



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: July 31, 2008

In reply refer to: A-08-59 through -62

The Honorable Robert A. Sturgell
Acting Administrator
Federal Aviation Administration
Washington, D.C. 20591

The National Transportation Safety Board is investigating a fatal accident involving a commercial air tour flight carrying passengers from a cruise ship that was on a 1-day stopover in Ketchikan in Southeast Alaska.¹ Based on the preliminary findings from this investigation, and the findings from four other previous air tour accidents during the past 10 years,² the Safety Board is concerned about the lack of weather information, ineffective Federal Aviation Administration (FAA) oversight of air tour operators' adherence to required weather minimums, and inadequate pilot training for commercial air tour operations in Southeast Alaska.

Ketchikan and other Southeast Alaska cities³ have become a popular stopover for many cruise ship operators during the summer tour season, which runs from May to September. In 2007, an estimated 900,000 cruise ship passengers⁴ visited Ketchikan alone; the number of cruise ship tourists for 2008 is projected to increase. The Safety Board believes the safety issues discussed in this letter require timely attention to address the potential for additional accidents.

¹ Another air tour accident in Ketchikan happened within 3 weeks (on August 16) of the subject accident. The preliminary report for that accident, ANC07MA083, can be found on the Safety Board's website at <http://www.nts.gov/ntsb/brief.asp?ev_id=20070823X01233&key=1>.

² These four accidents all occurred in Southeast Alaska and involved safety issues similar to those discussed in this letter. For more information, see a) ANC99FA073 at <http://www.nts.gov/ntsb/brief.asp?ev_id=20001212X18906&key=1>; b) ANC99FA139 at <http://www.nts.gov/ntsb/brief.asp?ev_id=20001212X19659&key=1>; c) ANC01FA093 at <http://www.nts.gov/ntsb/brief.asp?ev_id=20010816X01703&key=1>; and d) ANC06LA066 at <http://www.nts.gov/ntsb/brief.asp?ev_id=20060606X00685&key=1>.

³ These cities include Ketchikan, Juneau, Sitka, and Skagway.

⁴ This figure is an estimate published by the Ketchikan Visitors Bureau. Sightseeing attractions include area harbor tours, the Misty Fjords National Monument, and bear-viewing destinations. Air tour operators in the Ketchikan area often coordinate a portion of their marketing efforts through cruise line operators and the Ketchikan Visitors Bureau.

Background

On July 24, 2007, about 1405 Alaska daylight time, a float-equipped de Havilland DHC-2 airplane, N995WA, operated by Taquan Air Service, was destroyed when it impacted mountainous terrain about 40 miles northeast of Ketchikan. The airline transport pilot and all four passengers were killed. The airplane was being operated under 14 *Code of Federal Regulations* (CFR) Part 135 as a visual flight rules (VFR) on-demand air tour flight. Instrument meteorological conditions were reported in the area at the time of the accident.⁵

The accident airplane was the second of three DHC-2 airplanes that were conducting air tour flights over the Misty Fjords National Monument. The pilot of the third tour airplane stated that he was about 5 minutes behind the accident airplane. He said he heard the pilot of the first tour airplane make a radio call on a common radio frequency inquiring about the weather conditions along the flight route (see the following figure for an illustration of general air tour routes in the area).⁶ He also recalled hearing a standard position report from the pilot of the accident airplane. The pilot of the third airplane stated that just after entering an area of mountain passes, he encountered “a wall of weather” that blocked his intended flight route. He said that the weather conditions consisted of low clouds, rain, and fog, which prompted him to turn around, fly an alternate route, and complete his tour. The pilot of the first airplane was able to complete the originally assigned tour, but he stated that he encountered marginal VFR and rapidly changing weather conditions along the flight route. The wreckage of the accident airplane was located in mountainous terrain along the planned air tour flight route, about 2 miles north from where the third airplane had turned around.

In addition to the reports of the two other pilots, images recovered from a passenger’s camera aboard the accident flight depicted worsening weather as the flight progressed toward the accident site. Additionally, a pilot-rated passenger who flew with the accident pilot on a previous flight about 2 hours before the accident flight reported marginal VFR conditions in and around the area of the eventual accident site.

⁵ The preliminary report for this accident, ANC07FA068, can be found on the Safety Board’s website at <http://www.nts.gov/ntsb/brief.asp?ev_id=20070801X01084&key=1>.

⁶ The common flight route for operators conducting a Misty Fjords air tour flight is northeast from Ketchikan, over sea-level channels and inland ocean fjords. The flights cross over the East Behm Canal and climb into mountainous, tree-covered valleys. In most cases, the tours include a landing in Rudyerd Bay before returning to Ketchikan.

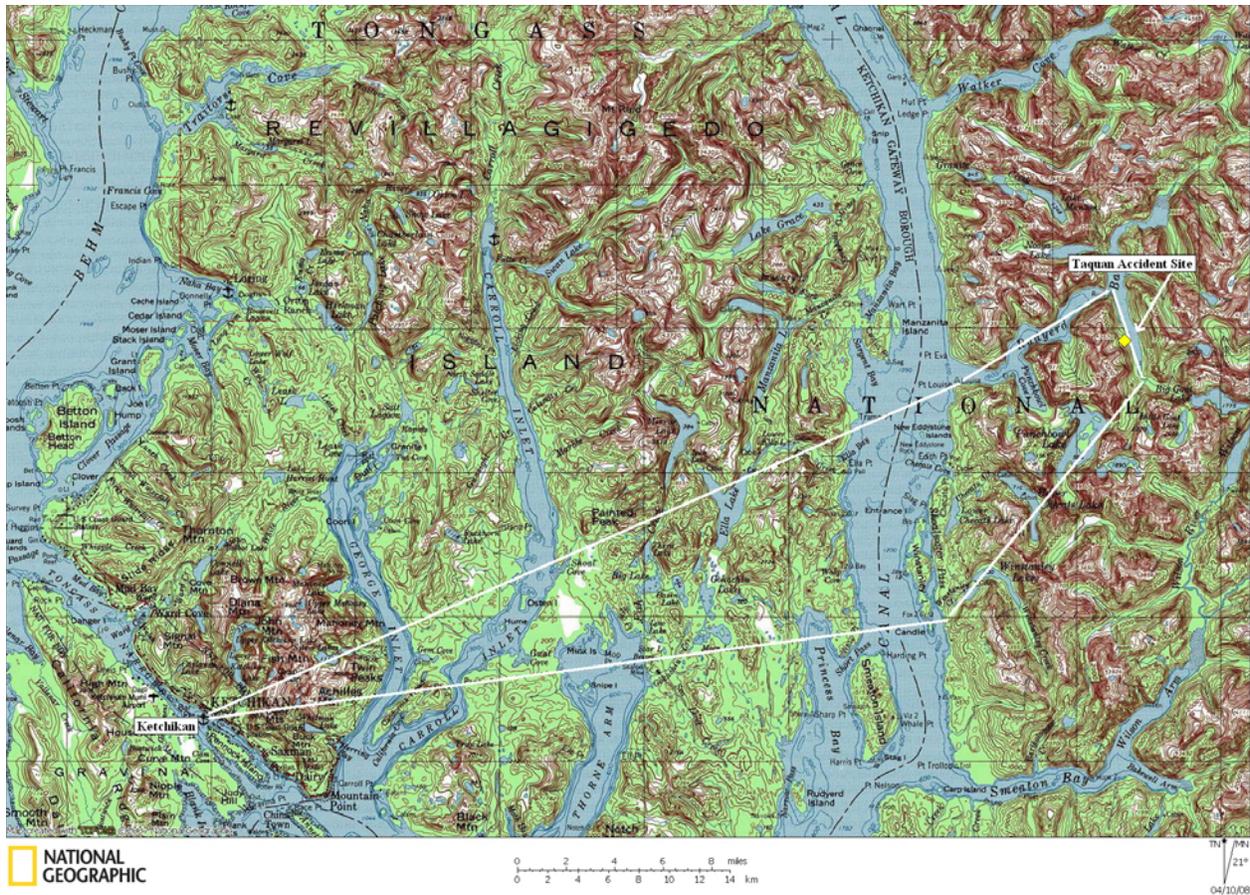


Figure. Accident location and general air tour routes.

Discussion

Inadequacy of Weather Reporting in Southeast Alaska

During postaccident interviews with air tour operators and pilots in Ketchikan, most indicated that they primarily use weather observations that they informally share via radio as their respective flights progress. The weather reporting station closest to the Taquan accident site is at the airport in Ketchikan, which is about 40 miles southwest. The pilots all consistently agreed that additional, current weather information (particularly along heavily traveled tour routes, especially in the Misty Fjords area) would significantly improve safety for air tour operators.

In 1995, the Safety Board published a safety study titled, *Aviation Safety in Alaska*, which examined the safety of aircraft operations in Alaska.⁷ Among the 23 recommendations produced from the study were two recommendations to the FAA and National Weather Service (NWS) to evaluate the technical feasibility and aviation safety benefits of remote color video weather

⁷ For more information, see National Transportation Safety Board, *Aviation Safety in Alaska*, Safety Study NTSB/SS-95/03 (Washington, DC: NTSB, 1995).

observing systems in Alaska.⁸ Numerous weather cameras have since been installed in portions of Alaska, and the program has proven very successful and is highly regarded; as noted on the FAA's website for the weather camera program, weather cameras can "reduce aviation accidents, save lives, and prevent unnecessary fuel usage." No weather cameras have yet been installed along the air tour routes in Southeast Alaska, near Ketchikan, although there are plans to install an additional 139 camera sites in Alaska by 2014—five of which are along Southeast Alaska air tour routes.⁹ Cameras in the Ketchikan and Misty Fjords areas are not scheduled for installation until fiscal year 2009.¹⁰

Weather cameras can provide pilots information about approaching weather fronts before departure, which would allow them to assess the likelihood that a tour could depart as planned or to take another route. Further, cameras would allow air tour management personnel at the operators' home base to monitor potential weather changes along the tour route and relay that information to the pilot. If the Taquan pilot had a better understanding of the weather and visibility conditions in Misty Fjords before departure or before he entered the area, he may have elected to delay the flight or avoid the accident area.

The Safety Board is aware that the FAA has implemented national automatic dependent surveillance-broadcast (ADS-B) technology in Alaska. Formerly known as Capstone, the program (which includes ground-based stations, satellites, and aircraft avionics) currently provides pilots with terrain awareness, moving map, and conflicting traffic data. Although this effort is projected to also have the capability of presenting weather radar and textual observations to pilots, these enhancements have not yet been fully implemented. Additionally, only a small percentage of airplanes in Alaska have been equipped with the Capstone equipment.¹¹

The Safety Board encourages the FAA to accelerate the implementation of a fully capable ADS-B system in Southeast Alaska. Until all air tour operators in Southeast Alaska are utilizing the full benefits from ADS-B, the Safety Board is concerned about the lack of near real-time weather information for commercial air tour operations in Southeast Alaska. The Board is pleased that, as an interim measure, the FAA plans to install and maintain weather cameras in Southeast Alaska; however, the timetable for camera installation is only a plan and the Board urges the FAA to not lose momentum with this effort. Therefore, the Board believes that the FAA should install and maintain weather cameras at critical areas of air tour routes within the Misty Fjords National Monument and other scenic areas in Southeast Alaska that are frequently traveled by air tour operators.

⁸ Safety Recommendation A-95-128 to the FAA was classified "Closed—Acceptable Action" on July 14, 1997. Safety Recommendation A-95-140 to the NWS was classified "Closed—Acceptable Action" on January 5, 2001.

⁹ According to the FAA's Alaska weather camera program office, there are currently two weather cameras in the southern-most region of southeast Alaska; however, none are in the vicinity of Ketchikan due to FAA budgetary restrictions and priorities. The FAA is planning to install additional cameras in Southeast Alaska during fiscal years 2008 through 2014.

¹⁰ A complete list of planned installations is available on the FAA's website at <<http://akweathercams.faa.gov/wxcaminstalllist.php>>.

¹¹ The accident aircraft was equipped with first-generation equipment for use with ADS-B technology; however, in keeping with the technology's capabilities at this time, the equipment only provided the Taquan Air pilot with a moving map for situational awareness once in flight and limited terrain avoidance capability.

Federal Aviation Administration Oversight of Operators' Adherence to Weather Minimums

During an interview with the Safety Board, the Taquan principal operations inspector (POI) recalled that the acting manager of the Juneau flight standards district office (FSDO) received a voicemail message from a local citizen stating that on numerous occasions, he saw various "float planes flying into a wall of rain and fog"¹² while conducting air tour flights over the Misty Fjords National Monument. According to the POI, he was already in Ketchikan when the voicemail was received. The acting manager informed the POI that the caller did not identify a specific operator and did not leave a name or contact phone number. The POI said that he contacted a number of operators in Ketchikan in an attempt to identify the operator but was unsuccessful. No FAA enforcement actions or additional surveillance of any of the operators in Ketchikan were initiated.

According to FAA Order 1800.56D, "National Flight Standards Work Program Guidelines," "surveillance is one of the most important functions performed by AFS [flight standards service] field office personnel to ensure safety and regulatory compliance in the aviation system." The required inspections are prescribed by the FAA's national program office and may be supplemented by the local district office based on perceived potential risks. For example, the manager of the Juneau FSDO reported during a postaccident interview that, for a short time about 10 years ago, FAA inspectors from other FAA regions would purchase a seat on a tour, unannounced, and conduct en route surveillance of the operator's procedures relating to weather minimums adherence, flightpath routes, and passenger briefings. He reported that, although not specifically required in FAA Order 1800.56D, this practice was a valuable tool for monitoring operators' practices in a real-world scenario. However, according to the FSDO manager, this practice was discontinued for an unknown reason.

Currently, FAA air tour inspectors in Alaska typically conduct surveillance of their assigned air tour operators by inspecting their aircraft at the operator's place of business, inspecting their maintenance facilities, and conducting annual checkrides. They rarely fly with the operators during an air tour flight because, typically, every seat is occupied by a paying passenger; in effect, inspectors only provide surveillance at operators' departure and arrival points: the readily accessible Ketchikan airport or harbor. When asked if FAA inspectors from the Juneau FSDO had attempted to observe operators' adherence to weather minimums via ground-based viewing locations throughout their area of responsibility, the FSDO manager said they had not. Hawaii, for example, experiences similar rapidly changing weather patterns, and, between 1995 and 2003, the Honolulu, Hawaii, FSDO operated a geographical surveillance unit (GSU) to provide direct surveillance, such as monitoring air tour activity from remote locations and sending inspectors posing as tourists on revenue flights of air tour operators.¹³ According to

¹² Title 14 CFR 135.203, 135.205, and 135.207 contain minimum altitude and visibility requirements for VFR operations in airplanes and helicopters. For airplanes, the regulations stipulate daytime VFR minimums of 500 feet above the surface or from any obstacle and a flight visibility of 2 miles if the ceiling is less than 1,000 feet. Helicopters over congested areas must maintain 300 feet above the surface and, during the day, have a visibility of 1/2 mile. In addition, helicopters must maintain visual surface reference sufficient to safely control the aircraft.

¹³ The GSU was equipped with surveillance cameras, binoculars, video cameras, and other equipment that the inspectors used to monitor operations and to ensure that pilots and tour companies were complying with cloud and terrain clearance requirements.

Honolulu FSDO personnel, the GSU was highly successful at performing surveillance of air tour operations.

The Safety Board notes that the work program guidelines in Order 1800.56D have not been effective for ensuring the necessary direct surveillance of air tour operators in Southeast Alaska. If direct surveillance had been conducted in the months before these accidents occurred, the reported risky flying practices (such as flight into clouds and reduced visibility) may have been detected and addressed with all air tour operators in the area. Thus, the Safety Board concludes that lack of direct surveillance of air tour pilots in Southeast Alaska may have resulted in some operators flying into marginal weather conditions, either intentionally or unintentionally, placing themselves and their passengers at unnecessary risk for accidents, and that, because of the region's remote location, the Juneau FSDO has no way of providing direct surveillance and enforcing adherence to VFR rules. Therefore, the Safety Board believes that the FAA should develop a permanent mechanism to provide en route and ground-based observations of air tour flights in Southeast Alaska at least once a month during the tour season to ensure operators are adhering to safe flying practices.

Air Tour Pilot Training for Assessing Weather

The Taquan Air accident pilot had been flying commercial air tours in Southeast Alaska since May 9, 2007, his initial hire date. Before being hired by Taquan, the pilot flew de Havilland DHC-6 Twin Otters and de Havilland DHC-8 Dash 8 airplanes in Arizona. He reported only 7 hours of Alaska flight time experience at the time he was hired by Taquan Air and had accumulated about 185 hours of flying in Alaska at the time of the accident.

A pilot's skill in assessing changing local weather conditions is related to his experience flying in those conditions. Air tour pilots in Hawaii (which also experiences rapidly changing weather conditions) indicated that a pilot's skill in visually assessing changes in weather conditions during tour flights is the most effective tool in preventing air tour accidents and that skills improved as local flying experience increased.¹⁴ A pilot's skill in assessing changing weather conditions and anticipating the effect of any changes on flying conditions is critical for effective decision-making, particularly in areas of rapidly changing weather, such as Misty Fjords. A 1999 study conducted by the FAA found that pilots with the most local experience had no controlled flight into terrain accidents where flight into weather was a factor.¹⁵

These findings raise concern about the Taquan Air accident pilot's lack of local flying experience in a difficult operating environment and the effect this lack of experience may have had on his decision-making. It is highly unlikely that the Taquan Air accident pilot would have decided to continue into the area of deteriorating weather conditions if he had accurately assessed the changing weather and had appreciated how it would likely affect flight visibility along his route of flight. Therefore, the pilot's lack of flying experience in the weather conditions

¹⁴ For more information, see 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).

¹⁵ Federal Aviation Administration, *Joint Interagency/Industry Study of Alaskan Passenger and Freight Pilots* (Washington, DC: FAA, 1999).

found in the Misty Fjord area and his inability to accurately assess how rapidly and to what extent the weather was deteriorating likely influenced his decision to fly in the vicinity of the accident flight.

FAA-sponsored human-factors research conducted by aviation psychologists suggests that cue-based training programs¹⁶ can improve pilots' weather-related decision-making during VFR flights.¹⁷ The Safety Board concludes that cue-based training, tailored to the dynamic local climate conditions of Southeast Alaska, could provide an important safety benefit to all commercial air tour pilots who are flying in the area. 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 Southeast Alaska. Therefore, the Board believes that the FAA should develop, in cooperation with Southeast Alaska commercial air tour operators, aviation psychologists, and meteorologists, among others, a cue-based training program for commercial air tour pilots in Southeast Alaska that specifically addresses hazardous aspects of local weather phenomena and in-flight decision-making. This type of training could benefit any pilot operating in Southeast Alaska. The 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-08-61, the FAA should require all commercial air tour operators in Southeast Alaska to provide initial and recurrent training in these subjects to their pilots.

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

Install and maintain weather cameras at critical areas of air tour routes within the Misty Fjords National Monument and other scenic areas in Southeast Alaska that are frequently traveled by air tour operators. (A-08-59)

Develop a permanent mechanism to provide en route and ground-based observations of air tour flights in Southeast Alaska at least once a month during the tour season to ensure operators are adhering to safe flying practices. (A-08-60)

Develop, in cooperation with Southeast Alaska commercial air tour operators, aviation psychologists, and meteorologists, among others, a cue-based training program for commercial air tour pilots in Southeast Alaska that specifically addresses hazardous aspects of local weather phenomena and in-flight decision-making. (A-08-61)

¹⁶ Cue-based training involves teaching the student to recognize various salient cues that should trigger a decision-making process.

¹⁷ 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): pp. 337-345.

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-08-61, require all commercial air tour operators in Southeast Alaska to provide initial and recurrent training in these subjects to their pilots. (A-08-62)

In response to the recommendation in this letter, please refer to Safety Recommendations A-08-59 through -62. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: correspondence@ntsb.gov. If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our Tumbleweed secure mailbox procedures. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

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

[Original Signed]

By: Mark V. Rosenker
Chairman