



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: February 27, 2007

In reply refer to: A-07-18 through -26

Honorable Marion C. Blakey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On September 24, 2004, about 1642 Hawaiian standard time,¹ a Bell 206B helicopter, N16849, registered to and operated by Bali Hai Helicopter Tours, Inc., of Hanapepe, Hawaii, impacted mountainous terrain in Kalaheo, Hawaii, on the island of Kauai, 8.4 miles northeast of Port Allen Airport in Hanapepe. The commercial pilot and the four passengers were killed, and the helicopter was destroyed by impact forces and postimpact fire. The nonstop sightseeing air tour flight was operated under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91² and visual flight rules (VFR) with no flight plan filed.³ Instrument meteorological conditions (IMC) prevailed near the accident site.⁴

The National Transportation Safety Board determined that the probable cause of this accident was the pilot's decision to continue flight under VFR into an area of turbulent, reduced visibility weather conditions, which resulted in the pilot's spatial disorientation and loss of control of the helicopter. Contributing to this accident was the pilot's inexperience in assessing local weather conditions, inadequate Federal Aviation Administration (FAA) surveillance of Special Federal Aviation Regulation (SFAR) 71 operating restrictions,⁵ and the operator's pilot-scheduling practices that likely had an adverse impact on pilot decision-making and performance.

¹ Hawaiian standard time is coordinated universal time minus 10 hours. Unless otherwise indicated, all times are Hawaiian standard time based on a 24-hour clock.

² According to Federal Aviation Regulations, 14 CFR Part 91 commercial air tour flights are authorized as long as they are conducted as "nonstop sightseeing operations in non-common carriage" in accordance with 14 CFR 119.1(e)(2) and 135.1(a)(5), which specify that the flights must begin and end at the same airport and must be conducted within a 25-statute-mile radius of that airport.

³ Personnel at the company office logged tour departure times and knew the usual tour routes, but they did not track the flights or perform flight-following services.

⁴ National Transportation Safety Board, *Weather Encounter and Subsequent Collision into Terrain, Bali Hai Helicopter Tours, Inc., Bell 206B, N16849, Kalaheo, Hawaii, September 24, 2004*, Aviation Accident Report NTSB/AAR-07/03 (Washington, DC: NTSB, 2007).

⁵ The minimum altitude for tour flights specified in SFAR 71 is 1,500 feet above ground level and no closer than 1,500 feet to any person or property, unless otherwise authorized.

Pilot's Inexperience with Local Weather Patterns

The accident pilot had been flying commercial air tours for Bali Hai on Kauai for less than 2 months. Nearly all of his previous flight experience had been gained as a military pilot with the Indian Air Force. Though the pilot was experienced in helicopter operations and claimed previous mountain and coastal flying experience, he had few flight hours as a commercial air tour pilot and had limited knowledge of Kauai's weather patterns. The pilot had no previous experience flying in Hawaii before he was hired by Bali Hai, and he began conducting tour flights after accruing just 6.7 hours of flight training from company personnel, none of which included specific training on Kauai weather.

Many experienced local air tour pilots interviewed after the accident stated that VFR helicopter operations on Kauai were unusually challenging because of the rugged terrain, mountain winds, and rapidly changing visibility and cloud conditions. They stated that these conditions rendered traditional sources of pilot weather information, such as automated reporting stations and flight service station briefings, not very useful and that this heightened the importance of a pilot's skill in visually assessing changes in weather conditions during tour flights. The experienced pilots indicated that a pilot's skill in assessing changing weather conditions and anticipating the effect of any changes on flying conditions was critical for effective decision-making. They stated that such skills improved as local flying experience increased. This raises concern about the impact of local inexperience on the safety of pilot decision-making. A review of the eight weather-related air tour accidents that have occurred in Hawaii since SFAR 71's implementation revealed that four of the accidents involved pilots, including the accident pilot, who had relatively low experience flying air tours in the Hawaii. In fact, three of the accidents involved pilots who had flown there for less than 2 months.

It is highly unlikely that the accident pilot would have decided to continue into the area of deteriorating weather conditions and attempted to cross in the vicinity of the accident site if he had accurately assessed the changing weather and had appreciated how it would likely affect flight visibility in those areas. Therefore, the pilot's decision to fly in the vicinity of the accident site indicates that he was unable to accurately assess how rapidly or to what extent the weather was deteriorating in that area. The pilot had previously told a passenger that he had flown through thin clouds during a ridge crossing because he could see through the clouds, thus, the pilot may have expected that this would be the case during the accident flight. However, at the time of the accident, visibility was instead dramatically reduced along the top of the ridge as the incoming line of weather reached the high terrain.

The Safety Board concludes that the pilot's inexperience with Hawaii weather conditions affected his ability to make appropriate in-flight decisions when faced with deteriorating weather. The Safety Board also concludes that other pilots who are inexperienced with Hawaii weather conditions may also be hindered in their ability to make appropriate in-flight decisions when faced with deteriorating weather. FAA-sponsored, human-factors research conducted by aviation psychologists suggests that cue-based training programs can improve pilots' weather-related decision-making during VFR flights.⁶ Therefore, the Safety Board further concludes that

⁶ M. Wiggins and D. O'Hare, "Weatherwise: Evaluation of a Cue-Based Training Approach for the Recognition of Deteriorating Weather Conditions During Flight," *Human Factors* (2003): 337-345.

cue-based training, tailored to the dynamic local island climate conditions of Hawaii, could provide an important safety benefit to pilots who are new to flying in the state.

There are currently no FAA guidance materials providing specialized training on the recognition of local weather cues that are critical for in-flight decision-making in the Hawaiian Islands. Therefore, the Safety Board believes that the FAA, in cooperation with Hawaii commercial air tour operators, aviation psychologists, and meteorologists, among others, should develop a cue-based training program for commercial air tour pilots in Hawaii that specifically addresses hazardous aspects of local weather phenomena and in-flight decision-making. The Safety Board also believes that, once a cue-based training program that specifically addresses hazardous aspects of local weather phenomena and weather-related, decision-making issues is developed (as requested in Safety Recommendation A-07-18), the FAA should require all commercial air tour operators in Hawaii to provide this training to newly hired pilots.

Bali Hai's Pilot-Scheduling Practices

Bali Hai's pilots remained at the helicopters' flight controls nearly continuously for up to 8 hours per day because of the company practice of keeping the helicopters running between tour flights. The pilots did not have scheduled breaks, and they ate lunch while sitting in the helicopter between tours, if at all. There was no shelter at Bali Hai's staging area, and there were no restroom facilities. The lack of scheduled breaks, the short turnaround times between flights, and the unavailability of private restroom facilities probably discouraged consumption of food and liquids during the workday because there was little opportunity to go to the bathroom. This increased the risk of dehydration and other physiological problems, which could have degraded performance.

These working conditions were also conducive to fatigue. Research on pilot fatigue in a noisy, vibrating helicopter simulator found considerable increases in subjective fatigue after 6 hours of short repetitive flights. At the end of this period, some helicopter pilots who participated in the study said they were so fatigued that they did not feel safe to fly a real helicopter. As subjective fatigue increased, study pilots demonstrated increasingly frequent "lapses" in performance. The study also found that routine, hourly rest breaks outside the cockpit reduced the buildup of pilot fatigue to manageable levels, even when flight periods were extended to 8 hours.⁷

The day of the accident was the pilot's second-longest day of flying since he began working for Bali Hai. By the time of the accident, he had been at the controls of the helicopter with the rotors turning for about 7.7 hours and had been observed to leave the cockpit briefly only once, about 1500. Passengers waiting to board the pilot's 1500 flight later described him as appearing fatigued at that time. This evidence suggests that the pilot was likely to have been fatigued during the accident flight.

Bali Hai operated under Part 91 and was, therefore, not subject to flight time, duty period, or rest requirements. However, the pilot's cumulative flight time of approximately 6.5 hours did not exceed single-pilot limitations specified under Part 135. Part 135 allows a maximum of

⁷ A.M. Stave, "The Effects of Cockpit Environment on Long-Term Pilot Performance," *Human Factors*, Vol. 19 (1977): 503-514.

8 hours of flight time per consecutive 24-hour period, with additional flight time permitted when the anticipated duty period will not exceed 14 hours and is preceded and followed by rest periods of at least 10 hours.

By comparison, U.S. Army flight regulations⁸ also recommend that helicopter pilot flight time be limited to 8 hours per 24-hour period. However, the Army has recognized the stresses associated with helicopter flying, and its regulations recommend that maximum flight times be reduced to 6.15 hours for day contour flight or low-level flight at or below 200 feet above ground level. Army regulations also contain a broader definition of flight time. Army regulations consider a pilot's flight time to begin when a helicopter lifts off the ground and ends when it lands and either its engines are stopped or the flight crew changes. The accident pilot's air tours included a combination of low-level ridge crossings and higher-altitude flying. Although not subject to Army regulations, depending on how this flying was classified, the accident pilot's cumulative time at the controls might have exceeded Army safety limitations.

It is difficult to evaluate the relative extent to which dehydration, unmet physiological needs, or fatigue might have contributed to the accident pilot's decision to continue flying into an area of deteriorating weather rather than deviate around the weather and risk a delayed return. However, it is likely that one or more of these factors was affecting the pilot at the time of the accident, any one of which would have negatively affected the pilot's concentration and decision-making. The Safety Board concludes that Bali Hai's pilot-scheduling practices, although permitted under Federal Aviation Regulations (FARs), likely had an adverse impact on pilot decision-making and performance. The Safety Board also concludes that existing FARs do not adequately address the pilot fatigue issues associated with the continuous, repetitive, high-frequency flight operations that are unique to commercial air tour helicopter operations. Therefore, the Safety Board believes that the FAA should establish operational practices for commercial air tour helicopter pilots that include rest breaks and that will ensure acceptable pilot performance and safety and require commercial air tour helicopter operators to adhere to these practices.

Honolulu Flight Standards District Office Staffing Issues

Staffing issues at the Honolulu Flight Standards District Office (FSDO) and their effect on safety have been subjects of Safety Board concern for years. In 1990, staffing deficiencies at the Honolulu FSDO, in particular, led the Board to conclude that "at least three accidents in the Hawaiian Islands might have been prevented if [Honolulu] FSDO-13 had personnel and guidance to maintain adequate surveillance of its assigned ... Part 135 operators." The Board subsequently issued Safety Recommendation A-90-136, which asked the FAA to "perform a special study of the adequacy of Flight Standards District Office staffing considering the availability of work hours, the geographic area of responsibility, and the size and complexity of the assigned operations." Five years later, Safety Recommendation A-95-61 was issued, asking the FAA to use data collected for air tour operations to provide adequate staffing at all FSDOs that have air tour operations in their geographic boundary.

⁸ Department of the Army. *Regulation 95-1: Aviation Flight Regulations* (Washington, DC: U.S. Army, 1997).

The FAA's actions in response to A-90-136 and A-95-61, which included plans for a means to identify needed adjustments to workforce distribution by option, specialty, and location, have resulted in these recommendations being classified "Closed—Acceptable Action" and "Closed—Acceptable Alternate Action," respectively. However, the continued staffing deficiencies at the Honolulu FSDO clearly show that the FAA has not effectively implemented its plans. At the time of the accident, the FSDO manager estimated the FSDO was about 10 inspectors short, but he stated that he was not authorized to hire any new inspectors because the Western-Pacific Region as a whole was overstaffed, and a hiring freeze was in effect for the region.⁹ FSDO inspectors reported they were time-constrained in performing even the minimum required oversight for their Part 135 operators – a problem the Safety Board noted in its recommendation some 15 years earlier.

Without FAA enforcement, repeated noncompliance with SFAR 71 and the certificates of waiver or authorization¹⁰ has persisted, some of which is likely unintentional. Interviews revealed that some Kauai air tour pilots differed in their understanding of their respective companies' existing approvals and incorrectly identified their authorized ridge-crossing altitudes. Thus, these pilots likely crossed ridgelines in some locations during tour flights at altitudes lower than what is permitted under SFAR 71 or their respective authorizations, and, without FAA surveillance and intervention, they likely believed that such practices were permissible and safe.

Because the FAA is not enforcing SFAR 71 and the deviation authorizations for all air tour operators, some pilots may be intentionally disregarding the rules with no consequences, thus, fostering hazardous in-flight decision-making practices and placing passenger safety at risk. For example, photographic evidence from the accident flight and passengers' descriptions of flight conditions during previous tours indicate that the accident pilot had repeatedly flown the helicopter into clouds and areas of highly degraded in-flight visibility. Moreover, a Safety Board investigation of another air tour accident on Kauai found that, in addition to that accident's pilot, two other air tour pilots also chose to enter areas of highly degraded in-flight visibility. Thus, the Safety Board concludes that, because the Honolulu FSDO is not providing direct surveillance and enforcement of SFAR 71, pilots continue to violate SFAR 71 and the certificate of waiver or authorization requirements, either intentionally or unintentionally, thus, placing themselves and their passengers at unnecessary risk for accidents, particularly in marginal weather conditions.

Between October 1995 and late 2003, the Honolulu FSDO's geographical surveillance unit (GSU), which consisted of dedicated inspectors with specialized surveillance equipment and methods, had been tasked to enforce SFAR 71 by monitoring all air tour operators, including those operating under Part 91. The GSU performed periodic, direct surveillance of the flight

⁹ According to the FSDO manager, he completed a 2004 staffing allocation model, and it indicated that the FSDO was 13 inspectors short. By September 2006, FSDO personnel reported that the total FSDO staffing level was similar to that at the time of the accident; however, due to retirements and transfers, fewer inspectors were dedicated to Part 121 oversight and five more inspectors, including the newly hired ones, were dedicated to Part 135 oversight. The newly hired inspectors were not expected to be fully trained and able to resume full responsibilities until the end of fiscal year 2007.

¹⁰ The Honolulu FSDO approved, on a case-by-case basis, certificates of waiver or authorization for operators to deviate below the SFAR 71 minimum altitude. To obtain a certificate of waiver or authorization, operators were required to demonstrate to the FAA that they would be able to provide a level of safety equivalent to that provided by operating at the higher altitude.

operations of air tour operators, and this resulted in the identification of a number of in-flight violations of SFAR 71 operating requirements. Before it was officially disbanded in May 2004, the GSU also performed some surveillance of Bali Hai that resulted in the correction of some discrepancies, but the GSU had not performed in-depth inspections of the company. Although FSDO personnel considered the GSU to be highly effective, the FSDO had to disband the GSU to reallocate the unit's personnel to fill operations and airworthiness inspector positions.

The Safety Board concludes that the FAA has not provided sufficient resources for the Honolulu FSDO to implement air tour surveillance. Such surveillance, in the months before the accident, may have detected and corrected the accident pilot's risky flying practices, such as low-altitude, off-route ridge crossings, and flight into clouds and reduced visibility. Therefore, the Safety Board believes that the FAA should develop a permanent mechanism to provide direct surveillance of commercial air tour operations in the State of Hawaii and to enforce commercial air tour regulations.

Air Tour Safety Meeting Requirements

In addition to the required FAA-administered initial and annual knowledge tests and checkrides, operators approved to deviate from SFAR 71 were required to ensure that their tour pilots participate in at least one formal air tour safety meeting annually. The FAA stated that the purpose of the safety meetings was to review SFAR 71 and sightseeing/air tour issues and procedures, and Bali Hai's owner stated that he believed that the meetings provided his pilots an opportunity to refresh their knowledge of SFAR 71 and the SFAR 71 deviation requirements.

Safety Board interviews with meeting attendees, however, revealed disparity between the intent of these meetings and the actual discussion topics and follow-up discussions that occurred. Although the Honolulu FSDO requires meeting attendance, it does not run the meetings or dictate the agenda. A FSDO inspector stated that some past meetings disintegrated rapidly into a complaint session or strayed into other topics.

As mentioned previously, many Kauai air tour pilots demonstrated a lack of understanding of their respective companies' minimum altitudes for ridge crossings. Improved refresher training may increase their knowledge of these issues. In addition, the annual safety meeting could be used to discuss pertinent safety issues, such as lessons learned, hazardous and/or consistent weather phenomena, and hazards related to site-specific areas, among other topics. Therefore, the Safety Board concludes that the annual SFAR 71 safety meetings have not been effective because the Honolulu FSDO has not ensured that the meetings are focused on safety trends and SFAR 71 procedures. Therefore, the Safety Board believes that the FAA should direct the Honolulu FSDO to ensure that the annual safety meetings, as required under approved certificates of waiver or authorization, focus on pertinent and timely commercial air tour safety issues, including, but not limited to, reviews of Hawaii air tour accidents, local weather phenomena, and SFAR 71 procedures.

Safety Impact of SFAR 71

In its 2003 notice of proposed rulemaking (NPRM),¹¹ “National Air Tour Safety Standards,” the FAA attributed a decrease in the number of air tour accidents in Hawaii to the issuance of SFAR 71. The FAA also stated that the benefits associated with minimum altitude, visibility, and cloud clearance requirements “can be attributed to: (1) Increased time available for the pilot to react in an emergency, (2) prevention of situations in which the pilot unexpectedly encounters IMC, and (3) avoidance of adverse weather conditions.”

Because of the current lack of an accurate, verifiable method of collecting and tracking flight-activity data for specific segments of nonscheduled Part 135 and Part 91 flight operations, the Safety Board concluded in a January 22, 2004, letter to the FAA about the NPRM, that, without the required safety and accident rate data, there is not a reliable basis for the FAA’s assertion that SFAR 71 has resulted in a decrease in air tour accidents.

Safety Board review of Hawaii air tour accident data for the 10-year periods before and after SFAR 71’s implementation showed that, although the total number of air tour accidents decreased after SFAR 71’s implementation, the proportion of weather-related accidents increased and was responsible for 31 of the 43 total fatalities that resulted from these accidents. Although the rising trend in weather-related accidents appears to support the Board’s concerns that SFAR 71 altitude restrictions may increase the potential for inadvertent encounters with cloud layers, the Board acknowledges that there is not enough data to determine its significance. Therefore, the Safety Board concludes that the safety impact of SFAR 71, in terms of a potential decrease in the Hawaii air tour accident rate or a potential increase in the rate of weather-related accidents, cannot be established with the current data. Therefore, the Safety Board believes that the FAA should reevaluate the altitude restrictions in the State of Hawaii to determine if they may have resulted in any unintended degradation of safety with regard to weather-related accidents and fatalities.

Need for National Air Tour Safety Standards

In its 1995 Special Investigation Report¹² of the safety of the air tour industry, the Safety Board was concerned that the provisions of Part 91 were inadequate to ensure sufficient FAA oversight of air tour companies to identify and correct important safety deficiencies that could expose the traveling public to unacceptable safety risks. To address this concern, the Board issued Safety Recommendation A-95-58, which asked the FAA to “develop and implement national standards by December 31, 1995, within 14 CFR Part 135, or equivalent regulations, for all air tour operators ... to bring them under one set of standards with operations specifications and eliminate the exception currently contained in 14 CFR Part 135.1.” This accident, involving a Part 91 air tour operator that carried a large number of passengers annually yet had numerous safety deficiencies and lacked FAA oversight, serves to illustrate the very scenario the Board’s recommendation sought to prevent.

¹¹ The NPRM, Docket No. FAA-1998-4521, Notice No. 03-10, was issued on October 22, 2003, in 68 *Federal Register*, 60572.

¹² National Transportation Safety Board, *Safety of the Air Tour Industry in the United States*, Special Investigation Report NTSB/SIR-95/01 (Washington, DC: NTSB, 1995).

The FAA shared the Safety Board's concerns. In its 2003 NPRM, the FAA recognized that Part 91 air tour operators do not have the equivalent safety measures that are implemented by Part 135 operators and that action was needed. The FAA also indicated that it agreed that the same safety standard should be applied to all commercial air tours, wherever they are conducted. In the NPRM, the FAA proposed to require that all commercial air tour operators be certificated under Part 135 or Part 121 and that Part 91 air tour operations be limited to infrequent, charitable events.

In response to the NPRM, however, the FAA received an overwhelming number of complaints from air tour operators that conducted business under Part 91, indicating that a number of businesses (such as single-aircraft, single-pilot operations) would go out of business if required to comply with Part 135 regulations. As a result, the FAA made substantial revisions to the proposed rule. The final rule, which was released February 8, 2007, still allows for Part 91 air tour operations under the 14 CFR 119.1(e)(2) and 135.1(a)(5) exception. However, these operators must also comply with the safety requirements of the new commercial air tour safety regulations defined in Part 136, Subpart A, and must also apply for, receive, and comply with a letter of authorization (LOA) from the FAA in accordance with 14 CFR 91.147. The LOA requirements include the operator's name; principal business address; principal place of business; the name of the person responsible for management; the name of the person responsible for aircraft maintenance; the make, model, and series of each aircraft; and the registration number of each aircraft.

Although the NPRM had proposed to place all commercial air tour operations under Part 135, the Safety Board acknowledges that Part 135 is an air taxi rule with which smaller air tour operators would have difficulties complying. Part 135 regulations were originally established for nonscheduled air taxi operations, which focused on the transport of passengers or cargo from one location to another, and these regulations specified restrictions and training requirements for additional issues that would not usually be associated with air tour operations, such as cargo handling, hazardous materials carriage, hazardous materials training program, and international operations.

In the final rule, the FAA effectively withdraws its proposal to place all air tours under Part 135, and the Safety Board agrees that, though a number of the regulations under Part 135 enhance safety when compared to the requirements for Part 91 operations, the additional and unrelated rules would burden the smaller air tour operators with additional training and operational requirements that do not necessarily relate to their daily operations. Additionally, there may be some requirements under Part 135 that may not be stringent enough for the air tour industry, such as flight time and duty period limitations. However, the Safety Board concludes that the public would benefit from air tour regulations that provide increased oversight and additional safety requirements for Part 91 air tour operators that carry large numbers of passengers annually, such as Bali Hai.

The Safety Board acknowledges that, although the final rule establishes some national air tour safety standards in the form of Part 136, Subpart A, the regulation still does not contain provisions that would prevent the types of deficiencies highlighted by this accident. Specifically, for Part 91 air tour operations, the new LOA and Part 136 requirements do not provide for mandatory FAA oversight. And, for all air tour operations, the final rule does not incorporate any

initial and recurrent pilot training programs that address local geography and meteorological hazards, and special airspace restrictions; maintenance policies and procedures; flight scheduling that fosters adequate breaks and flight periods; and operations specifications that address management, procedures, route specifications, and altitude restrictions, as necessary.

The Safety Board concludes that a regulation specific to commercial air tour operations would be more appropriate than an air taxi regulation, and it would allow the FAA inspectors responsible for air tour operators to focus on the daily safety requirements unique to those operations. Therefore, the Safety Board believes that the FAA should develop and enforce safety standards for all commercial air tour operations that include, at a minimum, initial and recurrent pilot training programs that address local geography and meteorological hazards and special airspace restrictions; maintenance policies and procedures; flight scheduling that fosters adequate breaks and flight periods (as established by the implementation of Safety Recommendation A-07-20); and operations specifications that address management, procedures, route specifications, and altitude restrictions, as necessary.

Implementing Automatic Dependent Surveillance-Broadcast in Hawaii

In 1998, the FAA developed an initiative for implementing the National Automatic Dependent Surveillance-Broadcast (ADS-B) Program to support the next-generation air transportation system. The program, which includes ground-based stations, satellites, and aircraft avionics, among other technologies, is designed to provide pilots with radarlike information in the cockpit and to enable air traffic controllers to monitor low-flying aircraft in those areas with limited or no radar coverage. According to a 2006 proposed schedule for deploying of ADS-B services nationwide, the FAA plans to install ADS-B infrastructure in the State of Hawaii by 2013.

During the Safety Board's investigation of the March 23, 2004, accident in which a Sikorsky S-76A++ helicopter crashed into the Gulf of Mexico after the flight crew failed to identify and arrest the helicopter's descent,¹³ the Safety Board concluded that ADS-B technology would help Gulf of Mexico aircraft operators mitigate the inherent risks associated with offshore operations by providing pilots with terrain, weather, and other flight information in the cockpit and dispatchers with current location information. On March 24, 2006, the Safety Board issued Safety Recommendation A-06-21,¹⁴ which asked the FAA to "ensure that the infrastructure for the National Automatic Dependent Surveillance-Broadcast Program in the Gulf of Mexico is operational by fiscal year 2010." In response, the FAA has indicated it has stepped up the implementation timeframe for the Gulf of Mexico.

The Safety Board commends the FAA for recognizing the safety benefits of ADS-B technology for oil industry operators in the Gulf of Mexico and for taking action in response to Safety Recommendation A-06-21 to advance the timeline for installing ADS-B system

¹³ National Transportation Safety Board, *Controlled Flight Into Terrain, Era Aviation, Sikorsky S-76A++, N579EH, Gulf of Mexico, About 70 Nautical Miles South-Southeast of Scholes International Airport, Galveston, Texas, March 23, 2004*, Aircraft Accident Report NTSB/AAR-06/02 (Washington, DC: NTSB, 2006).

¹⁴ On July 17, 2006, the Safety Board classified A-06-21, "Open—Response Received," after the FAA surveillance and broadcast services program manager provided a June 15, 2006, briefing on the ADS-B program to the Board Members and staff, which included a discussion of the progress of the program for the Gulf of Mexico.

infrastructure there by 2010. The Safety Board also notes that Hawaii's mountainous landscape, limited air traffic control radar coverage, challenging weather, and high-density air tour traffic make it a prime candidate for the National ADS-B Program.¹⁵ ADS-B will support avionics features that enable pilots to see the location, extent, and movement of weather systems, thus, improving pilot awareness and helping pilots make safer decisions in flight. For example, if the accident helicopter had been equipped with avionics capable of displaying ground-based, weather-radar information transmitted via ADS-B infrastructure, the pilot would have been able to see the full extent of the weather converging on the Kahili Ridge, and his decision to continue into the weather may have been different.

In addition to providing in-flight weather information to pilots, ADS-B also has the potential to reduce the risk of midair collisions, a concern commonly cited by air tour helicopter operators and their pilots. As Hawaii's air tour industry continues to grow, increasing numbers of aircraft will be flying over rugged, scenic terrain in a finite airspace, and some of these flights will occur in conditions of reduced visibility. ADS-B will support cockpit displays of traffic information that could improve pilot awareness of the position and movement of other aircraft in high-density tour areas.

ADS-B services will also allow operators to remotely monitor the progress of their own tour flights. Operators could use this information to identify pilot excursions from company tour routes or below prescribed altitudes. The detection of such events would provide an opportunity for operators to discuss such events with the pilots involved and would allow operators to evaluate the need for any changes to their pilot training, standard operating procedures, or SFAR 71 deviation authorizations. The Safety Board concludes that the National ADS-B Program technology could help Hawaii air tour operators reduce operational risks.

In October 2006, the FAA surveillance and broadcast services program manager indicated that the FAA planned to award a contract in July 2007 for the installation of ADS-B ground infrastructure covering all the areas in which there are now surveillance services for national airspace users and air traffic controllers. The FAA also indicated that, once the new infrastructure is in place, the program office and its vendors will explore options for providing surveillance services to other areas. The Safety Board notes, however, that major portions of the tour routes normally flown by Bali Hai and other air tour helicopter operators throughout Hawaii do not currently receive air traffic surveillance services. Thus, the Safety Board concludes that, under the FAA's current plan for installing the National ADS-B Program infrastructure in Hawaii, only limited services would be provided to the Hawaii air tour operators that could achieve significant safety benefits from the technology. Therefore, the Safety Board believes the FAA should accelerate the implementation of ADS-B infrastructure in the State of Hawaii to include high-quality ADS-B services to low-flying aircraft along heavily traveled commercial air tour routes.

In order to receive enhanced services that will be supported under the National ADS-B Program, Hawaii air tour operators will first have to equip their aircraft with compatible avionics to benefit from planned ADS-B infrastructure. The FAA's proposed schedule indicates that

¹⁵ Initial ADS-B program testing was originally slated to take place in Alaska and Hawaii, but, due to the lack of funding in the Hawaii area, the initial testing was instead conducted in Alaska and Ohio.

aircraft operators will have until 2020 to ensure that aircraft utilizing air traffic services are so equipped. The ADS-B program office has stated that it has not yet been established whether low-flying aircraft throughout the State of Hawaii will be required to have ADS-B-compatible avionics installed by 2020.¹⁶ The Safety Board concludes that commercial air tour operators operating under VFR may not be required to install ADS-B compatible avionics, even after ADS-B infrastructure is installed, which could lessen the safety-related benefit of these new services on Hawaii air tour flight operations. Therefore, the Safety Board believes that the FAA should require that Hawaii air tour operators equip tour aircraft with compatible ADS-B technology within 1 year of the installation of a functional National ADS-B Program infrastructure in Hawaii.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

In cooperation with Hawaii commercial air tour operators, aviation psychologists, and meteorologists, among others, develop a cue-based training program for commercial air tour pilots in Hawaii that specifically addresses hazardous aspects of local weather phenomena and in-flight decision-making. (A-07-18)

Once a cue-based training program that specifically addresses hazardous aspects of local weather phenomena and weather-related, decision-making issues is developed (as requested in Safety Recommendation A-07-18), require all commercial air tour operators in Hawaii to provide this training to newly hired pilots. (A-07-19)

Establish operational practices for commercial air tour helicopter pilots that include rest breaks and that will ensure acceptable pilot performance and safety and require commercial air tour helicopter operators to adhere to these practices. (A-07-20)

Develop a permanent mechanism to provide direct surveillance of commercial air tour operations in the State of Hawaii and to enforce commercial air tour regulations. (A-07-21)

Direct the Honolulu Flight Standards District Office to ensure that the annual safety meetings, as required under approved certificates of waiver or authorization, focus on pertinent and timely commercial air tour safety issues, including, but not limited to, reviews of Hawaii air tour accidents, local weather phenomena, and Special Federal Aviation Regulation 71 procedures. (A-07-22)

Reevaluate the altitude restrictions in the State of Hawaii to determine if they may have resulted in any unintended degradation of safety with regard to weather-related accidents and fatalities. (A-07-23)

¹⁶ The FAA stated that it intends to release an NPRM in September 2007 that will define the avionics that will be required to operate in different classes of airspace.

Develop and enforce safety standards for all commercial air tour operations that include, at a minimum, initial and recurrent pilot training programs that address local geography and meteorological hazards and special airspace restrictions; maintenance policies and procedures; flight scheduling that fosters adequate breaks and flight periods (as established by the implementation of Safety Recommendation A-07-20); and operations specifications that address management, procedures, route specifications, and altitude restrictions, as necessary. (A-07-24)

Accelerate the implementation of automatic dependent surveillance-broadcast (ADS-B) infrastructure in the State of Hawaii to include high-quality ADS-B services to low-flying aircraft along heavily traveled commercial air tour routes. (A-07-25)

Require that Hawaii air tour operators equip tour aircraft with compatible automatic dependent surveillance-broadcast (ADS-B) technology within 1 year of the installation of a functional National ADS-B Program infrastructure in Hawaii. (A-07-26)

Chairman ROSENKER, Vice Chairman SUMWALT, and Members HERSMAN, HIGGINS, and CHEALANDER concurred with these recommendations.

[Original Signed]

By: Mark V. Rosenker
Chairman