



National Transportation Safety Board

Washington, D.C. 20594

Aircraft Accident Brief

Accident Number: IAD05FA023
Aircraft and Registration: CASA C-212-CC, N960BW
Location: Bamiyan, Afghanistan
Date: November 27, 2004
Adopted On: November 8, 2006

HISTORY OF FLIGHT

On November 27, 2004, about 0820 Afghanistan time,¹ a Construcciones Aeronauticas Sociedad Anonima C-212-CC (CASA 212) twin-engine, turboprop airplane, N960BW, registered to Aviation Worldwide Services, LLC, and operated by Presidential Airways, Inc., of Melbourne, Florida, collided with mountainous terrain in the vicinity of the Bamiyan Valley, near Bamiyan, Afghanistan.² The Department of Defense (DoD) contract flight was operated under the provisions of 14 *Code of Federal Regulations* (CFR) Part 135, with a company flight plan filed. Daylight visual meteorological conditions (VMC) prevailed. The captain, the first officer, and the mechanic-certificated passenger, who were U.S. civilians employed by the operator, and the three military passengers, who were active-duty U.S. Army soldiers, received fatal injuries. The airplane was destroyed. The flight departed Bagram Air Base (OAIX), Bagram, Afghanistan, about 0738.

Presidential Airways provided transport services for U.S. military personnel and cargo within Afghanistan, Uzbekistan, and Pakistan under an Air Mobility Command (AMC) contract with the DoD.³ According to Presidential Airways' program site manager, he briefed the captain on the mission itinerary about 0700. The purpose of the mission was to transport military cargo⁴ to Farah, Afghanistan (OAFR), and the three military passengers were traveling in a "space available" status.⁵ The flight was to depart OAIX and fly to OAFR, and then fly to Shindand, Afghanistan

¹ Afghanistan time is coordinated universal time plus 4 hours 30 minutes. All times are reported in Afghanistan time, unless otherwise indicated.

² At the request of the Transitional Islamic Government of Afghanistan, Ministry of Civil Aviation & Tourism, the National Transportation Safety Board accepted delegation of the accident investigation in accordance with paragraph 5.1 of Annex 13 to the Convention on International Civil Aviation.

³ The AMC contract was FA4428-04-D-0036, dated September 20, 2004.

⁴ The cargo was 400 pounds of 81-mm mortar illumination rounds.

⁵ According to the operator, the cargo mission flights would attempt to accommodate passengers as requested by the military when airplane space was available and loading allowed. Military logistics personnel were responsible for manifesting the passengers and cargo loads.

(OASD), for fuel before returning to OAIX. The briefing included the expected cargo and passenger loads, as well as military intelligence information that there were no significant threats for the mission. The program site manager and the captain discussed the area weather forecast, which primarily consisted of VMC with the possibility of blowing dust at OASD, and they agreed that Kandahar, Afghanistan (OAKN), would be an appropriate alternate destination if the flight were unable to land at OASD.

According to the program site manager, he was not aware if route planning was performed for the mission. The accepted visual flight rules (VFR) flight plan contained destination information but did not indicate the specific route of the flight. The program site manager stated he assumed the crews followed certain typical routes between destinations; the pilots were to fly the routes “GPS [global positioning system] direct” while maintaining flight in VMC and clearance from terrain.

According to OAIX air traffic control transcripts, during initial radio contact with the ground controller, the crew announced an intended flight altitude of 10,000 feet mean sea level (msl) and a departure heading to the south; this departure heading was consistent with the operator’s typical route from OAIX to OAFR, which involved a departure and flight to the south for approximately 32 nautical miles (nm) to avoid the mountains west of OAIX, then a turn to the west direct to OAFR.

The crew taxied the airplane for takeoff but then stopped it briefly on the taxiway and boarded an additional passenger.⁶ The controller then cleared the flight for takeoff from runway 3, and the flight departed. At 0738, the OAIX controller instructed the crew to contact the departure controller, and the crew acknowledged. There was no record of radio communication between the flight crew and the departure controller, and no further known radio communication was received from the flight.

A review of ground-based radar data revealed the airplane did not depart on the southerly heading but, instead, departed to the northwest. Radar contact was lost approximately 9.5 nm northwest of OAIX, consistent with the normal expected limit of radar coverage for the area. The last recorded radar position showed the flight on a westerly heading at an approximate altitude of 10,000 feet msl; the position and heading were consistent with the flight entering the Bamiyan Valley (see figure 1).

⁶ According to the operator, there was no time limit restriction for loading passengers. As the accident airplane was taxied for takeoff, military personnel arrived and requested to board an additional passenger. The program site manager was able to flag down the flight crewmembers, and they stopped the airplane, so that the passenger could board.

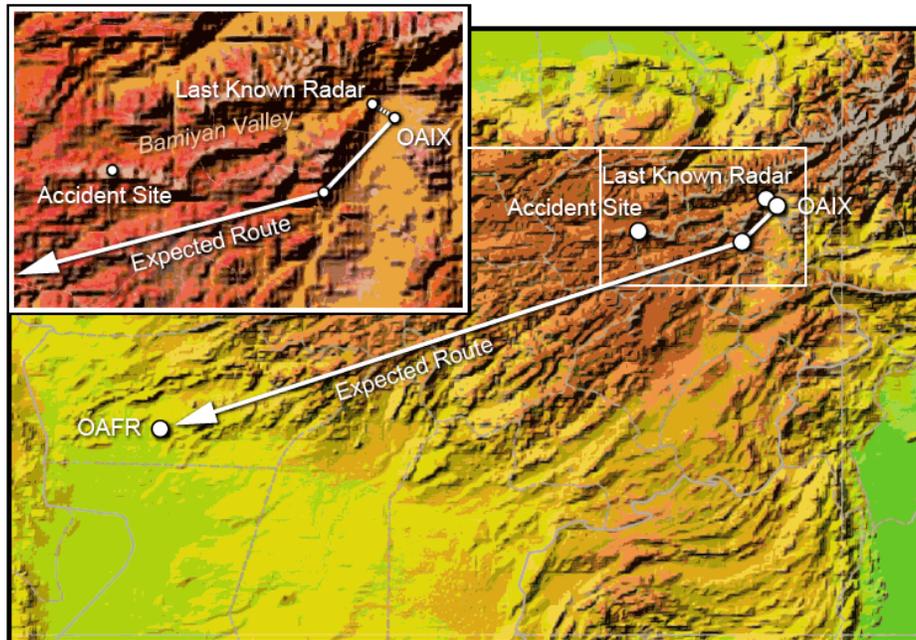


Figure 1. Map of the expected route, the last known radar position of the flight, and the accident site.

The cockpit voice recorder (CVR) recording began about 0748:37.⁷ The flight was airborne, and the first officer stated, “cruise check is complete.” Initial conversation indicated that the crew had never flown the selected route to OAFR and the mechanic⁸ noted that the valley they had chosen to fly through was not the direct route to OAFR. At 0753:28, the captain stated, “we’ll just have to see where this leads.” The CVR then recorded the captain, the first officer, and the mechanic discussing a topographical map, outside visual references, their current position coordinates (obtained from a GPS as they navigated), and their route over the mountains to OAFR. At 0756:12, the captain stated, “well normally we’d have time to on a short day like this we’d have time to play a little bit do some explorin’ but with those winds comin’ up I want to [expletive] get there as fast as we can.” At 0800:12, the captain stated, “with this good visibility ... it’s as easy as pie. you run into somethin’ big you just parallel it until you find a way thru [sic]. ... this is the first good visibility day I’ve had in the Casa. It’s not just good it’s outstanding.”

An unidentified passenger asked about the route of flight at 0802:25, and the mechanic stated, “I don’t know what we’re gunna see, we don’t normally go this route.”⁹ The captain

⁷ The times reported in the CVR transcript were measured using an elapsed time reference that associated the estimated accident time of 0820:00 with the end of the recording.

⁸ According to the operating specifications for the CASA 212 airplane, a mechanic is not a required crewmember. During the accident flight, the mechanic-certificated passenger was seated in the cockpit jumpseat.

⁹ According to the program site manager, the mechanic had flown 13 times between November 9 and 24, 2004.

stated, “all we want is to avoid seeing rock at twelve o’clock.” At 0803:21, the first officer stated, “yeah you’re an x-wing fighter star wars man,” and the captain replied, “you’re [expletive] right. this is fun.”

At 0803:34, the captain stated, “okay it’s about time we’re gunna start climbin’ ... we’re comin’ up to a box up here. ... yeah I think this valley might peter out right up here.” The first officer and the captain then discussed some of their previous mountain flying experiences. At 0812:45, the captain stated, “I swear to god they wouldn’t pay me if they knew how much fun this was,” and the first officer replied, “yeah, yeah, this is what we do flyin’ jumpers ... we always do this. as low as we can get,” and the captain stated, “yeah that’s the way I use to do it.” At 0813:06, the captain added, “it takes an extraordinary day that you can actually get down in ... and do some [expletive] like this.”

At 0815:47, the first officer stated that the ridgeline off to their left had a minimum elevation of approximately 14,000 feet msl. The captain replied that he wanted to look for a notch to fly through. At 0818:26, the first officer stated, “boy it’s a good thing we’re not too heavy today I guess,” and the captain replied, “yeah oh I wouldn’t have done this if we were at gross. we can always turn around up in here.” At 0819:04, the mechanic asked, “okay you guys are gunna make this right?” The captain replied, “yeah h h [sic] I’m hopin’.”

About 10 seconds later, the cockpit area microphone (CAM) recorded a sound similar to a stall warning tone single beep, and the mechanic immediately asked if there was a way out. At 0819:16, the captain stated they could execute a 180° turnaround, and he instructed the first officer to “drop a quarter flaps.” At 0819:25, the first officer stated, “yeah, let’s turn around,” and the captain again requested, “drop a quarter flaps.” The mechanic then stated, “You need to ah make a decision.” At 0819:44, the CAM recorded a sound similar to a stall warning that continued to the end of the recording. The mechanic stated, “call off his airspeed for him,” and the first officer stated, “you got ninety five.” Eight seconds after the first officer’s statement, the recording ended.

The accident site was approximately 80 nm west of OAIX and approximately 25 nm north of the operator’s typical route between OAIX and OAFR. The operator was notified by military personnel, about 1415, that the airplane had never arrived at OAFR. Search and rescue operations were initiated by the military about 1540, and the wreckage was located on November 28, 2004, about 0815. First responders who arrived at the accident site on November 30, 2004, reported evidence that one passenger had exited and re-entered the wreckage before he died (see Survival Aspects section).

PERSONNEL INFORMATION

The Captain

The captain, age 37, held an airline transport pilot certificate with a rating for airplane multi-engine land and type ratings for “CA-212,” “CE-500,” “EMB-110,” and “SA-227”

airplanes.¹⁰ He also held commercial privileges for airplane single-engine land and airplane single-engine sea. His most recent Federal Aviation Administration (FAA) first-class airman medical certificate was dated October 1, 2004, with the limitation, “must wear corrective lenses.”

The captain was hired by Presidential Airways on October 1, 2004. According to his résumé, the captain reported 5,720 total flight hours, which included 4,930 hours pilot-in-command (PIC) with 685 hours PIC in CASA 212 airplanes. According to an insurance application dated September 23, 2004, the captain reported 865 hours in CASA 212 airplanes. The director of operations of Presidential Airways reported that, during the captain’s employment interview, he stated he had “harsh environment” operating experience and had flown extensively throughout the northwestern United States and Alaska. The director of operations stated he verified this information with the two previous employers listed on the captain’s résumé.

The captain began company indoctrination training with six other pilots, including the first officer, on October 1, 2004. He completed the indoctrination training on October 5, 2004, and began aircraft-specific training in CASA 212 airplanes, which he completed on October 9, 2004. On November 2, 2004, the captain passed an Airman Competency/Proficiency Check in a CASA 212 airplane in accordance with 14 CFR 135.293, “Initial and recurrent pilot testing requirements,” paragraphs (a) and (b); 14 CFR 135.297, “Pilot in command: Instrument proficiency check requirements”; and 14 CFR 135.299, “Pilot in command: Line check: Routes and airports.”

The captain arrived in Afghanistan on November 14, 2004, and the next day he flew a 6.3-hour theater-indoctrination flight with a company pilot who had experience with flying in Afghanistan. The flight included stops at OAIX; OAKN; Herat, Afghanistan (OAGR); and OASD. Records provided by the operator indicated the captain flew six subsequent missions in Afghanistan with, at least, one flight into OAFR. The captain accumulated a total of 32.3 hours in Afghanistan, which included 23.5 hours in CASA 212 airplanes. According to the operator, in the 90 and 30 days prior to the accident, the captain had accumulated 87.8 and 65.9 total flight hours, respectively.

According to Presidential Airways’ program site manager, the captain’s last flight prior to the accident flight ended at 1130 on November 24, 2004. Four company pilots who lived in the same quarters with the captain reported that, in the 72 hours before the accident, the captain appeared well rested, had a good attitude, and ate regular meals. The program site manager estimated the captain smoked about two cigarettes per day. Two company pilots stated that, on the morning of the accident, the captain told them he had a sore or scratchy throat, and he thought he might be coming down with a cold. Both pilots stated they offered to fly for the captain, but the captain declined.

¹⁰ These type-rating designators refer to certain CASA 212, Cessna Citation, Embraer 110, and Swearingen/Fairchild Metro series airplanes.

A review of FAA airman records revealed that, on February 10, 1997, the captain was issued a notice of disapproval of application for an airline transport pilot certificate. He subsequently completed the requirements and was issued an airline transport pilot certificate on March 7, 1997.

A review of Presidential Airways' records revealed the captain reported he had never been convicted of reckless driving or of driving a motor vehicle under the influence, and his driver's license had never been suspended or revoked.

The First Officer

The first officer, age 35, held an airline transport pilot certificate with a rating for airplane multi-engine land and commercial privileges for airplane single-engine land. His most recent FAA first-class airman medical certificate was dated January 28, 2004, with no waivers or limitations.

The first officer was hired by Presidential Airways on October 1, 2004. According to his résumé, the first officer reported 2,228 total flight hours, which included 1,248 hours in multi-engine airplanes. According to an insurance application, dated September 23, 2004, the first officer reported 917 hours PIC and 420 hours in CASA 212 airplanes.

The first officer began company indoctrination training with six other pilots on October 1, 2004. He completed the indoctrination training on October 5, 2004, and began aircraft-specific training in CASA 212 airplanes, which he completed on October 9, 2004. On October 10, 2004, the first officer and another captain ferried a CASA 212 airplane from Alaska to Florida. On October 13, 2004, the first officer passed an Airman Competency/Proficiency Check in a CASA 212 airplane, in accordance with 14 CFR 135.293, "Initial and recurrent pilot testing requirements," paragraphs (a) and (b), and 14 CFR 135.299, "Pilot in command: Line checks: Routes and airports."

The first officer arrived in Afghanistan on November 14, 2004, and, the next day, he flew a 4.8-hour theater-indoctrination flight with a captain who was experienced flying in Afghanistan. The flight included stops at OAIX; Salam, Afghanistan; and Jalalabad, Afghanistan. Records provided by the operator indicated the first officer flew five subsequent missions in Afghanistan with, at least, one flight into OAFR. The first officer accumulated a total of 29.6 hours in Afghanistan, which included 23.4 hours in CASA 212 airplanes. According to the operator, in the 90 and 30 days prior to the accident, the first officer had accumulated a total of 67 and 65.2 flight hours, respectively.

According to the operator's program site manager, the first officer's last flight prior to the accident flight ended at 1130 on November 24, 2004. Four company pilots who lived in the same quarters with the first officer reported that, in the 72 hours before the accident, the first officer appeared well rested, had a good attitude, and ate regular meals.

A company captain stated he had flown with the first officer during the previous three summers on firefighting support flights to drop smokejumpers and para-cargo¹¹ to fight wildfires. He described the first officer as a knowledgeable and skilled pilot who was experienced with mountain flying and low-altitude missions.

A review of FAA airman records revealed on July 9, 1991, the first officer was issued a notice of disapproval of application for a private pilot certificate. He subsequently completed the requirements and was issued a private pilot certificate on July 18, 1991. He was issued a notice of disapproval of application for a commercial pilot certificate on September 12, 1995. He subsequently completed the requirements and was issued a commercial pilot certificate on September 13, 1995. On October 16, 2002, he was issued a notice of disapproval of application for an airline transport pilot certificate. He was issued a second disapproval on October 21, 2002. He subsequently completed the requirements and was issued an airline transport pilot certificate on October 22, 2002.

A review of Presidential Airways' records revealed the first officer reported he had never been convicted of reckless driving or of driving a motor vehicle under the influence, and his driver's license had never been suspended or revoked.

AIRCRAFT INFORMATION

The CASA 212 was an unpressurized, high-wing airplane with fixed landing gear, a rear ramp-type cargo door, and a maximum gross weight of 16,976 pounds (lbs). It was configured with nine seats. The airplane was powered by two Garrett TPE331-10R-511C, 900-shaft-horsepower engines, each equipped with a Hartzell constant-speed, four-blade propeller with full-feathering and reverse-pitch capabilities. The instrument panel was equipped with an Apollo GX-50 GPS.

The cockpit was equipped with quick-donning oxygen masks for the captain and the first officer. The passenger oxygen masks and equipment were carried in a case and could be plugged into a console in the passenger area when their use was required.

The airplane's emergency locator transmitter (ELT) was an Artex model 110-4, which was designed to transmit a 121.5-megahertz (MHz) signal automatically when subjected to certain forces, such as those sustained during an impact.

According to weight and balance calculations, the airplane weighed approximately 15,664 lbs at takeoff and had a predicted landing weight of 13,714 lbs. The center of gravity (CG) at takeoff was calculated as 19.1 percent of mean aerodynamic chord (MAC), and the predicted

¹¹ Smokejumpers are airborne firefighters who parachute from airplanes to access wildfires in remote areas, and they are often supported by para-cargo drops of personal gear, food, water, and equipment.

landing CG was 17.5 percent of MAC. According to the airplane flight manual (AFM), the airplane's maximum permitted takeoff weight was 16,976 lbs, the forward CG limit for the calculated takeoff weight was about 16 percent of MAC, and the aft limit was about 30 percent of MAC. On the basis of these data, the airplane would have remained within operational limits during the entire accident flight.

The stall speed of the airplane is affected by flap configuration and wing bank angle. As the airplane's flap angle increases (that is, as flaps are lowered), stall speed decreases. As the airplane's wing bank angle increases (to turn in level flight), stall speed increases. Based on AFM performance charts, the approximate stall speeds for the airplane, in knots (kts) of calibrated airspeed in various bank angle and flap configurations, are shown in figure 2.

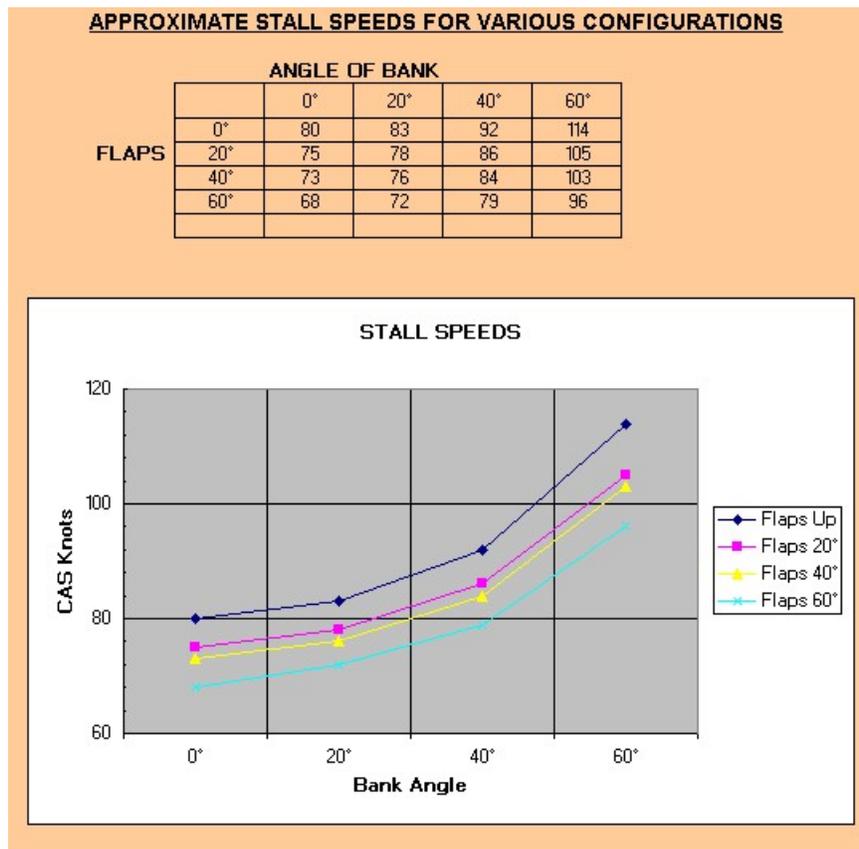


Figure 2. Approximate stall speeds for various bank angles and flap settings.

According to the AFM's "Balked Landing Rate of Climb - Two Engine Operation" chart, at 14,000-foot pressure altitude, -8° Celsius, and an aircraft weight of 15,000 lbs, the climb rate would be about 690 feet per minute (fpm) with full flaps, takeoff power, and an airspeed of 83 kts.

A review of maintenance records indicated that, at the time the airplane departed on the accident flight, it had accumulated 21,489.6 total hours. The No. 1 engine had accumulated 11,087.3 hours since new and 363.6 hours since overhaul, and the No. 2 engine had accumulated

7,327.1 hours since new and 908.3 hours since overhaul. The airplane received its 1A and 2A inspections¹², in accordance with the manufacturer's guidelines, on November 25, 2004, and had accumulated 4.2 hours since the inspections.

METEOROLOGICAL INFORMATION

A weather observation taken about 0725 at OAIX, elevation 4,895 feet, recorded wind variable at 4 kts, unrestricted visibility, few clouds at 8,000 feet and 20,000 feet, temperature 39° Fahrenheit, dew point 28° Fahrenheit, and altimeter setting 30.35 inches of mercury.

A weather forecast briefing prepared by the military at 0600 for an area that included the flight route predicted winds aloft from 240° at 20 kts, at 9,000 feet and 10,000 feet. The forecast predicted no visibility restrictions, thunderstorms, turbulence, icing, or precipitation aloft. Surface conditions at OASD, elevation 3,773 feet, from 1100 to 1200, were predicted to include winds from 180° at 15 kts gusting to 25 kts and 3 statute miles visibility in blowing dust.

Another Presidential Airways crew departed OAIX in a CASA 212 airplane about the same time as the accident flight, but their flight was en route to a different destination, OAHR. The typical route to that crew's destination did include flight along the Bamiyan Valley, and the captain of that flight stated he flew within about 5 nm of the accident site. He stated that he flew at 12,500 feet msl and observed the wind was from the southwest at 5 to 10 kts. He stated that he observed a scattered to broken cloud layer at 13,000 feet msl and that the cloud layer had a maximum thickness of 500 feet but was predominantly about 200 feet thick with cloud caps just above the individual mountain peaks. He estimated that there was a minimum of 10 miles of visibility in haze.

FLIGHT RECORDERS

The airplane's Fairchild model 100A CVR was examined at the National Transportation Safety Board, Vehicle Recorders Division, Washington, D.C. The exterior of the CVR was damaged, but the tape inside sustained little damage. The CVR recording consisted of four channels of good quality¹³ audio information. One channel captured the audio from the captain's panel, another captured the audio from the first officer's panel, and a third captured the audio from the CAM; the fourth CVR channel was unused. The CVR captured the last 32 minutes of the flight, and the recording captured no radio communications between the flight crew and any

¹² The 1A and 2A inspections are specified by the manufacturer and are performed at 100-hour and 200-hour intervals, respectively.

¹³ The Safety Board uses the following categories to classify the levels of the CVR recording quality: excellent, good, fair, poor, and unusable. A good quality recording is one in which most of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate one to two words that were not intelligible. Any loss in the transcript can be attributed to simultaneous cockpit/radio transmissions that obscure each other.

air traffic control facilities. The review of voice recordings from the captain, the first officer, and the mechanic revealed no evidence of sounds consistent with oxygen mask use.

The airplane was not equipped, and was not required to be equipped, with a flight data recorder.¹⁴

WRECKAGE AND IMPACT INFORMATION

The wreckage was at an elevation of approximately 14,650 msl in a box canyon that was bounded on the east and west by 15,000-foot ridgelines and terminated at a 16,580-foot peak to the south. The northern end of the box canyon opened to the Bamiyan Valley, where the floor of the canyon was approximately 11,000 feet msl; the floor of the box canyon rose from north to south to its terminus. The terrain was rocky, snow-covered, and void of trees and vegetation.

The Safety Board's accident investigation team did not travel to the accident site. The first military recovery team to access the site arrived on board a Boeing CH-47 helicopter, and the recovery team estimated that about 20 inches of snow had fallen since the accident 3 days earlier. The CH-47 was hovered over the site for about 10 minutes in order to use its rotor wash to blow away the snow. Review of photographs and information provided by the military showed the wreckage was located on the northern face of an area of rising terrain. According to military first responders, the airplane was on its left side at the northeast end of a wreckage and cargo debris path that extended approximately 450 feet. The responders reported that the rear cargo ramp was separated and on the ground adjacent to the empennage, the right wing and right engine were separated, and the left wing was crushed under the fuselage. Wing flap configuration was not determined. The CVR was the only wreckage component recovered for examination.

The first responders reported that they observed no evidence that the captain or the first officer had used their oxygen masks and that the oxygen equipment for the passengers was found in an unopened case.

MEDICAL AND PATHOLOGICAL INFORMATION

Toxicological examinations of specimens from the captain and the first officer were performed by the Armed Forces Institute of Pathology, Washington, D.C. No evidence of alcohol or performance-impairing drugs was found.

The Office of the Armed Forces Medical Examiner, Dover Air Force Base Port Mortuary, Dover, Delaware, performed autopsies on all six occupants of the airplane on

¹⁴ According to 14 CFR 135.152, an approved flight recorder is required for a multiengine, turbine-powered airplane or rotorcraft that has a passenger seating configuration (excluding any required crewmember seat) of 10 to 19 seats and that was brought onto the U.S. register (or was registered outside the United States and added to the operator's U.S. operations specifications) after October 11, 1991.

December 3, 2004. The autopsy reports stated the cause of death for the captain, the first officer, the mechanic-certificated passenger, and two of the active-duty military passengers was “blunt force injuries.”

The autopsy report for the third active-duty military passenger stated the cause of death was “blunt force injuries of the torso complicated by hypoxia and hypothermia.” The Safety Board reviewed the autopsy findings regarding the passenger’s internal injuries and examined a photograph of a specific internal injury.¹⁵

SURVIVAL ASPECTS

Passenger with Survivable Injuries

Military first responders who arrived at the accident site observed a body, later identified as the active-duty military passenger who died of injuries complicated by hypoxia and hypothermia, lying prone inside the rear cargo area of the wreckage. The body was oriented with the head toward the front of fuselage, and the clothing consisted of pants and shoes. In close proximity to the body were an unrolled sleeping bag, a cigarette butt, and a half-empty water bladder from a Camelbak hydration system. An open box of Meals Ready-to-Eat was also inside the fuselage, but responders could not determine if it had been opened before or after the accident.

Outside the wreckage, an empty cigarette package was observed on the ground near the fuselage, and two frozen urine stains were observed in the snow, one near the front of the fuselage and one near the rear cargo ramp. A metal ladder was leaning against the fuselage in such a way that, according to first responders, it appeared to have been deliberately positioned to enable a person to climb on top of the wreckage. First responders also reported that a wooden pallet on top of the rear cargo ramp appeared to have been placed there. An opened Swiss Army daypack was found on the ground near the fuselage, and underneath it were maps and a pilot’s checklist.

Notification of the Overdue Airplane

According to the operator’s program site manager at OAIX, the airplane’s estimated time of arrival at OAFR was 0955, and it was due back at OAIX about 1345. Military personnel notified the program site manager about 1415 that the airplane had never arrived at OAFR, which was about 30 minutes after its expected return time at OAIX.

¹⁵ The autopsy report stated, “Hemoperitoneum, 1100 mL of blood; right side retro-peritoneum hemorrhage extending from the level of the 12th thoracic vertebrae to the pelvis (12 x 6 x 3 inches); laceration of the mesentery of the transverse colon and portion of the small bowel with associated ischemic bowel (10 inches in greatest length).” The Safety Board examined a photograph of the ischemic bowel. According to the Armed Forces medical examiner, 140 milliliters (mL) of urine was found in the passenger’s bladder.

According to the DoD contract, the flight crews were required to report their arrivals at remote locations to the military Air Mobility Division (AMD),¹⁶ which required the arrival information for its own purposes; AMD was not involved in tracking flights for the operator. According to Presidential Airways pilots interviewed after the accident, the operator provided each flight crew an Iridium satellite telephone¹⁷ to report their flight's arrival to AMD upon landing. One pilot stated he tried to use the satellite telephone the first month he was in Afghanistan but stated, "less than half the time, it would work properly. Sometimes I would fly my entire route and then call AMD when I landed back at [OAIX]." Another pilot stated he sometimes had to make five or six attempts with the satellite telephone before getting through to AMD, and, because of the short on-ground times, he did not have time to make repeated calls. Communications capability was limited at the remote locations in Afghanistan.

The military air movement personnel at OAFR stated it was not unusual for inbound flights to be delayed, diverted, or canceled. Although military personnel at some remote locations had some communications capabilities, they stated they were not tasked to report aircraft arrival or departure information to the operator for the purpose of flight tracking and that they were unaware of any overdue aircraft notification procedures for Presidential Airways flights. The director of operations stated that the military would relay arrival information to the operations center when flight crews were unable to communicate directly.

A member of the military quality assurance personnel (QAP) who oversaw the Presidential Airways contract stated he was notified, at 1330, that passengers at OAFR had been waiting for the airplane. He stated he went to the military command post at OAIX and began calling other airfields to look for the airplane. When military personnel notified the program site manager, at 1415, that the airplane had never arrived at OAFR, the program site manager also went to the military command post to initiate calls to try to find the flight.

After calls to several possible landing sites failed to locate the airplane, military officials reported the missing airplane to their higher commands, about 1430, and, about 1515, the Joint Search and Rescue Center (JSRC) was notified. According to the operator and a JSRC timeline provided by the military, search and rescue aircraft were placed on alert by 1540 and were airborne within about 30 minutes.

Search and Rescue

The operator informed military search and rescue personnel that a typical flight between OAIX and OAFR would depart to the south for approximately 32 nm, and then proceed west directly to OAFR, and that the flight crew had planned to divert to OAKN if they were unable to land at OASD. Military search and rescue personnel were initially dispatched to search the area

¹⁶ AMD was located at Al Udeid Air Base, Qatar, which was about 730 nm southwest of OAFR.

¹⁷ According to a military Joint Search and Rescue Center timeline, the operator did not have the phone number to the accident airplane's satellite telephone readily available after the accident.

along the flight's alternate destination and then the area south of OAIX, based on the operator's assumption that the flight had followed the typical route. Initial 121.5-MHz signals were detected¹⁸, about 1730, but a search revealed the signals were not associated with the airplane's ELT. Other false alerts were detected, investigated, and ruled out throughout the evening.

According to the OAIX military radar chief controller, the military's air traffic manager site leader was the only person who requested radar data for the last known position of the flight from the OAIX Radar Approach Control (RAPCON); the air traffic manager site leader stated he made this request "sometime after sunset."¹⁹ A command post controller at OAIX stated that he had twice requested the radar data for the accident flight from OAIX RAPCON and that he was informed that OAIX RAPCON could not pull the tapes and that the information was hard to get to. According to the OAIX command post controller, he subsequently contacted the OAIX tower²⁰ and requested the radar data for the airplane's departure, and a Presidential Airways representative and military personnel went to the tower to review the data.

According to the JSRC timeline provided by the military, the radar information was provided to search and rescue personnel about 2100, and search aircraft subsequently began searching the areas north and west of OAIX, based on the flight's last known position.

A 121.5-MHz signal was detected in the search area northwest of OAIX about 0500 on November 28, 2004, and search aircraft located the wreckage about 0815. According to the military, weather did not significantly affect search and rescue efforts on the day of the accident. However, by the time the wreckage was identified, adverse weather had moved into the area. Varying degrees of turbulence, clouds, icing, poor visibility, and winds of 40 to 60 kts prevented rescue personnel from reaching the site until 0630 on November 30, 2004.

¹⁸ The signals were likely detected by military resources. According to the International Civil Aviation Organization, Afghanistan was not a participant in the international civilian search and rescue system known by the acronym COSPAS-SARSAT (Cosmicheskaya Sistyema Poiska Avaryinich Sudov [translation: Space System for the Search of Vessels in Distress] – Search and Rescue Satellite-Aided Tracking). The COSPAS-SARSAT system utilizes satellite and ground equipment to detect and locate the signals from 121.5-MHz and 406-MHz ELTs, and it forwards the information to the search and rescue authorities of participating countries and organizations to expedite identification of crash locations. COSPAS-SARSAT participants include the four parties to the COSPAS-SARSAT International Programme Agreement (Canada, France, Russia, and the United States), 24 ground segment providers, nine user states and two organizations, as follows: Algeria, Argentina, Australia, Brazil, Chile, People's Republic of China, Denmark, Germany, Greece, India, Indonesia, Italy, Japan, Republic of Korea, Madagascar, The Netherlands, New Zealand, Nigeria, Norway, Pakistan, Peru, Poland, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Tunisia, Turkey, United Kingdom, Vietnam, the International Telecommunication Development Corporation, and the Marine Department of Hong Kong, China.

¹⁹ The OAIX military radar chief controller stated that he contacted each of the personnel assigned to OAIX RAPCON duties to determine who requested the radar information from them and that they reported only the air traffic manager site leader contacted them.

²⁰ During this call, the OAIX command post controller reached the air traffic manager site leader, whom OAIX RAPCON personnel confirmed contacted them to request the radar information.

ORGANIZATION AND MANAGEMENT INFORMATION

Presidential Airways held a Part 135 operating certificate, under which it operated seven CASA 212 airplanes, one Fairchild Metroliner SA-227 airplane, and three McDonnell Douglas MD-530 helicopters. According to the director of operations, once Presidential Airways was awarded the AMC contract to provide services within Afghanistan, Uzbekistan, and Pakistan,²¹ company personnel immediately visited the military's requested service sites and began briefings with the local military command on how the operations would be conducted. Due to safety concerns and aircraft performance limitations, the operator declined to service some of the military's requested sites.

According to an FAA air safety inspector, during the year before the accident, the FAA's oversight of Presidential Airways included more than 100 visits to the operator's facility in Florida. During those visits, the FAA identified minor discrepancies, which the operator subsequently corrected, and no violations were issued. The FAA inspector stated that he was not aware of any FAA oversight of Presidential Airways' operations in Afghanistan.

In addition to the FAA requirements, Presidential Airways, under contract to AMC, was required to adhere to the provisions of 32 CFR Part 861 regarding flight crew training, qualifications, and proficiency. Title 32 CFR Part 861 also requires that the DoD approve and monitor contract operators for compliance with contract provisions, including safety provisions. Such monitoring should entail initial and recurring on-site safety surveys and evaluation. These evaluations of Presidential Airways would be performed by the DoD QAP personnel in Afghanistan who were tasked to ensure that the operator complied with the contract.²² According to the regulation, the DoD oversight requirements are intended to "complement rather than replace the [FAA] criteria applicable to the carrier" and pertain to the "enhanced level of service required" for DoD operations.²³ According to 32 CFR 861.4(c)(3), a consideration in the evaluation process included that an "air taxi operator is expected to demonstrate some type of effective flight following capability."

Flight Dispatch and Locating

Presidential Airways dispatched the flights requested by the military from its operations center at OAIX. According to the program site manager, all flights were flown VFR, and the flight crews would file a company flight plan with the operator that contained the mission's intended destinations. The director of operations stated that the "normal procedure" for flight

²¹ The contract was awarded on September 20, 2004, and Presidential Airways' first airplane arrived in Afghanistan 5 days later. Two CASA 212 airplanes, including the accident airplane, and one SA-227 airplane were used for the AMC contract.

²² The QAP personnel stated that they coordinated with the operator in scheduling and rescheduling missions, manifested passengers and cargo, and met with every departure to ensure the airplanes were loaded with the correct cargo and mail.

²³ The requirements are outlined in 32 CFR 861.4(a) and (e).

crews was to contact the operations center upon landing at remote locations, if able. The director of operations stated that, if the flight crews were unable to establish contact because of communications problems, the flight crews could log their remote site arrival times upon their return to OAIX at the completion of the entire mission. According to one pilot, an airplane was not considered overdue until it exceeded its estimated return time at OAIX.

Presidential Airways pilots stated their routes were flown using GPS-direct navigation. They stated that, although the flights did not use standard routes between destinations, they usually flew within 5 to 10 nm of the centerline of typically flown routes, and they would not have expected the accident flight to have been flying as far north as the accident location. The program site manager stated that terrain, weather, and a desire to avoid establishing a flight pattern in an environment with hostile ground forces were some reasons the flight crews varied the specific ground track of each flight. He also stated that, due to military helicopter operations, the flight altitude of the company's airplanes was required to be no lower than 1,500 feet above the level of the average lowest terrain.

Flight Crew Training Program

According to the director of operations, from October 1, 2004, to November 14, 2004, the captain and the first officer had each received approximately 130 hours of ground instruction, including 60 hours of systems training, 50 hours of indoctrination training, 2.5 hours of flight training in CASA 212 airplanes, and crew resource management (CRM) training. The CRM training consisted of a 30-minute instructional video and a 1.5-hour discussion.²⁴

According to the director of operations, the captain and the first officer were not provided training in mountain flying because the training was not a requirement under Part 135, and each had "extensive" mountain-flying backgrounds. The training program did include emphasis on pilot and passenger regulations specific to Part 135 operations, which included guidelines on pilot and passenger oxygen use. According to other Presidential Airways pilots interviewed about their own use of oxygen, one pilot stated he would use oxygen only occasionally during flights above 13,500 feet msl, and another pilot incorrectly stated the altitude requirements for oxygen use.²⁵

²⁴ FAA Advisory Circular (AC) 120-51E defines CRM as the "effective use of all available resources: human resources, hardware, and information." According to AC 120-51E, among the goals of CRM training is to address the challenges of optimizing crew problem-solving and decision-making skills, and the crew's ability to maintain situational awareness. Since 1980, the Safety Board has issued numerous recommendations to the FAA regarding improved CRM training requirements for Part 135 operators. The Board's most recent recommendation on this subject, Safety Recommendation A-03-52, was issued on December 2, 2003, and asked the FAA to "require that ... Part 135 on-demand charter operators that conduct dual-pilot operations establish and implement a Federal Aviation Administration-approved crew resource management training program for their flight crews in accordance with 14 CFR Part 121, subparts N and O." Following the November 28, 2004, Canadair, Ltd., CL-600-2A12 accident in Montrose, Colorado, the Board noted that the FAA's action on this issue is overdue, and, on August 4, 2006, the Board reclassified Safety Recommendation A-03-52 "Open—Unacceptable Response" and reiterated the recommendation. The recommendation letter is available on the Safety Board's Web site at <<http://www.nts.gov>>.

²⁵ The pilot stated that it was his understanding that, if the airplane was above 12,500 feet for more than 30 minutes or if it was above 14,000 feet, he had to use oxygen. According to Federal regulations, pilots of

According to the program site manager, there was no formal Afghanistan theater-orientation program for the pilots. The company's standard practice was to pair new captains with another captain or a theater-experienced first officer for one or two missions; new first officers were paired with theater-experienced captains. The program site manager stated the accident captain and first officer were paired for mission-planning reasons because they were the only CASA 212 crew on site who could also fly Presidential Airways' SA-227 airplane.

ADDITIONAL INFORMATION

Flight-locating Requirements

According to 14 CFR 135.79, "Flight locating requirements":

(a) Each certificate holder must have procedures established for locating each flight, for which an FAA flight plan is not filed, that—

(1) Provide the certificate holder with at least the information required to be included in a VFR flight plan;

(2) Provide for timely notification of an FAA facility or search and rescue facility, if an aircraft is overdue or missing; and

(3) Provide the certificate holder with the location, date, and estimated time for reestablishing radio or telephone communications, if the flight will operate in an area where communications cannot be maintained.

(b) Flight locating information shall be retained at the certificate holder's principal place of business, or at other places designated by the certificate holder in the flight locating procedures, until the completion of the flight.

(c) Each certificate holder shall furnish the representative of the Administrator assigned to it with a copy of its flight locating procedures and any changes or additions, unless those procedures are included in a manual required under this part.

unpressurized airplanes are required to use oxygen if the airplane is above 10,000 feet msl through 12,000 msl feet for more than 30 minutes duration and at all times above 12,000 feet msl (see Additional Information section, Regulations and Guidelines).

Oxygen-use Requirements

According to 14 CFR 135.89, “Pilot requirements: Use of oxygen,” “Each pilot of an unpressurized aircraft shall use oxygen continuously when flying, (1) At altitudes above 10,000 feet through 12,000 feet msl for that part of the flight at those altitudes that is of more than 30 minutes duration; and (2) Above 12,000 feet msl.”

According to an aviation medicine textbook,²⁶ from 10,000 to 15,000 feet, an individual without supplemental oxygen “exhibits few or no signs and has virtually no symptoms [of hypoxia].²⁷ The ability to perform skilled tasks is impaired, ... an effect of which the subject is frequently unaware.” The textbook also notes that “an individual breathing air at 8,000 feet may take significantly longer to achieve optimum performance at novel tasks than is the case at sea level. For example, this degree of hypoxia has been found to double the reaction times of initial responses to a complex choice-reaction task as compared with the responses at sea level. The intensity of this effect increases with altitude and complexity of the task, markedly so, about 12,000 feet.”²⁸ Studies also noted research subjects exhibited mental performance impairment during task tests that were begun after only 5 minutes²⁹ and 10 minutes³⁰ of exposure to a simulated altitude of 8,000 feet.

Emergency Locator Transmitter Equipment

The airplane’s Artex ELT 110-4 was approved in accordance with Technical Standard Order (TSO)-C91a, and it satisfied the FAA’s equipment requirement specified in 14 CFR 91.207, “Emergency locator transmitters.”³¹ Units approved under TSO-C91a operate on the frequency of 121.5 MHz at a power output of 0.1 Watt. According to data from the National Oceanic and Atmospheric Administration (NOAA),³² only about one in five 121.5-MHz alerts originate from actual ELT units, and actual alert signals are not discernible from many non-ELT sources that produce interference. Fewer than 2 in 1,000 121.5-MHz alerts are from actual

²⁶ Harding, R.M.; Gradwell, D.P. 1999. *Hypoxia and Hyperventilation*. In: Aviation Medicine, Third Edition. Butterworth Heinemann, Oxford, U.K. p. 55.

²⁷ According to the FAA Aeronautical Information Manual, paragraph 8-1-2, “Effects of Altitude,” hypoxia is “a state of oxygen deficiency in the body sufficient to impair functions of the brain and other organs.”

²⁸ Harding and Gradwell. 1999. p. 53.

²⁹ Kelman, G.R.; Crow, T.J. 1969. *Impairment of mental performance at a simulated altitude of 8,000 feet*. In: Aerospace Medicine 40 (9). pp. 981-982.

³⁰ Denison, D.M.; Ledwith, F.; Poulton, E.C. 1966. *Complex reaction times at simulated cabin altitudes of 5,000 feet and 8,000 feet*. In: Aerospace Medicine. pp. 1010-1013. October 1966.

³¹ According to 14 CFR 91.207, “Emergency locator transmitters,” a U.S.-registered civil airplane must be equipped with an approved automatic-type ELT. According to 14 CFR 135.25, “Aircraft requirements,” no certificate holder may operate an aircraft under this part, unless that aircraft “... meets the applicable airworthiness requirements of this chapter.” The chapter includes the requirements outlined in Part 91.

³² Information obtained November 22, 2005, from the home page of NOAA National Environmental Satellite, Data, and Information Service (NESDIS), *Comparison of the 406 MHz and 121.5 MHz Distress Beacons*, <<http://www.sarsat.noaa.gov>>.

distress situations. Since 121.5-MHz units transmit signals anonymously, the only way to ascertain whether or not an alert is an actual distress situation is to dispatch resources to investigate the location. The position accuracy of 121.5-MHz units is approximately 12 to 15 nm.

In contrast, ELT units approved in accordance with TSO-C126 operate at a frequency of 406 MHz at a power output of 5 Watts. According to NOAA data, all alerts originate from actual ELT units as digital, coded signals that are detected near-instantaneously by satellites; about 1 in 12 alerts are from actual distress situations. The coded signals provide searchers with aircraft registration and point of contact information. The position accuracy of 406-MHz units is approximately 1 to 3 nm, and some units are enhanced with an integral GPS feature that enables position accuracy of less than 100 yards.

According to 59 *Federal Register* (FR) 32050, published on June 21, 1994, the FAA stated, “Voluntary use of the 406-MHz ELTs would provide a definite enhancement over the minimum requirements of the Federal Aviation Regulation.³³ There may be even more life-saving benefits ... for those operations conducted over water and in remote areas.” Further, according to 66 FR 34913, published on July 2, 2001, the COSPAS-SARSAT program decided to cease the satellite processing of 121.5-MHz signals by February 2009 because those signals “inundate search and rescue authorities with poor accuracy and numerous false alerts, adversely impacting the effectiveness of lifesaving services.” COSPAS-SARSAT reported this decision was made, in part, in response to guidance from the International Civil Aviation Organization and further stated that, “although the 406-MHz beacons currently cost more, they provide search and rescue agencies with more reliable and complete information to do their job more efficiently and effectively.”

³³ According to 14 CFR Part 91.207, only an “approved automatic-type ELT” is required, which includes approved 121.5-MHz units.

ANALYSIS

The unpressurized airplane collided with mountainous terrain at an elevation of 14,650 feet msl in a box canyon about 80 nm west of the departure airport in daylight visual meteorological conditions. The wreckage was located approximately 25 nm northwest of the operator's typical route between the departure airport, OAIX, and the destination airport, OAFR. Prior to takeoff, the crew had announced to the air traffic control tower a departure heading to the south, which was consistent with the typical route, but the airplane instead turned to the northwest immediately after departure.

The CVR recording, which began when the airplane was already in cruise flight, yielded no discussions among the crew regarding their decision to deviate from the typical route. However, given that the pretakeoff briefing included intelligence that there were no military threats expected for the route and that the airplane deviated from that route immediately after takeoff, the crew's decision to deviate likely was not made on the basis of perceived ground threats. Further, the mechanic-certificated passenger, who, according to the CVR was assisting with navigation duties, was familiar with the route structures and commented, "we don't normally go this route." It is not clear when the crew decided to fly the northerly route, but it is clear that the crew intentionally did not follow the direct route to OAFR and continued the flight through the Bamiyan Valley. The captain even commented that this was the first clear day since he'd been in Afghanistan and that at times he was open to "play" and "do some explorin'."

The captain and the first officer were both experienced in mountain flying, and the CVR transcript of discussions between the captain and the first officer indicated they were behaving unprofessionally and were deliberately flying the nonstandard route low through the valley for "fun." The captain commented that the visibility was outstanding and that it takes such extraordinary conditions to enable him to "get down in ... and do some [expletive] like this." This comment, combined with his comments about having fun and that he "wouldn't have done this if we were at gross," indicates that the captain made a conscious decision to fly the airplane in the manner in which he was flying and that he wouldn't have chosen to fly the airplane in such a manner if the airplane had been at maximum gross weight.

The discussions among the flight crew also indicated they were aware the airplane was approaching the terminus of a box canyon more than 15 minutes before the airplane struck terrain. Prior to collision with terrain, the captain made statements that indicated he was uncertain the airplane could clear the terrain and that he hesitated in making a decision on whether to continue to climb the airplane or to turn it around. According to the airplane's performance charts, at the atmospheric conditions present at the time and the altitude of the accident site, the accident airplane would have been able to establish a climb. However, the pilots would have to ensure that the climb was initiated in sufficient time to enable the airplane to clear the mountain ridge. In the final seconds of the flight, it was the mechanic seated in the cockpit jumpseat who prompted the captain to make a decision whether or not to execute an 180° turnaround and who prompted the first officer to call off the airspeeds for the captain to assist with preventing a stall. The airplane collided with the rising terrain in a direction consistent with

an attempted 180° turnaround. The terrain was rocky, snow-covered, and void of trees and vegetation.

Because of radar coverage limitations, the flight's cruise altitude is not known, however, the floor of the box canyon rose from a minimum elevation of about 11,000 feet msl, and the airplane collided with terrain at 14,650 feet msl. The airplane was not pressurized, and neither the captain nor the first officer was using the airplane's oxygen system as required by Federal regulations. According to studies, from 10,000 to 15,000 feet msl, a person without supplemental oxygen can be expected to be impaired by hypoxia, yet the person will exhibit few or no signs, have virtually no symptoms, and will likely be unaware of the effect. Studies also noted mental performance impairment in research subjects on tests beginning after only 5 minutes³⁴ and 10 minutes³⁵ of exposure to a simulated altitude of 8,000 feet. In this accident, the flight crew was vulnerable to the effects of hypoxia because they were not using supplemental oxygen as required; however, there was insufficient evidence to determine the extent to which hypoxia affected the crew's performance.

The DoD contract flights were flown "GPS direct" at the pilots' discretion. The company flight plans filed by each crew contained only destination information and did not define specific routes of flight. According to 14 CFR 135.79, "Flight locating requirements," an operator must have procedures established that provide for timely notification of a search and rescue facility if an aircraft is overdue or missing; Presidential Airways had no such procedures for its DoD contract operations. According to 32 CFR 861.4(c)(3), the DoD was required to evaluate its contract operators; as part of the evaluation, an "air taxi operator is expected to demonstrate some type of effective flight following capability."

The Presidential Airways director of operations stated that crews were required to report their remote site arrival times to the operations center at OAIX. However, the operator's communications capabilities were limited at some remote sites, so crews were allowed simply to log their remote site arrival times upon their return to OAIX, at the completion of the entire mission. Because of this practice, it was not unusual for the operations center not to hear from a flight at every arrival site. Therefore, although the accident flight never arrived at OAFR (its first destination) as expected at 0955, the operator was unaware the airplane was missing until about 1415, which was when military personnel at OAFR reported that the airplane had never arrived.

When telephone and radio searches failed to locate the airplane, air search and rescue operations were initiated by the military about 1540. By the time the air searches were initiated, the injured survivor had been stranded at the downed airplane for about 7 hours. His rescue was further delayed when the subsequent 5 hours of aerial searches were focused in areas where the airplane had not flown; military search and rescue personnel were initially dispatched to search the area

³⁴ Kelman and Crow. 1969. pp. 981-982.

³⁵ Denison, Ledwith, and Poulton. 1966. pp. 1010-1013.

along the flight's alternate destination route and then the area south of OAIX, based on the operator's assumption that the flight had followed the typical route.

Military radar data of the airplane's last known position, which showed the airplane actually departed to the northwest, were provided to searchers about 2100; subsequent searches were then focused northwest of OAIX, based on the radar-derived position. A 121.5-MHz signal was detected in the northwest search area about 0500 on November 28, 2004, and search aircraft located the wreckage about 0815. According to the military, weather did not significantly affect search and rescue efforts on the day of the accident. By the time the wreckage was identified, however, adverse weather had moved in that prevented rescue personnel from reaching the site until 0630 on November 30, 2004.

A review of the autopsy report for the active-duty military passenger, who initially survived at the accident site but died before help arrived, indicated that none of his injuries were immediately life threatening. One injury diagnosis, in particular, was consistent with at least 8 to 9 hours of survival.³⁶ Moreover, urine evidence from the accident scene and from the passenger's autopsy,³⁷ as well as medical research data regarding urine output rates³⁸ and bladder capacities,³⁹ indicate that a minimum of nearly 10 hours would have passed from the time of the accident to the time of his death.⁴⁰ Thus, the information available to the Safety Board is consistent with an absolute minimum survival time of approximately 8 hours following the accident. If the passenger had received medical assistance within that time frame, followed by appropriate surgical intervention, he most likely would have survived.

Presidential Airways was a civilian operator under contract to the DoD to provide transport services under Part 135 and Part 861 for U.S. military personnel and cargo. The operator had been providing services in Afghanistan for about 2 months, and it dispatched flights from its operations center at OAIX. During the year before the accident, the FAA visited Presidential Airways' facility in Florida more than 100 times. During those visits, the FAA identified minor discrepancies, which the operator subsequently corrected, and no violations

³⁶ The autopsy report noted, "laceration of the mesentery of the transverse colon and a portion of the small bowel with associated ischemic bowel (10 inches in greatest length)." A photograph of that section of injured bowel showed that it had darkened to an almost-black color due to the loss of blood supply to the injured area. Such discoloration was noted in animal studies to begin after approximately 8 to 9 hours following loss of blood supply to the section of bowel. (Source: Marston, A. 1971. *Experimental aspects of superior mesenteric artery occlusion*. In: *Vascular Disorders of the Intestine*. Appleton-Century-Crofts, New York, NY. pp. 345-357.)

³⁷ The passenger's bladder contained 140 mL of urine at autopsy.

³⁸ Based on the passenger's extensive internal bleeding, his urine output would likely not have been much higher than 30 mL per hour. (Source: American College of Surgeons Committee on Trauma, *Advanced Trauma Life Support for Doctors Student Course Manual*, Chicago, 1997 p. 98.)

³⁹ The first urge to urinate is generally felt when the bladder contains about 150 to 250 mL of urine. (Source: Tanagho, E.A.; Lue, T. F. 2004. *Neuropathic Bladder Disorders*. In: *Smith's General Urology*, Sixteenth Edition. Lange Medical Books, New York, NY. pp. 435-452.)

⁴⁰ This assumes that the passenger emptied his bladder immediately following the accident and voided again upon initially feeling the urge to do so.

were issued. Although the FAA approved that the operator could conduct Part 135 operations in Afghanistan, the operator did not provide, and was not required to provide, personnel who could directly oversee the operations there.

Although the DoD contract stated that the company must operate in accordance with Part 135 specifications, evidence indicates that Presidential Airways' operations in Afghanistan were not in accordance with Part 135 in areas, such as the use of flight plans, supplemental oxygen, and flight locating, and no FAA personnel were present in Afghanistan to ensure adherence to the specifications. Further, according to Federal regulations, the DoD had the responsibility to oversee Presidential Airways to ensure an enhanced level of service was provided to coincide with the DoD mission. However, no evidence was found to suggest that DoD personnel ensured that the operator demonstrated some type of effective flight-following capability or ensured any oversight. The Safety Board is concerned that the unique risks and oversight challenges presented by operations in remote overseas locations have not been adequately addressed for civilian contractors that provide air transportation services to the U.S. military.

In summary, the Safety Board concludes:

- The flight crew flew a nonstandard route into a box canyon and did not take remedial action in a timely manner.
- The flight crew did not use supplemental oxygen as required by Federal regulations for the altitudes at which the flight was operating.
- The operator did not provide sufficient oversight of and guidance to its flight crews.
- The operator did not ensure that operations in Afghanistan were conducted in compliance with Part 135 regulations.
- The operator's dispatch procedures were inadequate in that they did not ensure that specific routes of flight were defined and flown.
- The operator did not adequately mitigate the limited communications capability at some remote sites.
- The operator's flight-locating procedures were inadequate in that they did not consistently track flight arrivals at each remote location in a timely manner.
- Once the airplane was identified as missing, the coordination of the search and rescue effort was flawed, and radar data of the airplane's last known position were not provided to searchers in a timely manner.

- The FAA did not provide adequate oversight of the Part 135 operations in Afghanistan.
- The DoD did not provide adequate oversight of the contract carrier's operations in Afghanistan that was consistent with the safety provisions of the DoD's contract with Presidential Airways and the regulations in 32 CFR Part 861.
- If the passenger had received timely medical assistance, followed by appropriate surgical intervention, he most likely would have survived.

PROBABLE CAUSE

The captain's inappropriate decision to fly a nonstandard route and his failure to maintain adequate terrain clearance, which resulted in the inflight collision with mountainous terrain. Factors were the operator's failure to require its flight crews to file and to fly a defined route of flight, the operator's failure to ensure that the flight crews adhered to company policies and FAA and DoD Federal safety regulations, and the lack of in-country oversight by the FAA and the DoD of the operator. Contributing to the death of one of the passengers was the operator's lack of flight-locating procedures and its failure to adequately mitigate the limited communications capability at remote sites.

Member Hersman, Concurring:

This accident presented a rather unique set of circumstances for the Safety Board to consider. We were asked to investigate a civilian accident that occurred in a theater of war while the operator was conducting operations on behalf of the Department of Defense. In analyzing the facts of this accident and in devising safety recommendations to address the problems that surfaced in the accident, the Safety Board has had some difficulty in determining whether recommendations should go to the FAA, as the Federal agency with safety oversight over civilian air operations, or to DoD, as the agency that had more actual control over the nature and conduct of this particular flight. Staff's recommendation for a solution to this dilemma is to issue recommendations to both agencies and then further recommend that DoD and FAA in the future articulate between themselves to what extent each agency has safety oversight in similar circumstances. Given the large number of these types of flights, it is perplexing that DoD and FAA have not executed a Memorandum of Understanding to memorialize the nature of their relationship with regard to these flights.

At first glance, the solution proposed by staff seems to be the best response for a third party Federal agency, like the NTSB, to take in this politically delicate situation. However, on a second look, it becomes apparent that it leaves open too many questions about control and responsibility and provides no real roadmap for dealing with the next atypical military contract/civilian air operation that ends in a crash.

Furthermore, the proposed recommendations in this report leave open the expectation that FAA can and does have oversight responsibility in a war theater halfway around the world, even though FAA does not have any oversight personnel assigned there. Our recommendations to FAA would imply that the Safety Board believes that FAA should have personnel assigned to oversee operations in Afghanistan, Iraq, and presumably any other military or intelligence theater, simply because DoD or other government entities have chosen to contract flights to civilian operators. This is an uncomfortable position for this Board member, given the fact that FAA resources are already stretched thin to effectively perform their safety oversight responsibilities for civilian air operations based in the U.S.

This position is even more difficult to defend given the fact that the NTSB, whose investigative authority also is limited to civilian air operations, did not have a presence in Afghanistan. In fact, the Safety Board's policy, with which I do not disagree, is to *not* send its investigators to war theaters or other scenes of hostile military activities. In the case of this accident, the Safety Board's analysis and report are based on facts and evidence gathered by DoD, because Safety Board investigators did not go to the scene. If this accident was the result of a civilian operation over which the FAA should have exercised its oversight authority, then it should have been considered a civilian accident in which the Safety Board should have exercised its investigative authority. This is not to suggest that the Safety Board should change its policy about deploying investigators to hostile military environments. Rather, this suggests that if the Safety Board did not consider the environment surrounding this accident safe enough in which to conduct a civilian accident investigation, it may not be appropriate to conclude that the FAA was

wrong to have delegated its civilian safety oversight functions to the DoD in the same environment.

While I am signing this report as written, I continue to have reservations about the appropriateness of citing FAA in the probable cause for this accident when it is clear that this was a dangerous environment for their inspectors and clearly a military operation subject to DoD control. I believe that it would have been more fitting simply to address recommendations to the FAA so that this situation can be clarified and corrected in the future. The Safety Board, for example, could have recommended that FAA refuse to list countries on an operator's Ops Specs if there is no established mechanism for in-country oversight comparable to the FAA's domestic oversight.

I understand and appreciate the sensitivity of this accident investigation and the difficulty it presented the Safety Board in concluding a probable cause and making recommendations to address it. On the other hand, it is not unreasonable, given DoD's current inclination to contract many of its operations to civilians, that this situation will arise again.

[Original Signed]

Deborah A. P. Hersman