Airlines, The Netherlands
- Korea Aviation Accident Investigation Board
- LAN Airlines, S.A., Chile
- LOT Polish Airlines, Republic of Poland
- Lufthansa German Airlines
- Malaysia Airlines
- Malta Maritime Authority
- Middle East Airline, Lebanon
- Ministry of Economic Affairs and Communications, Estonia
- Nigerian Airspace Management Agency
- Nigerian Federal Ministry of Aviation
- North Cariboo Air
- PFDMA, Canada

- Philippine Aircraft Accident Investigation Board
- Philippine Airlines
- Pratt & Whitney Canada Corp.
- Royal Thai Air Force
- SINTEF, Norway
- Skyservice Airlines
- Spanish Aviation Professionals Association, Spain
- Standard Aero Ltd. Canada
- Sterling Airlines, Sweden and Denmark
- TAM Brazilian Airlines
- Thai Airways International
- Thai Airways International, Thailand
- Transport Canada
- Transportation Safety Board of Canada
- University of Sheffield
- VNV-DALPA, Holland
- Westjet, Canada

Thirty-nine foreign countries were represented in NTSB Training Center courses, symposia, and partnerships in 2006: Aruba, Australia, Bahamas, Bermuda, Brazil, Canada, Chile, Colombia, Denmark, El Salvador, Estonia, France, Germany, Greenland, Holland, Hong Kong, Ireland, Israel, Jamaica, Japan, Korea, Lebanon, Malaysia, Malta, Mexico, the Netherlands, Nigeria, Norway, Panama, Philippines, Poland, Singapore, Spain, Sweden, Taiwan, Thailand, United Arab Emirates, the United Kingdom, and Venezuela.

### *Continuing Education Units*

In October 2005, the NTSB Training Center received authorization by the International Association for Continuing Education and Training (IACET) to award Continuing Education Units (CEUs). The IACET, whose members include 650 businesses, government agencies, higher education institutions, nonprofit corporations, and individuals, authorizes select organizations to issue CEUs only when they can demonstrate a consistent adherence to strict educational training guidelines and protocols.

Many organizations and agencies use these credits for staff development, and individuals use them to maintain professional certifications. The NTSB Training Center continues to issue a certificate to each participant who successfully completes a course, and the Training Center releases official transcripts affixed with the IACET and the Safety Board seal.

### *Instructors*

This section distinguishes between investigators (numbers of people) and investigative resources (hours of work by investigators) used in NTSB Training Center programs during 2006.

### *Use of Investigators*

1. In 2006, the NTSB Training Center offered 29 programs.
2. A Safety Board investigator provided some level of instruction in 13 of these 29 programs (45 percent).

### *Use of NTSB Resources*

1. Only two new courses involving Safety Board investigative staff were produced in 2006:
  - a. Railroad Accident Investigation for Railroad Professionals. Program preparation took about 20 hours, and presentation took 12 hours.
  - b. Passenger Vessel Safety – Sole State Waters (co-produced with the U.S. Coast Guard). Program preparation for this course took about 40 hours, and presentation took 4 hours.
2. One new course in Advanced Transportation Disaster Assistance was also produced. Producing it did not involve the Safety Board investigative staff.

### *Use of Contract Instructors*

1. The NTSB Training Center offered 29 programs.
2. A contract instructor provided instruction in 22 of these 29 programs (76 percent).

### *Use of Volunteer Instructors*

1. The NTSB Training Center offered 29 programs.
2. A volunteer instructor provided instruction in 10 of these 29 programs (34 percent).

### *Use of Support Staff Instructors*

1. The NTSB Training Center offered 29 programs.
2. A support staff instructor provided instruction in 16 of the 29 programs (55 percent).

### *Facility Use*

Portions of the operating costs were recovered through user agreements established with a variety of governmental or transportation-related organizations.

The following organizations hosted events in 2006 in the facility:

- Airline Pilots Association
- Airport Consultants Council
- Airport Council International
- Armed Forces Institute of Pathology
- Aviation Safety Alliance

- Captive Resources
- Coast Guard
- Committee for Dulles
- Daecher Group
- Defense Information Administration
- Drug Enforcement Agency
- Federal Bureau of Investigation
- Homeland Security – Border Patrol
- International Association of Chiefs of Police
- International Society of Air Safety Investigators
- Lock Media
- Moran Tug
- National Aeronautical and Space Administration
- National Association of State Boating Law Administrators
- National Safe Boating Council
- National School Transportation Association
- Red Cross Headquarters
- Society of Automotive Engineers International
- United Motorcoach Association

### *Continuing Operations Agreements*

The NTSB Training Center facility provides the Safety Board space to continue operations during emergencies in accordance with the Continuity of Operations Plan (COOP). Space has been made available, for a fee, through interagency agreements with other Federal agencies to ensure continued operations for their essential functions as well. The Federal Energy Regulatory Commission and the U.S. Courts of Appeals for Veterans Claims have executed agreements for their COOP space; the fees are paid through reimbursable work authorizations.

### *Learning Tools*

Adding to the NTSB Training Center's BAE Jetstream 41 (J-41) procedural trainer acquired in 2005, the Training Center is working with the FBI to obtain the reconstruction of the wreckage of Pan Am flight 103, which was a Boeing 747 that was destroyed by a bomb over Lockerbie, Scotland. It would be an outstanding learning tool and companion piece to the Trans World Airlines flight 800 Boeing 747-100 wreckage reconstruction. The Safety Board expects an agreement by summer 2007.

### *Revenue*

During calendar year 2006, the NTSB Training Center earned \$588,048 in revenue from course tuition and fees, facility rentals, and interagency Continuity of Operations Plan (COOP) agreements. Receipts were used to fund the direct costs of providing the programs. In addition, funds were used for maintenance of Training Center equipment, telecommunications upgrades, supplies, and to finance a reserve for equipment replacement.



## Office of Safety Recommendations and Advocacy

In 2006, the Safety Board's recommendations continued to have a positive impact on transportation safety. During the year, 89 recommendations were closed with an acceptable status. The recommendations led to the following safety improvements.

**Aviation:** Updated aircraft weight and balance and center of gravity requirements to account for increases in average individual and baggage weights; better guidance for pilots on dealing with potential aircraft upsets and to correct previously inaccurate training; revised training for employees to identify undeclared and unauthorized hazardous materials; better information for flight crews of turbine-powered aircraft about minimum airspeed maneuvering for all airplane configurations, phases and flight conditions, including icing and non-icing conditions; improved guidance about installation, repair, and inspection of emergency evacuation systems, including aircraft slides; renewed emphasis on the importance of strict compliance with the sterile cockpit rule; and improved checklists to help ensure that aircraft cargo is weighed, loaded, and sequenced correctly.

**Highway:** Better passenger restraint systems in 12- and 15-passenger vans; testing of systems to aid drivers in maintaining control of 15-passenger vans; routine inspection and maintenance of passenger seat anchorages in motorcoaches and upgraded standards to avoid seats detaching from their anchorages during collisions and rollovers; improved traffic control guidelines for U.S. Border Patrol checkpoints on high-speed arterial roadways; and training for highway and railroad maintenance workers on the design, function, and repair of interconnected highway and railroad signal systems.

**Marine:** Stronger standards for mariner drug and alcohol testing, including onboard breath testing and urine collection kits, and quick post accident testing; better smoke detection and suppression systems on large cruise ships to mitigate smoke and the spread of fire through ship laundry ducts and on mooring decks that carry high fire loads; advice for mariners on the hazards of using specific medications when operating a vessel; comprehensive safety management system implemented by the New York City Department of Transportation, including medical fitness oversight and recurring evaluation of maritime navigation technology.

**Railroad:** Revised directions for Washington Metro train operators on identifying and responding to train rollbacks and revised procedures for halting rollbacks; improved standards for railroad event recorder crashworthiness for new and rebuilt locomotives, improved standards for modifications to recorders to monitor and record throttle position directly, and implemented additional recorder testing procedures; improved scheduling and record-keeping for emergency preparedness training for Amtrak employees; and made for progress in completing interoperability standards for positive train control systems.

**Pipeline:** New guidance for pipeline operators about testing of new pumping stations and relief valves; new guidelines for pipeline operators on the potential safety risks associated with rotating pipeline controller work shifts; improved coordination with electric and other utilities during pipeline emergencies; and guidance adopted by pipeline system operators for the installation of precisely placed permanent markers at sites where gas and hazardous liquid pipelines cross navigable waterways.

Safety improvements are often made without formal safety recommendations. In 2006, Safety Board investigators generated 45 safety improvements through the Safety Proposal Review Board, a program to acknowledge and account for safety improvements that are brought about through direct interaction of Board investigative staff with government and industry representatives and without formal safety recommendations.

Last year, the Safety Board issued three new safety alerts. One aviation alert advises general aviation pilots to maintain constant awareness of severe weather. One marine alert advises small passenger vessel operators that increased average passenger weight and vessel modifications may adversely affect stability, and one marine alert urges charter vessel operators to make sure passengers wear life jackets when encountering hazardous conditions at sea. Eight other safety alerts were updated with new statistics and information. The Board's website gets hundreds of "hits" each month regarding these alerts. The aircraft ground-icing alert gets the most "hits;" in 2006, it received between 400 and 500 "hits" each month.

## Office of Transportation Disaster Assistance

In 1996, Congress passed the Aviation Disaster Family Assistance Act, which gave the Safety Board the responsibility of assisting the victims of aviation disasters, including their families. The Board's primary responsibility involves coordination between Federal agencies, commercial airlines, State and local authorities, and the families of victims. In 1997, Congress enacted the Foreign Air Carrier Support Act to ensure that foreign air carriers operating flights to and from the United States meet the same standards of victim assistance as their U.S. counterparts.

In the event of an accident in which the Office of Transportation Disaster Assistance (TDA) is tasked to respond, a team of specialists is launched, including an administrative officer and managers for emergency operations, crisis operations, forensic sciences, and disaster services. Although the office has mandatory responsibilities for major aviation accidents, the expertise and techniques developed by this team have been called on repeatedly to assist in accidents in all transportation modes including support to regional investigators for general aviation accidents.

Primary tasks of the team on arrival at an accident site include coordinating resources provided by local, State, and Federal agencies; establishing a Joint Family Support Operations Center (JFSOC); and ensuring that the airline establishes a Family Assistance Center (FAC). Normally the JFSOC and the FAC are co-located at a hotel where the families are lodged. In addition, the team maintains contact with family members following the on-scene phase of the accident to provide investigation updates and notification of public hearings and/or Safety Board meetings and to respond to various other questions and concerns raised by family members.

### Accident Launches

#### *Aviation Accident in Lexington, Kentucky*

Office of Transportation Disaster Assistance specialists coordinated assistance to victims and their family members following the crash of Comair flight 5191. In coordination with the air carrier and local community, responders established a family assistance center, provided updates on the accident investigation, coordinated a site visit for family members, and worked with the local coroner to ensure resources were available to recover and to positively identify the victims. There were 49 fatalities.

#### *Cirrus Aircraft Struck Apartment Building in New York City*

Office of Transportation Disaster Assistance specialist helped regional investigators with on-scene coordination of recovery and identification of victims and provided accident investigation updates to family members. There were two fatalities.

#### *In-flight loss of Control Accident in Prescott, Arizona*

Office of Transportation Disaster Assistance specialist helped a regional investigator with on-scene assistance to family members. The specialist worked with local coroner to ensure the recovery and identification of the victims and updated family members about the progress of the accident investigation. There were five fatalities.

### *School Bus accident in Huntsville, Alabama*

Office of Transportation Disaster Assistance specialist helped the investigative team assist the families of the victims. The specialist worked with school officials to ensure mental health assistance was provided to students, and the specialist provided accident investigation updates to the victims and their family members. There were four fatalities.

### *Metro Train Accident in Washington, DC*

Office of Transportation Disaster Assistance specialist helped the Investigator-In-Charge schedule and conduct the 72-hour history interview with family members of the employee killed in the accident. There was one fatality.

### *Metro Train Accident in Alexandria, Virginia*

Assisted investigator-in-charge schedule the 72-hour history interview with family members of the employees killed in the accident. There were two fatalities.

## NTSB Training Center Courses

The Office of Transportation Disaster Assistance (TDA) provides comprehensive courses for professionals who help families of major transportation accident victims. The hands-on instruction provides participants with an operational expertise that enables them to respond more effectively to transportation disasters. These courses bring together leading experts in the field and cover a wide range of topics including initial accident notification, grief and trauma, forensic procedures, multi-cultural memorial services, and effective family briefings.

The course *Family Assistance During Transportation Disasters (TDA 301)* brings together leaders from many transportation disciplines to share knowledge and enhance family assistance. TDA specialists, grief and trauma specialists, Federal transportation officials, and other professionals present a course focused on meeting both the immediate and long-term needs of family members affected by transportation disasters. Topics include:

- Federal and commercial carrier partnerships
- Accident notification and Safety Board family assistance response
- On-scene accident operations
- Family assistance operations
- Family briefings
- Traumatic grief and mourning
- Forensic recovery and identification operations

The course was presented in February, July, and November 2006 at the NTSB Training Center. It was so well attended in 2005 that an additional session had to be added in 2006. Professionals representing domestic and international air carriers, airport authorities, several government agencies, including foreign governments, private organizations, and airport authorities attended the course.

In April 2006, *Transportation Disaster Response—Airports (TDA 404)* was given to attendees from the airport industry. The course addressed the numerous challenges faced by airports and airlines in the first 12 hours following a major passenger aircraft accident, and the course equipped participants with strategies and materials to plan and coordinate an effective response to the relatives and friends of accident victims. TDA staff led the course and assisted participants with planning issues unique to their airport. Topics in this course included:

- Understanding the unique response requirements for the two primary types of aviation disasters and how victims are affected by them
- Dealing with issues unique to accidents and incidents involving airlines with limited airport staff (or contracted airport staff)
- Determining who should be considered a “family member”
- Assisting with the immediate needs of family members in the first 12 hours after an accident
- Planning a Friends and Family Gathering Center and protecting family members’ privacy
- Transitioning family members from the Friends and Family Gathering Center to the airline-established Family Assistance Center
- Understanding the Federal Bureau of Investigation’s (FBI’s) role in criminal transportation accident investigations and family support services
- Communicating effectively with local and State responders, the Safety Board, the Federal Aviation Administration, the FBI, airlines and airport tenants

In October 2006, the Office of Transportation Disaster Assistance developed and delivered the first advanced workshop, which was *Meeting the Challenges in a New Era of Disaster Response (TDA 701)*. This workshop, held 10 years after the passage of the Aviation Disaster Family Assistance Act, was designed to allow participants to appreciate the past, examine the present, and prepare for the future. The Safety Board brought together speakers with a wide range of experience and responsibility to thoroughly examine the needs of victims and their family members following a transportation disaster. The workshop encouraged participants to evaluate and plan for a disaster response in the 21st century. Topics in this course included:

- Reexamining disaster management in the age of family assistance
- Understanding a family member’s perspective on assistance
- Using an all hazards approach to family assistance
- Understanding how concepts in family assistance have evolved
- Planning family assistance for industry and communities
- Applying the concept of psychological first aid
- Identifying victims: Developing a standard of care

## Partnerships with Other Agencies

The Safety Board and its Office of Transportation Disaster Assistance have memoranda of understanding with several other Federal agencies, the U.S. Department of Homeland Security, the U.S. Department of Defense, the U.S. Department of State, and the U.S. Department of Justice. The Safety Board also has a memorandum of understanding with the American Red Cross. Together, these agencies collaborate to support both the investigative and family assistance efforts at major accidents.

The Safety Board also became a partner in a newly established Fatality Management and Family Assistance Working Group. The group, comprised of staff of six federal agencies (the U.S. Department of Health and Human Services, the U.S. Department of Homeland Security, the U.S. Department of Defense, the Federal Bureau of Investigation, the U.S. Department of State, and the Board), focuses on providing a similar standard of care for fatality management and family assistance in mass disasters. The group will also serve as Federal subject matter experts in these areas, with the goal of improving policy and practice.

The Interagency Transportation Incident Program in New York City was formalized in 2005. The program was created to improve interagency cooperation in New York City in the event of another major transportation disaster. In 2005, the steering committee identified all of the key local agencies that would respond to a major transportation incident in New York City. The training of staff from these agencies took place over the year. The goal of the training was to enhance mutual understanding between local, State, and Federal agencies; share information regarding the needs of each agency during an investigation; and ensure that the needs of the Safety Board investigation or transportation disaster assistance response are met in a timely manner.

The Safety Board worked with the U.S. Department of Homeland Security's Disaster Mortuary Operational Response Team to finalize standard operating procedures for a response in support of the Board. The Office of Transportation Disaster Assistance hosted a 3-day meeting of 15 team members at the NTSB Training Center to examine existing protocols, make modifications, and draft new procedures.

The Safety Board also held a "Chicago" meeting this year. Such a meeting brings together the major air carrier family assistance personnel to examine responses and address concerns. The meeting was held in Denver, Colorado.

In addition, the Safety Board presented information to several groups, including:

- Air Force Family Support Center Directors – Disaster Response Training
- American Academy of Forensic Sciences annual conference
- American Red Cross (ongoing training)
- Association of Death Educators and Counselors (keynote at their annual convention)
- Department of Justice/Office for Victims of Crime annual conference
- FBI Airport Liaison annual conference
- FBI National Academy – Crisis Management Course
- FBI Office for Victim Assistance

- National Association of Medical Examiners annual conference
- National Association of Social Workers
- National Center for Forensic Sciences
- National Disaster Medical System annual conference
- National Sheriff's Association
- Pennsylvania Emergency Management Agency

The groups included employees from the following air carriers, airport agencies, and law enforcement entities:

- Baltimore-Washington International Thurgood Marshall airport
- Compass/Northwest Airlines
- Continental Airlines
- Dulles Airport
- Grand Forks, North Dakota airport
- JetBlue Airways
- NetJets/Executive Jet Management
- New York City Office of Chief Medical Examiner
- Southwest Airlines
- United Airlines
- US Airways/America West

## Member Profiles



### **MARK V. ROSENKER CHAIRMAN**

Mark V. Rosenker of Virginia was sworn in as the 11th Chairman of the National Transportation Safety Board on August 11, 2006. He had been serving as Acting Chairman since March 2005. His two-year term as Chairman runs until August 2008. In January 2006, after confirmation by the Senate, he began his second term as a Member, which will expire on December 31, 2010.

Chairman Rosenker became a Member of the NTSB in March 2003 and was designated by President Bush as Vice Chairman that April.

Beginning January 20, 2001 until the announcement of his nomination to the Board, Mr. Rosenker served as Deputy Assistant to the President and Director of the White House Military Office. In this capacity, he had responsibility for policies, personnel and plans that involve Department of Defense assets in direct support of the President.

Prior to his White House appointment, Mr. Rosenker was Managing Director of the Washington, DC office for the United Network for Organ Sharing (UNOS), overseeing the development, implementation and management of a national public information program dealing with all facets of organ transplantation in the U.S. Before joining UNOS, Mr. Rosenker served 23 years as Vice President, Public Affairs for the Electronic Industries Alliance.

Mr. Rosenker's interest and experience in transportation safety dates back more than three decades to his time at a major national public affairs organization. His clients there included the American Safety Belt Council, the Motorcycle Safety Foundation, and the Safety Helmet Council of America. He later served as Director of Communications for the American Moped/Motorized Bicycle Association.

Mr. Rosenker's professional experience also includes service in the federal government at the Department of Interior, the Federal Trade Commission and the Commodity Futures Trading Commission. In 1990, he was appointed by President Bush a member of the American Battle Monuments Commission (ABMC). After serving four years, Mr. Rosenker received the Commission's highest honor, the ABMC Meritorious Service Medal.

A retired Major General in the Air Force Reserve, General Rosenker entered the Air Force in 1969 through the University of Maryland ROTC program. He is a graduate of the Air Command and Staff College and the Air War College.

During his 37 ½ -year Air Force career, General Rosenker received a number of awards and decorations, including the Air Force Distinguished Service Medal with One Oak Leaf Cluster and the Legion of Merit.



For his leadership role in recreational boating issues, the National Safe Boating Council presented Mr. Rosenker their highest honor, the Confluence Award. This is traditionally given only to Members of Congress, and Mr. Rosenker is one of the few representatives of the Executive Branch to be so honored.

Rosenker was the Board Member on scene for the Safety Board's investigations into the April 2004 derailment of Amtrak's City of New Orleans near Flora, Mississippi; the November 2004 crash of a charter jet aircraft in Houston, Texas (the plane was on its way to pick up former President George H.W. Bush for a flight to Latin America); the September 2005 derailment of a Metra commuter train in Chicago; the October 2005 capsizing of the passenger vessel Ethan Allen in Lake George, New York, which claimed 20 lives; the November 2005 grade crossing collision involving a Metra commuter train in Chicago; the December 2005 crash of a seaplane in Miami, Florida that killed all 20 persons aboard; and the November 2006 accident in Alexandria, Virginia where two track inspectors were killed when struck by a transit train. He also was part of the NTSB's Go Team for the June 2003 capsizing of the charter fishing vessel Taki-Too, near Garibaldi, Oregon, which took the lives of 11 of the 19 people aboard.



## **ROBERT L. SUMWALT VICE CHAIRMAN**

Robert L. Sumwalt was sworn as the 37th Member of the National Transportation Safety Board on August 21, 2006. His term of office will run until December 31, 2011. President Bush has also designated him as Vice Chairman of the Board for a two-year term.

Prior to coming to the Board, Mr. Sumwalt was Manager of Aviation for the SCANA Corporation, a Fortune 500 energy-based company.

Mr. Sumwalt was a pilot for 24 years with Piedmont Airlines and then US Airways, logging over 14,000 flight hours and earning type ratings in five aircraft before retiring from the airline in 2005. He has extensive experience as an airline captain, airline check airman, instructor pilot and air safety representative.

Mr. Sumwalt worked on special assignment to the US Airways Flight Safety Department from 1997 to 2004, where he was involved in the development of numerous airline safety programs, including an enhanced crew awareness program and a windshear training program. From 2002 to 2004, he served on the US Airways Flight Operations Quality Assurance (FOQA) Monitoring Team.

Mr. Sumwalt served as a member of Air Line Pilots Association's (ALPA) Accident Investigation Board from 2002 to 2004, and also worked with ALPA's Aviation Weather Committee on improving the quality of weather products available to pilots. He has chaired ALPA's Human Factors and Training Group and was a co-founder of that organization's Critical Incident Response Program, which provides guidance to airline personnel involved in traumatic events such as accidents.

A trained accident investigator, Mr. Sumwalt participated in several NTSB investigations including the crash of USAir flight 427 in 1994 near Aliquippa PA, and USAir flight 861 near Birmingham Alabama in 1998. He also participated in the Transportation Safety Board of Canada's investigation of the accident involving Swissair flight 111 off the coast of Nova Scotia in 1998.

From 1991 to 1999, Mr. Sumwalt conducted aviation safety research as a consultant to NASA's Aviation Safety Reporting System, studying various issues including flight crew performance and air carrier de-icing and anti-icing problems.

Mr. Sumwalt has written extensively on aviation safety matters and has published over 85 articles and papers in aviation trade publications. He has broad experience in writing aircraft operations manuals and airline and corporate aviation policy and procedure guidelines. He has been a regular contributor to Professional Pilot magazine.

In 2003, Mr. Sumwalt joined the faculty of the University of Southern California's Aviation Safety and Security Program, where he was the primary human factors instructor.

In recognition of his contributions to the aviation industry, Mr. Sumwalt received the Flight Safety Foundation's Laura Taber Barbour Award in 2003 and ALPA's Air Safety Award in 2004.

Since joining the Board, the Vice Chairman has served as the Member on-scene for the October 20, 2006 derailment of a Norfolk Southern train in New Brighton, Pennsylvania. Twenty-three tank cars carrying ethanol, a hazardous substance, derailed. Ethanol released from the cars ignited and burned for several days. Shortly after his arrival at the Board, Vice Chairman Sumwalt accompanied the NTSB Go-Team to Lexington, Kentucky for the on-site investigation of the August 2006 crash of Comair flight 5191.

Mr. Sumwalt is a graduate of the University of South Carolina.



## DEBORAH A. P. HERSMAN MEMBER

Deborah A. P. Hersman was sworn in as the 35th Member of the National Transportation Safety Board on June 21, 2004.

Since her appointment to the Board, Member Hersman has been the Member on scene at seven major transportation accidents; most recently, the October 11, 2006 crash of a private aircraft into an apartment building in New York City. She was member on scene at the August 27, 2006 crash of a commercial aircraft operated by Comair at Lexington, Kentucky, in which 49 passengers and crewmembers lost

their lives. She also was the Member on scene at the July, 2005 head-on collision of two Canadian National Railway freight trains at Anding, Mississippi; the April, 2005 collision of an Arlington County school bus with a trash truck in Arlington, Virginia; the February, 2005 crash of an aircraft operated by Platinum Jet Management into an airport warehouse at Teterboro, New Jersey; the January, 2005 Norfolk Southern Railway freight train collision and subsequent hazardous material release in Graniteville, South Carolina; and the November, 2004 collision of two Washington Metro trains at the Woodley Park Station in Washington, D.C. Member Hersman also participated in the on-scene investigation of the crash of an aircraft operated by Pinnacle Airlines in Jefferson City, Missouri, in October, 2004.

Member Hersman has chaired a number of public events hosted by the Board. In September 2006, she chaired a two-day public forum on motorcycle safety. In July 2006, she chaired a two-day public hearing investigating the February 2006 fire on board UPS Airlines flight 1307. She also chaired a three-day public hearing in June 2005, on the Pinnacle Airlines crash.

Member Hersman is a certified Child Passenger Safety Technician. She holds a commercial drivers license with passenger, school bus, and air brake endorsements. She successfully completed a motorcycle basic rider course and holds a motorcycle endorsement.

Before joining the Board, Member Hersman was a Senior Professional Staff Member of the U.S. Senate Committee on Commerce, Science and Transportation from 1999 to 2004 where she was responsible for the legislative agenda, oversight and policy initiatives for surface transportation issues, including economic and safety regulation of railroads, truck and bus safety, pipeline safety, and hazardous materials transportation safety. She worked extensively on the Motor Carrier Safety Improvement Act of 1999, the Pipeline Safety Improvement Act of 2002, the Transportation Equity Act of the 21st Century, the Amtrak Reform and Accountability Act, and numerous transportation safety and security measures.

Prior to her appointment to the Senate Commerce Committee staff, she served as Staff Director and Senior Legislative Aide to Congressman Bob Wise of West Virginia from 1992 to 1999.

Member Hersman earned Bachelor of Arts degrees in Political Science and International Studies from Virginia Tech in Blacksburg, Virginia, in 1992, and a Master of Science degree in Conflict Analysis and Resolution from George Mason University in Fairfax, Virginia, in 1999. She is married and is the mother of three sons.

Member Hersman's term expires December 31, 2008.



## KATHRYN O'LEARY HIGGINS

### Member

Kathryn O'Leary Higgins was sworn in as the 36th Member of the National Transportation Safety Board on January 3, 2006.

Ms. Higgins brings 36 years of experience in the public and private sectors to her new appointment. She was most recently employed as President and CEO of TATC Consulting and was Vice President for Public Policy at the National Trust for Historic Preservation from May 1999 to January 2004.

Member Higgins served as Deputy Secretary of the U.S. Department of Labor (July 1997-May 1999), Acting Chair of the National Endowment for the Arts, and Vice Chair of the Presidential Commission on U.S. Coast Guard Roles and Missions.

Ms. Higgins served in the White House (February 1995 – July 1997) as Assistant to the President and Secretary to the Cabinet. In that capacity she worked closely with the NTSB, DOT, FAA, and Coast Guard on a number of matters, including the 1996 ValuJet 597 and TWA 800 accidents, formulation and implementation of hazardous materials regulations, increasing inspector staffing, FAA reauthorization, and creation of the NTSB Office of Family Assistance. She was awarded distinguished service medals by the FAA and Coast Guard for her work.

Ms. Higgins served as Chief of Staff to the Secretary of Labor (January 1993-February 1995), Chief of Staff to Congressman Sander Levin (January 1986 – January 1993), and Senior Legislative Associate and Minority Staff Director with the U.S. Senate Labor and Human Resources Committee (January 1981 –January 1986).

Member Higgins was with the White House Domestic Policy Council, serving as Assistant Director for Employment Policy (May 1978 –January 1981). She began her career in 1969 as a Manpower Specialist with the Employment and Training Administration, U.S. Department of Labor.

Ms. Higgins came to Washington from Yankton, South Dakota and earned a Bachelor of Science degree from the University of Nebraska. She was married to the late William J. Higgins and is the mother of two sons, Liam and Kevan.

Ms. Higgins' term expires December 31, 2009.



## **STEVEN R. CHEALANDER**

### **Member**

Steven R. Chealander was sworn in as the 38th Member of the National Transportation Safety Board of the National Transportation Safety Board on January 3, 2007.

Mr. Chealander brings a wealth of both civilian and military aviation experience to the NTSB. Prior to joining the Board, he was with American Airlines, serving since 1991 as a pilot and Captain qualified on the DC-10, B-737, MD-80, and F-100 aircraft, and as a Chief Pilot in Los Angeles. At American, he also was a flight safety manager, performing

safety and compliance audits and participating in investigations, and was most recently the Manager of Flight Operations Efficiency.

From 1964 to 1991, Mr. Chealander served in the U.S. Air Force, with tours of duty in Vietnam and Spain. An F-4 pilot and instructor pilot, and then a USAF Aggressor Pilot, Mr. Chealander was selected in 1981 to be a member of the USAF Air Demonstration Squadron, the Thunderbirds. He flew with the team until 1985, when he was assigned as a staff officer at Tactical Air Command Headquarters at Langley AFB, VA.

In 1986, Mr. Chealander was selected as Military Aide to President Ronald Reagan. In this capacity, he performed a variety of ceremonial and emergency preparedness duties, including custody of the President's emergency briefcase, "the football."

Subsequently, Mr. Chealander commanded an F-5 tactical fighter squadron at Williams AFB, AZ (1988-89), an F-16 squadron at Luke AFB, AZ (1989-91), and then was appointed Assistant Deputy Commander for Operations for the F-16 tactical fighter wing at Luke AFB. He retired from the Air Force in 1991 with the rank of Lt. Colonel.

Mr. Chealander received a B.S. degree in Business Administration from the University of Southern California and did graduate studies at the University of Utah. He is married and the father of two daughters.

Mr. Chealander's term as an NTSB Member expires on December 31, 2007.