*Testimony of*

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*— On —*

# The State of Airline Safety: Federal Oversight of Commercial Aviation

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NTSB | National Transportation Safety Board

*An Independent Federal Agency*

Good afternoon, Chairman Cruz, Ranking Member Sinema, and the Members of the Subcommittee. Thank you for inviting the National Transportation Safety Board (NTSB) to testify before you today.

The NTSB is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in other modes of transportation—highway, rail, marine, and pipeline. We determine the probable cause of the accidents we investigate, and we issue safety recommendations aimed at preventing future accidents. In addition, we conduct special transportation safety studies and special investigations and coordinate the resources of the federal government and other organizations to assist victims and their family members who have been impacted by major transportation disasters.

Our Office of Aviation Safety investigates all civil domestic air carrier, commuter, and air taxi accidents; general aviation accidents; and certain public-use aircraft accidents, amounting to approximately 1,400 investigations annually. We also participate in the investigation of major airline accidents in foreign countries that involve US carriers, US-manufactured or -designed equipment, or US-registered aircraft.

This testimony will provide information regarding our role in international investigations and our current participation in both recent accidents involving Boeing 737 MAX 8 (MAX 8) aircraft in Indonesia and Ethiopia. I will also address the state of aviation safety from the NTSB's perspective based on our investigations, including a description of safety issues we have identified and recommendations we have made, as well as a description of the work we are doing with emerging transportation technologies in aviation.

**Foreign Investigations of Boeing 737-MAX 8 Crashes**

The NTSB participates in the investigation of aviation accidents and serious incidents outside the United States in accordance with the Chicago Convention of the International Civil Aviation Organization (ICAO) and the Standards and Recommended Practices (SARPS) provided in Annex 13 to the Convention.[1] If an accident or serious incident occurs in a foreign state involving a civil aircraft of US Registry, a US operator, or an aircraft of US design or US manufacture, where the foreign state is a signatory to the ICAO Convention, that state is responsible for the investigation and controls the release of all information regarding the investigation.

In accordance with the ICAO Annex 13 SARPS, upon receipt of a formal notification of the accident or serious incident that may involve significant issues, the NTSB may designate a US Accredited Representative and appoint advisors to carry out the obligations, receive the investigative information and updates in accordance with the Annex, provide consultation, and receive safety recommendations from the state of occurrence. The advisors may include NTSB investigators with subject matter expertise, as well as others from US manufacturers, operators, and the Federal Aviation Administration (FAA).

[1] ICAO is a UN specialized agency, which manages the administration and governance of the Convention on International Civil Aviation (Chicago Convention), (https://www.icao.int/about-icao/Pages/default.aspx).

The key objectives of our participation in international aviation accident investigations are to:

- Identify safety deficiencies affecting US aviation interests;
- Capture safety lessons learned to prevent accidents in the US; and
- Enable credible and comprehensive accident investigations where US interests are concerned.

Given the international nature of air transportation and the leading role the United States plays in developing aviation technologies, our participation in foreign investigations is essential to enhancing aviation safety worldwide. In 2018, we appointed Accredited Representatives to 324 international investigations and traveled to support work on 17 of these investigations.[2]

On October 29, 2018, a MAX 8, operated by Lion Air, crashed into the Java Sea shortly after takeoff from Soekamo-Hatta International Airport, in Jakarta, Indonesia. All 189 passengers and crew on board died. The National Transportation Safety Committee of Indonesia is leading the investigation and released a preliminary report on November 27, 2018.[3] On March 10, 2019, a MAX 8, operated by Ethiopian Airlines, crashed after takeoff from Addis Ababa Bole International Airport in Ethiopia. All 157 passengers and crew, including 8 American citizens, died. The investigation is being led by the Ethiopia Accident Investigation Bureau.

Because the MAX 8 was designed and manufactured in the US, in accordance with ICAO Annex 13, the US has a right to participate in both of these investigations. Accordingly, the NTSB appointed Accredited Representatives to assist both of the ongoing foreign investigations involving MAX 8 aircraft.

Following last year's Lion Air crash, the NTSB immediately dispatched investigators to Indonesia to participate in the Indonesian government's investigation. During the search for the critical "black boxes" – flight data recorder (FDR) and cockpit voice recorder (CVR) – an NTSB investigator was stationed onboard one of the search vessels. Once the CVR was recovered on January 14, 2019, NTSB recalled four investigators from furlough due to the partial government shutdown to assist with proper transcription of that recorder's content.[4]

In response to the Ethiopian Airlines crash, the NTSB also appointed an Accredited Representative, and dispatched him with a team of investigators to Ethiopia. Furthermore, we sent recorder, flight crew operations and human factors investigators to France once the recorders were

[2] There were 202 accidents in 2018 where the NTSB appointed an Accredited Representative, 97 incidents, and 25 other safety-related occurrences. NTSB traveled in support of 8 of these accidents, 8 incidents, and one safety-related occurrence.

[3] National Transportation Safety Committee of Indonesia, Preliminary Report No. KNKT.18.10.35.04.

[4] Due to lapse of appropriations from December 22, 2018, through January 25, 2019, the NTSB furloughed all investigative staff. In accordance with provisions of the Anti-Deficiency Act (including sections 1341(a)(1)(B) and 1342 of Title 31, United States Code), allowable agency functions were limited to those where "failure to perform those functions would result in an imminent threat to the safety of human life or the protection of property." Due to the potential safety issues associated with the Lion Air crash, the NTSB responded by recalling from furlough four investigative staff to participate in the CVR readout.

sent to the Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile (BEA) for download and readout.

Also in accordance with ICAO Annex 13, technical advisors from the FAA, Boeing, and General Electric have accompanied NTSB investigators to the Lion Air and Ethiopian Air accident sites to provide their specialized technical knowledge regarding the aircraft and its systems.

Although the NTSB is actively involved in these investigations, ICAO Annex 13 requires that, as the states of occurrence, Indonesia and Ethiopia are responsible for their respective investigations. As such, they control the release of all investigative information related to those accidents. Although the state of occurrence is responsible for leading the investigation, NTSB participation in foreign accident investigations enables safety deficiencies to be promptly addressed by the FAA, the manufacturer, or the operator, as well as through NTSB safety recommendations when necessary. As the state of design and certification of the aircraft involved in these accidents, we are examining the US design certification process to ensure any deficiencies are captured and addressed, potentially up to and including NTSB safety recommendations.

**Commercial Aviation Safety in the United States**

For the last decade, the US aviation system has experienced a record level of safety, and an overall decline in the number of US-registered civil aviation accidents.[5] Aviation deaths in the United States decreased from 412 in 2016 to 350 in 2017. Nearly 94 percent of aviation fatalities (330 instances in 2017) occur in general aviation accidents, with the remainder primarily in Title 14 *Code of Federal Regulations (CFR)* Part 135 operations, which includes charters, air taxis, and air medical services flights. Until 2018, there had been no passenger fatalities as a result of accidents involving US air carriers operating under the provisions of 14 *CFR* Part 121 since the crash of Colgan Air flight 3407 in 2009.[6] Over the last several decades, significant advances in technology, important legislative and regulatory changes, and more comprehensive crew training have contributed to the current level of aviation safety. Following the Colgan Air crash, in 2010 Congress required FAA to make substantive regulatory changes addressing airline pilot fatigue, as well as airline pilot qualifications; FAA pilot records; airline flight crew and dispatcher training; FAA oversight and surveillance of air carriers; pilot mentoring, professional development and leadership; and flight crewmember pairing and crew resource management techniques.[7] There are still provisions related to NTSB recommendations from our investigation of flight 3407 that have not been implemented, such as the creation of a pilot training records database. We continue to see accidents and incidents that remind us of the need to be ever-vigilant in improving safety.

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[5] National Transportation Safety Board, 2017 preliminary aviation statistics. Accident data for calendar year 2018 are still being validated and have not yet been released.

[6] National Transportation Safety Board, *Loss of Control on Approach, Colgan Air, Inc., Operating as Continental Connection Flight 3407, Bombardier DHC 8 400, N200WQ*, Rpt. No. AAR-10/01 (Washington, DC: NTSB, 2012). In 2013, there were two fatal accidents involving nonscheduled cargo flights operating under Part 121—National Air Cargo crash after takeoff at Bagram Air Base, Afghanistan, and United Parcel Service flight 1354 crash during approach in Birmingham, Alabama.

[7] The Airline Safety and Federal Aviation Administration Extension Act of 2010 (Pub. L. 111-216). Congressional Research Service, *Federal Civil Aviation Programs: In Brief*, R42781.

Most Wanted List - Improve the Safety of Part 135 Aircraft Flight Operations

On February 4, 2019, we announced our Most Wanted List of Transportation Safety Improvements for 2019–2020.[8] This list identifies 10 focus areas for transportation safety improvements based on safety issues identified through our investigations. Many of the issues on the Most Wanted List address multimodal challenges for improving safety, including many that have been identified in some of our aviation accident investigations, such as alcohol and other drug impairment, distraction, occupant protection, fatigue, medical fitness, and safe shipment of hazardous materials. One issue area is specific to aviation: improving the safety of Part 135 aircraft flight operations.

Regardless of the purpose of the flight or the type of aircraft, all passenger-carrying flights should be safe. However, currently, air medical service, air taxi, charter, and on-demand operators are not required to meet some of the same safety requirements as commercial airline operators. On March 12, 2019, the NTSB issued three new safety recommendations and reiterated six previous safety recommendations to the FAA as a result of the investigation of an accident that occurred on May 15, 2017, in Teterboro, New Jersey.[9] In this accident, a Learjet 35A, operated by a Part 135 operator, departed controlled flight while on a circling approach to Teterboro Airport, and impacted a commercial building and parking lot. The pilot-in-command and the second-in-command died; there were no passengers on the aircraft and no one on the ground was injured. While the aircraft was operating as a Part 91 positioning flight at the time of the accident, the accident raised concerns about the safety of Part 135 operations and the need for effective flight data monitoring (FDM) programs, safety management systems (SMS), procedures to identify pilots who do not comply with standard operating procedures, programs to address pilots with performance deficiencies, and the need for enhanced guidance for crew resource management training and leadership training for upgrading captains.

The safety issues identified in the Teterboro accident were not new; the NTSB previously identified these issues and made recommendations to address FDM equipment and programs and SMS as a result of the investigation of the November 10, 2015, crash of Execuflight flight 1526 in Akron, Ohio.[10] The recommendations were reiterated following the October 26, 2016, crash of Ravn Connect flight 3153 in Togiak, Alaska, and we have again reiterated these important recommendations.[11] A list of the safety recommendations we have made regarding these operations is appended to this testimony. Implementation of these and other recommendations could prevent or mitigate many of the Part 135 crashes that the NTSB investigates, and that is why improving the safety of Part 135 aircraft operations is included on the Most Wanted List.

[8] National Transportation Safety Board, *2019–2020 Most Wanted List*.
[9] National Transportation Safety Board, *Departure From Controlled Flight, Trans-Pacific Air Charter, LLC, Learjet 35A, N452DA, Teterboro, New Jersey (Abstract)*, Rpt. No. AAR-19/02 (Washington, DC: NTSB, 2019)
[10] National Transportation Safety Board, *Crash During Nonprecision Instrument Approach to Landing, Execuflight Flight 1526, British Aerospace HS 125-700A, N237WR*, Rpt. No. AAR 16/02 (Washington, DC: NTSB 2016).
[11] National Transportation Safety Board, *Collision with Terrain, Hageland Aviation Services, Inc., dba Ravn Connect Flight 3153, Cessna 208B, N208SD*, Rpt. No. AAR 18/02 (Washington, DC: NTSB 2018).

Most Wanted List - Reduce Fatigue-Related Accidents

Fatigue is a pervasive problem in transportation that degrades a person's ability to stay awake, alert, and attentive to the demands of safely controlling a vehicle, vessel, aircraft, or train. By including "Reduce Fatigue-Related Accidents" on our Most Wanted List, we are calling for a comprehensive approach to combatting fatigue in transportation, focusing on research, education, and training; technology; sleep disorder treatment; hours-of-service regulations; and on- and off-duty scheduling policies and practices.

Over the last 20 years, NTSB has investigated many air carrier accidents involving fatigued flight crews, including Colgan Air flight 3407. As a result of that investigation, we recommended that the FAA require operators to address fatigue risks associated with commuting.[12] The FAA's final rule for Fatigue Risk Management Plans for Part 121 Air Carriers did not address this recommendation. In 2006, we issued a safety recommendation to the FAA as a result of our investigation of the October 19, 2004 aviation crash in Kirksville, Missouri, to "Modify and simplify the flight crew hours-of-service regulations to take into consideration factors such as length of duty day, starting time, workload and other factors shown by recent research, scientific evidence, and current industry experience to affect crew alertness."[13] On January 4, 2012, the FAA published a final rule which prescribed new flight- and duty-time regulations for all flight crewmembers and certificate holders conducting passenger operations under Part 121, but excluded operators who conduct cargo operations.[14] The NTSB disagrees with this exclusion, as many of the fatigue-related accidents that we have investigated over the years involved cargo operators. We also believe that, because of the time of day that cargo operations typically occur, such operations are in greater need of these requirements. The NTSB believes that the FAA should include all Part 121, including cargo operations, under these requirements.

Current Part 121 Investigations

The NTSB is currently investigating two fatal accidents involving Part 121 operations.

*Southwest Flight 1380 Engine Failure – Philadelphia, Pennsylvania*

On April 17, 2018, Southwest Airlines flight 1380, a Boeing 737-700, experienced a failure of the left engine after departing New York's LaGuardia Airport.[15] A fan blade in the left engine failed, which resulted in the loss of the engine inlet and cowling. Fragments from the cowling and engine inlet struck the fuselage and a window, causing a rapid depressurization. The crew conducted an emergency descent and diverted to Philadelphia International Airport. There were 144 passengers and five crewmembers onboard. One passenger was fatally injured and eight passengers had minor injuries.

[12] National Transportation Safety Board, Safety Recommendation A-10-016.
[13] National Transportation Safety Board, *Collision with Trees and Crash Short of the Runway, Corporate Airlines Flight 5966 BAE Systems BAE-J3201, N875JX Kirksville, Missouri*, Rpt. No. AAR-06/01 (Washington, DC: NTSB, 2006. Safety Recommendation A-06-010.
[14] Federal Aviation Administration, *Flightcrew Member Duty and Rest Requirements*, 14 CFR Parts 117, 119, and 121.
[15] National Transportation Safety Board, Southwest Airlines Engine Accident.

On November 14, 2018, the NTSB held an investigative hearing to obtain more information regarding the engine fan blade design and development history, engine fan blade inspection methods and procedures, and engine fan blade containment design and certification criteria.[16] The investigation into this accident is ongoing.

*Atlas Air Flight 3591 Crash – Baytown, Texas*

On February 23, 2019, Atlas Air flight 3591, a Boeing 767-375BCF, entered a rapid descent from 6,000 feet and crashed into Trinity Bay, about 40 miles southeast of its intended destination, George Bush Intercontinental Airport, in Houston, Texas.[17] The two pilots and one nonrevenue jumpseat pilot were killed, and the airplane was highly fragmented after impact. The flight was being operated as a Part 121 domestic cargo flight, which originated from Miami International Airport.

Based on data from the cockpit voice recorder, the flight data recorder, radar data, and other sources, the flight was normal from Miami to the Houston terminal area. As the flight approached Houston, the pilots were advised of an area of light to heavy precipitation along the flight route and that they could expect vectors around the weather. About one minute before the crash, data indicated some small vertical accelerations during descent. Shortly after, the engine thrust increased to maximum thrust, and the airplane pitched nose up. The airplane then pitched nose down over the next 18 seconds in response to nose-down elevator deflection. The stall warning (stick shaker) did not activate. Data indicated that the airplane entered a rapid descent, reaching an airspeed of about 430 knots. A security camera video captured the airplane in a steep, generally wings-level attitude until impact with the bay. The investigation into this accident is ongoing.

## Emerging Transportation Technologies

Advances in technology are transforming transportation and hold promise for improving transportation safety, but they also pose new challenges. Among those advancing technologies are commercial space transportation and unmanned aircraft systems (UASs).

### Commercial Space

We have been involved in commercial space accident investigations for over 25 years, since leading the investigation of a procedural anomaly associated with the launch of an Orbital Sciences Corporation Pegasus expendable launch vehicle in 1993.[18] Most recently, we led the investigation of the fatal in-flight breakup of SpaceShipTwo in October 2014.[19] Foremost among the safety issues identified in the 2014 accident was the need to consider and protect against human error for safe manned spaceflight, which is the responsibility of designers, operators, and

[16] National Transportation Safety Board, Investigative Hearing: CFM International engine failure on Southwest Airlines flight 1380.
[17] National Transportation Safety Board, Atlas Air #3591 crashed into Trinity Bay.
[18] National Transportation Safety Board, *Commercial Space Launch Incident, Launch Procedure Anomaly, Orbital Sciences Corporation, Pegaus/SCD-1*, Rpt. No. SIR 93/02 (Washington, DC: NTSB 1993).
[19] National Transportation Safety Board. *In-Flight Breakup During Test Flight, Scaled Composites SpaceShipTwo, N339SS, Near Koehn Dry Lake, California, October 31, 2014*, Rpt. No. AAR 15/02 (Washington, DC: NTSB 2015).

regulators. We made recommendations to the FAA and the commercial spaceflight industry to establish human factors guidance for commercial space operators and to strengthen the FAA's evaluation process for experimental permit applications by promoting stronger collaboration between FAA technical staff and commercial space vehicle operators.

Our work in commercial space transportation supports our broader mission of improving transportation safety through investigating accidents and serious incidents, collaborating with others to conduct outreach and education related to commercial space vehicles, and developing and disseminating accident investigation techniques in commercial space within the international community. To develop and maintain the necessary investigative expertise and tools in this emerging segment of transportation, we are focused on training for NTSB staff and continuing outreach with commercial space stakeholders.

Unmanned Aircraft Systems

The growing number of UASs and reports of near-collisions with manned aircraft have raised safety concerns regarding UAS integration into the national airspace system. In August 2010, we revised our 14 *CFR* Part 830 regulations to indicate that accident and incident notification requirements also apply to unmanned aircraft.[20] An advisory to operators was released in July 2016 clarifying the reporting requirements (i.e., if there is death or serious injury, the aircraft weighs more than 300 pounds and sustains substantial damage, or other specific serious incidents occur).[21]

On September 21, 2017, the pilot of a US Army UH-60 helicopter reported an in-flight collision with a small UAS just east of Midland Beach, Staten Island, New York. The helicopter sustained damage to its main rotor blade, window frame, and transmission deck. We determined that the probable cause of the incident was the failure of the UAS pilot to see and avoid the helicopter due to his intentional flight beyond visual line of sight. Contributing to the incident was the UAS pilot's incomplete knowledge of regulations and safe operating practices.[22] As the number and complexity of UAS operations continues to grow, it is inevitable that the number of NTSB UAS investigations will also increase.

We are also using UASs as an accident investigation tool in all modes. The NTSB appreciates this Committee's and Congress' support of a provision in our 2018 reauthorization that authorized the agency to acquire small UASs for investigative purposes.[23] UASs are rapidly becoming a standard tool in the domestic and international accident investigation community. Small UASs can be very rapidly deployed, which allows wreckage fields to be documented quickly and thoroughly when the accident area must be cleared expeditiously for safety or operational purposes. In addition, small UASs can access unique points of view useful to the investigator as well as areas otherwise inaccessible. Data collected is shared immediately, allowing investigators, managers, and support staff in distant locations instant access to accident site information in order to help focus the investigation on critical aspects of the accident.

[20] 49 CFR § 830.2 (2010).
[21] National Transportation Safety Board, *Advisory to Operators of Civil Unmanned Aircraft Systems in the United States*, July 29, 2016.
[22] National Transportation Safety Board, Inflight collision of UAS and helicopter, Staten Island, NY.
[23] 49 USC § 1113(b)(1)(J) (2018).

## Conclusion

Thank you again for the opportunity to be here today to discuss the work that the NTSB is doing to make transportation safer. I will be happy to answer any questions.

**A-10-029 Open—Acceptable Alternate Response TO THE FEDERAL AVIATION ADMINISTRATION:** Require Title 14 Code of Federal Regulations Part 121, 135, and 91K operators to (1) routinely download and analyze all available sources of safety information, as part of their flight operational quality assurance program, to identify deviations from established norms and procedures; (2) provide appropriate protections to ensure the confidentiality of the deidentified aggregate data; and (3) ensure that this information is used for safety-related and not punitive purposes.

**A-13-012 Open—Acceptable Response TO THE FEDERAL AVIATION ADMINISTRATION:** Require the installation of a crash-resistant flight recorder system on all newly manufactured turbine-powered, nonexperimental, nonrestricted-category aircraft that are not equipped with a flight data recorder and a cockpit voice recorder and are operating under Title 14 Code of Federal Regulations Parts 91, 121, or 135. The crash-resistant flight recorder system should record cockpit audio and images with a view of the cockpit environment to include as much of the outside view as possible, and parametric data per aircraft and system installation, all as specified in Technical Standard Order C197, "Information Collection and Monitoring Systems."

**A-13-013 Open—Acceptable Response TO THE FEDERAL AVIATION ADMINISTRATION:** Require all existing turbine-powered, nonexperimental, nonrestricted-category aircraft that are not equipped with a flight data recorder or cockpit voice recorder and are operating under Title 14 Code of Federal Regulations Parts 91, 121, or 135 to be retrofitted with a crash-resistant flight recorder system. The crash-resistant flight recorder system should record cockpit audio and images with a view of the cockpit environment to include as much of the outside view as possible, and parametric data per aircraft and system installation, all as specified in Technical Standard Order C197, "Information Collection and Monitoring Systems."

**A-15-007 Open—Unacceptable Response TO THE FEDERAL AVIATION ADMINISTRATION:** Require that all existing aircraft operated under Title 14 Code of Federal Regulations (CFR) Part 121 or 135 and currently required to have a cockpit voice recorder and a flight data recorder be retrofitted with a crash-protected cockpit image recording system compliant with Technical Standard Order TSOC176a, "Cockpit Image Recorder Equipment," TSO-C176a or equivalent. The cockpit image recorder should be equipped with an independent power source consistent with that required for cockpit voice recorders in 14 CFR 25.1457.

**A-15-008 Open—Unacceptable Response TO THE FEDERAL AVIATION ADMINISTRATION:** Require that all newly manufactured aircraft operated under Title 14 Code of Federal Regulations (CFR) Part 121 or 135 and required to have a cockpit voice recorder and a flight data recorder also be equipped with a crash-protected cockpit image recording system compliant with Technical Standard Order TSO-C176a, "Cockpit Image Recorder Equipment," or equivalent. The cockpit image recorder should be equipped with an independent power source consistent with that required for cockpit voice recorders in 14 CFR 25.1457.

**A-16-034 Open—Acceptable Response TO THE FEDERAL AVIATION ADMINISTRATION:** Require all Title 14 Code of Federal Regulations Part 135 operators to install flight data recording devices capable of supporting a flight data monitoring program.

**Appendix to NTSB Chairman Sumwalt's Testimony Concerning Commercial Aviation Safety - Recommendations to Improve the Safety of Part 135 Aircraft Flight Operations**

**A-16-035 Open—Acceptable Alternate Response TO THE FEDERAL AVIATION ADMINISTRATION:** After the action in Safety Recommendation A-16-34 is completed, require all Title 14 Code of Federal Regulations Part 135 operators to establish a structured flight data monitoring program that reviews all available data sources to identify deviations from established norms and procedures and other potential safety issues.

**A-16-036 Open—Acceptable Response TO THE FEDERAL AVIATION ADMINISTRATION:** Require all Title 14 Code of Federal Regulations Part 135 operators to establish safety management system programs.

**A-17-035 Open—Acceptable Response TO THE FEDERAL AVIATION ADMINISTRATION:** Implement ways to provide effective terrain awareness and warning system (TAWS) protections while mitigating nuisance alerts for single-engine airplanes operated under Title 14 Code of Federal Regulations Part 135 that frequently operate at altitudes below their respective TAWS class design alerting threshold.

**A-17-038 Open—Acceptable Response TO THE FEDERAL AVIATION ADMINISTRATION:** Expand the application of Federal Aviation Administration Order 8900.1, volume 3, chapter 19, section 6, "Safety Assurance System: Flight Training Curriculum Segments," paragraphs 3-1251(B) and 3-1252, which address controlled flight into terrain-avoidance training programs for Title 14 Code of Federal Regulations (CFR) Part 135 helicopter operations, to all 14 CFR Part 135 operations.

**A-18-013 Open—Acceptable Response TO THE FEDERAL AVIATION ADMINISTRATION:** Although controlled flight into terrain (CFIT)-avoidance training programs are not required by federal regulation for Title 14 Code of Federal Regulations Part 135 fixed-wing operations, work with Part 135 operators in Alaska to improve any voluntarily implemented training programs aimed at reducing the risk of CFIT accidents involving continuation of flight under visual flight rules (VFR) into instrument meteorological conditions, with special attention paid to the human factors issues identified in recent Alaska accident investigations, including, but not limited to, (1) the challenges of flying in mountainous terrain in Alaska and low-altitude VFR flight in an area subject to rapid changes in weather; and (2) limitations of the Alaska infrastructure, particularly weather observations, communications, and navigation aids.

**A-18-014 Open—Acceptable Response TO THE FEDERAL AVIATION ADMINISTRATION:** Work with Title 14 Code of Federal Regulations Part 135 certificate holders that operate under visual flight rules in the aircraft's required terrain awareness and warning system (TAWS) class to (1) ensure that management and pilots are aware of the risks associated with distraction (from continuous nuisance alerts) and complacency (brought about by routine use of the terrain inhibit feature); (2) develop plans for mitigating those risks and minimizing nuisance alerts; and (3) develop procedures that specifically address when pilots should test, inhibit, and uninhibit the TAWS alerts, considering the operator's typical operations and the TAWS manufacturer's guidance.

**Appendix to NTSB Chairman Sumwalt's Testimony Concerning Commercial Aviation Safety - Recommendations to Improve the Safety of Part 135 Aircraft Flight Operations**

**A-18-017 Open–-Await Response TO THE FEDERAL AVIATION ADMINISTRATION:** Ensure that Alaska airports that are served by Title 14 Code of Federal Regulations (CFR) Part 135 operators and have instrument approaches are equipped with weather-reporting capabilities to enable instrument flight rules operations in accordance with 14 CFR 135.225(a).

**A-19-007 Open–-Await Response TO THE FEDERAL AVIATION ADMINISTRATION:** Require all Title 14 *Code of Federal Regulations* Part 135 operators to establish programs for flight crewmembers who have demonstrated performance deficiencies or experienced failures during training and administer additional oversight and training to address and correct performance deficiencies.

**A-19-008 Open–-Await Response TO THE FEDERAL AVIATION ADMINISTRATION:** Develop guidance for Title 14 *Code of Federal Regulations* Part 135 operators to help them create and implement effective crew resource management training programs.