National Transportation Safety Board
Washington, D.C. 20594

Aircraft Accident Brief

Accident number:	LAX05FA015
Operator:	Med Flight Air Ambulance, Inc.
Aircraft and registration:	Learjet 35A, N30DK
Location:	San Diego, California
Date:	October 24, 2004
Adopted on:	May 23, 2006

HISTORY OF FLIGHT

On October 24, 2004, about 0025 Pacific daylight time,[1] a Learjet 35A, N30DK, registered to and operated by Med Flight Air Ambulance, Inc. (MFAA), crashed into mountainous terrain shortly after takeoff from Brown Field Municipal Airport (SDM), near San Diego, California. The captain, the copilot, and the three medical crewmembers were killed, and the airplane was destroyed. The repositioning flight was operated under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91 with an instrument flight rules (IFR) flight plan filed. Night visual meteorological conditions prevailed.

The accident flight was the fourth and final leg of a trip that originated the previous day. ATI Jet, Inc. (ATIJ), dispatched the airplane, the two flight crewmembers, and two of the medical crewmembers from Albuquerque International Sunport (ABQ), Albuquerque, New Mexico, about 1500 on October 23, 2004, for a repositioning flight to pick up another medical crewmember and a transport flight to pick up a medical patient in Mexico. According to MFAA personnel, repositioning flights were conducted under 14 CFR Part 91 rules, and medical patient transport flights were operated under Part 135.

On the flight's first leg, the airplane departed ABQ about 1520 and landed at El Paso International Airport (ELP), El Paso, Texas, about 1555 to pick up the third medical crewmember. On the flight's second leg, the airplane departed ELP about 1625 for Playa De Oro International Airport (MMZO), Manzanillo, Mexico, where it landed about 1825 to pick up the medical patient and one accompanying passenger. On the flight's third leg, the airplane departed MMZO about 2040 and flew to SDM,[2] where it landed about 2324 to drop off the medical

[1] All times are Pacific daylight time unless otherwise indicated.

[2] The flight was on an IFR flight plan from MMZO to SDM, and an air traffic controller at the Southern California Terminal Radar Approach Control had cleared the flight for the "VOR [very high frequency omnidirectional range] – A" approach. The flight crewmembers told the controller that they had visual contact with the airport, and they canceled the flight's IFR clearance. The flight proceeded to SDM on a visual approach.

patient and the passenger. The airplane was then met by U.S. Customs Service personnel and was on the ground for about 1 hour before it departed on the accident flight to return the airplane to its base at ABQ.

A review of records from the San Diego Flight Service Station (FSS) revealed that one of the flight crewmembers filed the IFR flight plan to ABQ at 0002 on October 24, 2004. The filed route of flight included an estimated 0020 departure from SDM with a cruise altitude of flight level 370 (37,000 feet pressure altitude) direct to Palm Springs, California, and then direct to ABQ. The flight plan included an estimated time en route of 1 hour 15 minutes with 3 hours of fuel on board the airplane. The flight crewmember did not request any weather information or an IFR clearance and clearance void time.[3]

The cockpit voice recorder (CVR) recording revealed that the captain and the copilot listened to the SDM automatic terminal information service (ATIS) recording; however, they listened only to the remarks portion of the recording and did not listen to the weather information. The copilot then attempted to contact "Brown Field Municipal clearance" on the radio frequency, but he received no response. The captain suggested that the copilot could try contacting the Tijuana tower. The copilot stated he could pick up the flight's clearance in the air but then stated, "I don't want to do it but…."

The copilot then tried to contact the San Diego FSS via the remote communications outlet frequency but received no reply. He next tried to contact the Tijuana tower but again received no reply. Afterward, the copilot tried to contact the San Diego FSS utilizing a different radio frequency but still received no reply. After the copilot's fourth failed attempt to obtain the IFR clearance using the radio, the captain said, "all right, let's just do VFR [visual flight rules]."

According to the operator, the flight crew had a cellular telephone and a satellite telephone on board the airplane. The CVR recording revealed no attempt by either crewmember to telephone the FSS for an IFR clearance and clearance void time.

The captain and the copilot discussed the departure. The captain stated that he wanted to depart from runway 8 to avoid flying over the city of San Diego. He also stated that a runway 8 departure would place the flight on a heading straight toward ABQ, and the copilot agreed with this statement. Neither the captain nor the copilot mentioned the mountainous terrain to the east and northeast as a consideration in deciding which runway to use for departure. The CVR recording revealed that the copilot yawned five times within 6 minutes during the departure discussion.

According to the CVR recording, the captain and the copilot performed the checklist items and set the altimeters to 29.93 inches of mercury (Hg). The copilot then asked for a briefing, to which the captain responded, "uh, let's see. will be standard callouts tonight and, if

[3] When operating from an airport without a control tower, or during hours when a control tower is closed, a pilot may receive an IFR clearance that contains a provision for the clearance to be void if the flight is not airborne by a specific time.

you can't punch up through a nice hole then just uh, you know, stay at a reasonably safe altitude and uh, underneath two hundred and fifty knots, and I'll do the best I can to, get somebody's attention." This statement was followed by the sound of takeoff power being set on the engines.

A review of radar data[4] revealed that the airplane departed runway 8L at 0023 and climbed on a straight-out departure. The published departure procedures for IFR aircraft[5] departing from runway 8L included a climbing left turn to a heading of 280º, which was a nearly complete course reversal to avoid the mountains east and northeast of SDM.

According to air traffic control (ATC) transcripts, the captain contacted the Southern California Terminal Radar Approach Control (SCT TRACON) controller after takeoff to pick up the flight's IFR clearance. The controller told the flight crew to set the transponder to code 7372 and "ident." A review of radar data revealed that the airplane climbed to about 2,300 feet mean sea level (msl) and leveled out, and its flight track remained approximately straight out from the departure runway.

At 0024:55, the controller stated the flight was radar identified, and he instructed the flight crew to turn to a heading of 020°, maintain VFR, and expect an IFR clearance above 5,000 feet msl. The captain acknowledged the heading instructions, and no further radio communication was received from the flight. A review of radar data revealed that, at the time the controller issued the instructions, the flight was about 3.5 nautical miles (nm) west of the mountains, and the heading issued by the controller resulted in a flight track that continued toward the mountains.

The last mode C[6] radar return from the flight at 0025:03 depicted the airplane about 6 nm east of SDM at an altitude of 2,300 feet msl. A review of the controller's display data recording revealed the controller's computer system issued a minimum safe altitude warning (MSAW),[7] which consisted of an aural alert and a visual alert on the controller's display, during the flight's last two mode C radar returns at 0024:59 and 0025:03. At 0025:56, the controller attempted to make radio contact with the flight but received no reply. After the controller's subsequent attempts to contact the flight crew were unsuccessful, a search and rescue operation was initiated.

[4] Any radar-derived position, course, time, or altitude described in this report is intended to illustrate the information available to air traffic control personnel for use as the basis of control instructions or advisories and is not intended to indicate actual airplane performance.

[5] Although the airplane departed under VFR, chapter 5-5-14 of the Federal Aviation Administration Aeronautical Information Manual, "Instrument Departures," states that pilots should consider the type of terrain and other obstructions to determine if obstruction avoidance could be maintained visually or if the departure procedure should be followed.

[6] Mode C is a transponder capability that enables the equipment to report an aircraft's altitude to ground-based interrogator equipment.

[7] MSAW is a function of the controller's computer system that provides alerts when a tracked mode C-equipped aircraft is below, or is predicted by the computer to proceed below, a predetermined minimum safe altitude.

The airplane wreckage was located about 8 nm east of SDM in a mountainous area southeast of Otay Mountain's highest peak. The initial impact point was at an elevation of 2,256 feet msl. The San Diego Police Department's Air Support Unit, which arrived at the site by helicopter about 20 minutes after the accident, used night vision goggles and infrared imaging to locate the wreckage. The Air Support Unit responders reported that they observed a broken-to-overcast layer of clouds near Otay Mountain while flying to the accident site and that the elevation of the main impact crater at the site was about 75 to 100 feet below the observed cloud layer.

PERSONNEL INFORMATION

The director of operations (DO) for ATIJ provided personnel records, training records, drug test results, and duty and flight time records for the captain and the copilot. The information in this section was extracted from that data, Federal Aviation Administration (FAA) records, and pilot logbooks.

The Captain

The captain, age 56, held an airline transport pilot certificate with a rating for airplane multiengine land and type ratings for CL-604 (Challenger) airplanes, IA-Jet (Westwind) airplanes, and Learjet airplanes (the Learjet model was not specified). He also held a commercial pilot certificate with a rating for airplane single-engine land. The captain's most recent FAA first-class airman medical certificate was issued on October 8, 2003, with a limitation that he must possess lenses for near vision.

The captain completed ATIJ's initial general ground training and initial crewmember emergency training, which included a review of the company's previous accidents and incidents, on August 21, 2004. According to ATIJ's DO, the review included a controlled flight into terrain (CFIT) scenario.

From August 23 to 27, 2004, the captain completed a Learjet 35/36 Part 135 pilot recurrent training course. The course was held at FlightSafety International's (FSI) Tucson, Arizona, training facility, and the course included 12 hours of simulator training, 15 hours of ground training, and 4 hours of briefing/debriefing training. During one of the simulator sessions, CFIT was addressed as a special-emphasis area. A review of the captain's FSI training records revealed that he received positive comments from his instructor.

On August 21, 2004, the captain passed the knowledge items required by 14 CFR 135.293, "Initial and Recurrent Pilot Testing Requirements," paragraph (a), items 1 and 8. On August 27, 2004, while at FSI, the captain passed the knowledge tests required by 14 CFR 35.293, paragraph (a), items 2 and 3, and the checkride required by 14 CFR 135.297, "Pilot in Command: Instrument Proficiency Check Requirements." On September 10, 2004, the captain passed the flight check required by 14 CFR 135.299, "Pilot in Command: Line Checks: Routes and Airports," while flying the accident airplane.

An ATIJ pilot personal data form listed the captain's total flight time as 13,000 hours and his total instrument time as 900 hours. A review of the captain's logbook entries between February 1997 and February 2000 revealed that he logged a total of 525 hours of flight time in Learjet 35 airplanes and 639 hours of flight time in Learjet 25D airplanes.

A review of the duty time sheets provided by ATIJ revealed that the captain had accumulated a total of 70 hours duty time and 36 hours flight time during September 2004 and 67 hours duty time and 38 hours flight time during October 2004. All of the flight hours were accumulated in Learjet 35 airplanes.

According to his wife, the captain had flown to SDM at least once before; that flight was in January 2003.

The Copilot

The copilot, age 30, held a commercial pilot certificate and a flight instructor certificate with ratings for airplane single-engine land, airplane multiengine land, and instrument airplane. His most recent FAA first-class airman medical certificate was issued on April 8, 2004, with the limitations that he must wear corrective lenses for distant vision and possess lenses for near vision.

The copilot completed ATIJ's initial general ground training and initial crewmember emergency training on August 21, 2004. As previously stated, the training included a review of the company's previous accidents and incidents, including a CFIT scenario.

From August 23 to 27, 2004, the copilot completed a Learjet 35/36 Part 135 pilot recurrent training course at FSI. As previously stated, during one of the simulator sessions, CFIT was addressed as a special-emphasis area. A review of the copilot's FSI training records revealed that he received positive comments from his instructor.

On April 16, 2004, the copilot passed the competency check and knowledge tests required by 14 CFR 135.293, paragraphs (a) and (b), while flying a Learjet 25. On August 21, 2004, the copilot passed an oral test, as outlined in paragraph (a), items 1 and 8. On August 27, 2004, he passed the tests outlined in paragraph (a), items 2 and 3, while in a Learjet 35A simulator.

An ATIJ pilot personal data form completed by the copilot indicated that he logged a total of 3,000 hours of flight time with 375 hours of instrument time. An MFAA pilot questionnaire indicated that, in 2004, the copilot accumulated about 100 flight hours in a Learjet 25.

A review of the copilot's duty time sheets revealed that he accumulated a total of 74 hours duty time and 29 hours flight time during September 2004 and 54 hours duty time and

32 hours flight time during October 2004. All of the flight hours were accumulated in Learjet 35 airplanes.

A review of the copilot's flight log revealed no record of previous flights into or out of SDM.

Flight Crew 72-Hour History

On October 21, 2004, the captain and the copilot worked a 10-hour duty day that included 7.4 hours flight time in the accident airplane. During a flight leg from Casper, Wyoming, to Battle Creek, Michigan, the airplane had a generator problem, and the captain and the copilot remained overnight in Michigan while the airplane underwent maintenance. On October 22, 2004, the captain and the copilot returned the airplane to its base at ABQ, and each pilot logged 3.3 hours of flight time during 4.3 hours of duty time, which ended at 1730.

After the captain completed his duty day, he spent the evening with his wife and went to bed about 2130. The next morning, which was the day of the first leg of the accident trip, the captain awoke about 0700. He and his wife ate breakfast, read the newspaper, and went shopping. While they were shopping, the captain received a call from MFAA regarding the accident trip. The captain left for ABQ about 1330.

After the copilot completed his duty day on October 22, 2004, he met with his mother-in-law, spent the rest of the evening with his wife relaxing, and went to bed about 2130. The next morning, which was the day of the first leg of the accident trip, the copilot awoke about 0830, helped his in-laws move some furniture, and spent the rest of the morning and early afternoon shopping. According to the copilot's wife, he received the call for the accident trip about 1410. She stated that he drove her home and then left for ABQ.

A review of dispatch logs revealed that, during the 24 hours before the accident, the captain and the copilot each accumulated about 6.5 hours of flight time and about 11 hours of duty time. Title 14 CFR 135.267(b), "Flight Time Limitations and Rest Requirements: Unscheduled One- and Two-Pilot Crews," was applicable to the trip legs before the accident flight that were subject to Part 135 rules. The regulation states the following:

> Except as provided in paragraph (c) of this section, during any 24 consecutive hours the total flight time of the assigned flight when added to any other commercial flying by that flight crewmember may not exceed…10 hours for a flight crew consisting of two pilots.

Paragraph (c) of the regulation states that the flight crewmember's flight time may exceed the flight time limit included in paragraph (b) if the following were to occur:

> The assigned flight time occurs during a regularly assigned duty period of no more than 14 hours, and (1) if this duty period is immediately preceded by and

> followed by a required rest period of at least 10 consecutive hours of rest; (2) if flight time is assigned during this period, that total flight time when added to any other commercial flying by the flight crewmember may not exceed…10 hours for a flight crew consisting of two pilots; and (3) if the combined duty and rest periods equal 24 hours.

AIRPLANE INFORMATION

The airplane was powered by two Honeywell TFE731-2-2B turbine engines. The airplane underwent a medical conversion and was configured to accommodate two flight crewmembers, three medical crewmembers, one medical patient, and one additional passenger. A review of the engine logbooks revealed that a 150-hour inspection was completed on May 12, 2004, with an airplane total time of 10,031 hours, a left engine total time of 9,794 hours, and a right engine total time of 9,871 hours.

MFAA purchased the airplane in July 2004. Between June 1, 2004, and August 10, 2004, when the airplane had a total time of 10,048 hours, the airplane underwent maintenance at Garrett Aviation Service Center in Houston, Texas. The maintenance included the airplane's 12-year/6,000 landings inspection; 12,000-hour inspection; and multiple phase A, B, and C inspections, as outlined in the manufacturer's maintenance schedules. On August 31, 2004, the airplane underwent a Part 135 conformity inspection at ATIJ's maintenance facility; at the time, the airplane had accumulated 10,049 hours. At the time of the accident, the airplane had accumulated 10,188 hours.

According to MFAA and ATIJ personnel, the airplane was scheduled to have a terrain awareness and warning system (TAWS) installed in January 2005.[8]

METEOROLOGICAL INFORMATION

The official weather observation at SDM is provided through an automated surface observing system (ASOS) recording, which pilots can access by telephone. Information from the ASOS is used to update the ATIS recording.

The ASOS reports before the time of the accident were as follows: at 2317, the reported conditions were scattered clouds at 2,100 feet above ground level (agl), visibility 8 miles,[9] temperature 14° Celsius (C), dew point 12º C, and altimeter setting 29.93 inches of Hg. At 2353, reported conditions were winds calm, ceiling overcast at 2,100 feet agl, visibility 8 miles, temperature 14º C, dew point 12º C, and altimeter setting 29.92 inches of Hg. About the same time, the weather observing facility at San Diego International Airport (SAN), which is located

[8] The purpose of a TAWS is to determine possible terrain conflicts along the airplane's flightpath and provide a warning to pilots in time for them to take corrective action. According to 14 CFR 91.223, turbine-powered airplanes configured with six or more passenger seats, excluding any pilot seat, were required to be equipped with an approved TAWS no later than March 29, 2005; the same was required under 14 CFR 135.154 for turbine-powered airplanes configured with six to nine passenger seats.

[9] Visibility is expressed in statute miles.

16 nm northwest of SDM, reported winds from 340º at 4 knots, visibility 10 miles, and a broken layer of clouds at 3,000 feet agl.

The ASOS and ATIS recordings did not include, and were not required to include, any information about the mountainous terrain near SDM. Since the time of the accident, the ATIS recording was updated to include a terrain caution to pilots during hours when the control tower is closed.

AIRPORT INFORMATION

SDM is at an elevation of 526 feet msl and is located about 5 nm north of the U.S.-Mexico border and 13 nm southeast of San Diego on the Otay Mesa. The rising terrain associated with the Otay Mountain peaks begins about 2 nm east-northeast of SDM, and the highest terrain, at an elevation of 3,566 feet msl, is located about 7 nm east of SDM. The FAA Airport/Facility Directory (AFD) listing for SDM did not include, and was not required to include, information about the mountainous terrain near the airport. Since the time of the accident, the AFD listing for SDM was revised to include terrain information.

SDM has two runways, 8L/26R and 8R/26L, and a federally contracted ATC tower. The tower operates Monday through Friday from 0800 to 2200 and is closed on weekends. When the tower is closed, pilots use the common traffic advisory frequency when operating to and from the SDM traffic area. The airport is served by two instrument approach procedures: "VOR [very high frequency omnidirectional range] or GPS [global positioning system] – A" and "GPS RWY [runway] 8L."

Air Traffic Control Information

The SCT TRACON is a level 12 facility classified as a combined radar approach control. The facility provides approach and departure services for most airports in the southern California area, including SDM. At the time of the accident, the west radar (WESR) controller position was responsible for airspace within 40 nm of SAN, ranging from the surface to 17,000 feet msl; the WESR controller handled no other aircraft for the duration of the accident flight.

The controller who was working the WESR position entered duty with the FAA on December 4, 1987, and worked at the SCT TRACON between 1994 and 1995. He returned to the SCT TRACON in February 1998 and achieved area certification on December 8, 1999. The controller previously worked at SDM tower and SAN tower.

On October 23, 2004, the controller worked a shift from 0630 to 1430. He then returned for duty at 2300 for his scheduled midnight shift, which was from 0000 to 0800 on October 24, 2004. The controller stated that he rested, but did not sleep, before reporting for the midnight shift and that he was not tired when he handled the accident flight. (The controller added that he would sometimes sleep before a midnight shift and that sometimes he was tired.) The accident shift, which was on a Sunday, was the last shift of his workweek, and Monday and Tuesday were his regular days off.

According to ATC transcripts and radar data, at 0024:12, when the flight was about 2 nm east of SDM and at an altitude of 1,800 feet msl, the captain contacted the controller and stated, "off brown field at this time squawking vfr with the ifr please to albuquerque." The controller replied, "lifeguard three zero delta kilo squawk seven three seven two and ident please."

At 0024:46, the SCT TRACON automated radar terminal system (ARTS)-III indicated that the flight's transponder code had changed, as instructed by the controller. Radar data showed that the flight was about 4 nm east of SDM and had leveled at 2,300 feet msl.

At 0024:55, the controller stated, "lifeguard three zero delta kilo radar contact cleared through class b airspace for now fly heading of zero two zero [degrees] maintain vfr and as soon as you get above five thousand [feet] I'll uh have an ifr clearance for ya." The captain stated, "ok uh zero two zero heading and uh lifeguard zero two uh zero delta kilo roger." Radar data showed that the flight was about 4.5 nm east of SDM and at an altitude of 2,300 feet msl.

During a postaccident interview, the controller stated that he issued the 020º heading to keep the flight away from Mexico's airspace, which he explained was his first priority. The controller further stated that he issued the 020º heading to turn the airplane toward the first waypoint on its filed route of flight, which he explained was his second priority.

The controller stated that he was aware of the mountainous terrain east SDM. When asked why he took no action to warn the flight crew of the airplane's proximity to terrain, the controller stated that it was the pilot's responsibility to avoid terrain when operating under VFR. The controller stated that he did not distinguish between day or night operations when providing VFR advisories to pilots. The controller also stated that he was aware of the cloud ceiling at 2,100 feet agl and that he expected the pilots to maintain VFR and to advise him if they were unable to do so.

At 0024:59, the controller's computer system generated MSAW aural and visual alerts on his display. The MSAW alerts ended 4 seconds later at 0025:03. A review of the radar playback indicated the visual alert on the controller's radar display was depicted as a flashing "LA" (low altitude) in the ARTS data block for the flight. At the time, radar data showed that the flight was 5 nm east of SDM at an altitude of 2,400 feet msl and was tracking an easterly heading. The minimum vectoring altitude (MVA)[10] in this area was 5,000 feet msl. The airplane's radar track continued for another 15 seconds, but no altitude readout was displayed. The last radar return was received at 0025:18, and it showed the flight 6 nm east of SDM and tracking an easterly heading. At 0025:22, the flight's data block indicated "coast" status, indicating that the SCT TRACON computer system could no longer associate the flight plan information with radar returns.

At 0025:33, the controller contacted the Tijuana approach controller via the landline and advised, "got a point for ya about six northeast of tijuana trying to pick him up vfr right now and

[10] The MVA is the lowest msl altitude at which a radar controller can vector an IFR aircraft.

turn him northwestbound out of…northbound out of your airspace uh beacon code seven three seven two." The Tijuana controller responded by saying, "point out approved."

During a postaccident interview, the controller stated that he did not hear or observe the MSAW alerts because he was on the landline with the Tijuana approach controller. He stated that, once he completed coordination, he returned his attention to his radar display and observed that the flight's data block had gone into coast status. According to radar and communication data, the MSAW alerts began 34 seconds before the controller initiated the call to the Tijuana controller. Radar contact with the airplane had been lost for 15 seconds when the controller began coordinating the flight's position with the Tijuana controller.

At 0025:56, the SCT TRACON controller stated on the frequency, "lifeguard zero delta kilo uh radar contact lost say altitude," but received no reply. The controller made several more attempts to make radio contact with the flight. After receiving no reply from the flight crew, the controller contacted Tijuana approach control and asked if the controllers observed the flight on radar, but no one had observed the flight. The controller notified his supervisor that he lost radar and radio communication with the flight, and facility personnel initiated search and rescue procedures.

FLIGHT RECORDERS

The airplane was equipped with a Collins 642C-1 CVR, serial number 3951. The CVR arrived at the National Transportation Safety Board's Vehicle Recorders Laboratory on October 26, 2004. The CVR sustained significant structural damage and was dented and compressed along its longitudinal axis. The case was cut away to access the recorder tape. The interior of the tape recorder appeared undamaged. The tape included three channels of excellent-to-good quality audio information.[11] A CVR group convened on November 4, 2004, and a transcript was made for the recording. The transcript began at 2359:58 when the captain and the copilot powered the airplane and began preparing for departure, and it continued until 0025:28 when the airplane collided with terrain. Time references in the CVR transcript were established utilizing times correlated from the ATC transcript.

WRECKAGE AND IMPACT INFORMATION

The initial impact point was at the 2,256-foot level of the west side of the mountain range on a 32º slope. The wreckage debris was distributed about 500 feet up the side of the mountain along a magnetic heading of 040º. The impact crater was about 48 feet wide.

The impact crater displayed three large, deep, oval-shaped impact marks connected by a shallower impact line. One of the oval marks was on the left side of the crater, one was in the approximate center of the crater, and one was on the right side of the crater. A piece of wingtip

[11] The Safety Board uses the following categories to classify the levels of CVR recording quality: excellent, good, fair, poor, and unusable. An excellent quality recording is one in which virtually all of the crew conversations can be accurately and easily understood. A good quality recording is one in which most of the crew conversations can be accurately and easily understood.

fuel tank with a red navigation light was about 9 feet to the left of the crater. Another piece of tip tank with a green navigation light was about 120 feet to the right of the impact crater. The brush located adjacent to the impact crater displayed branches that were freshly broken; inclinometer measurements revealed that the branches on the left side were broken about 10º lower than those on the right side.

All of the airplane's flight control surfaces were identified throughout the debris field. All fracture features were bent and distorted. The horizontal and vertical stabilizers remained attached to each other but were separated from the rest of the airplane. The rudder and elevator remained attached to the vertical stabilizer and horizontal stabilizer, respectively. The engines separated from the fuselage and were relatively close to the tail section. A section of the right inboard wing with the right flap and right spoiler attached remained in the impact crater. Sections of the left aileron, left flap, left spoiler, and right aileron were located in the debris field.

The right engine was separated from its cowling and was fragmented. The left engine remained enclosed by its cowling but sustained significant impact damage. The compressor blades for both engines displayed bending opposite the direction of rotation; many blades were bent nearly 90º, and some blades were separated from their rotor disk attach points.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies were performed on the captain and the copilot by the County of San Diego's Office of the Medical Examiner. The autopsy reports stated the cause of death for both the captain and the copilot was "blunt and sharp force injuries." The reports indicated no evidence of preaccident physical incapacitation or impairment of either flight crewmember.

Forensic toxicology was also performed by the medical examiner on specimens from both crewmembers. The toxicological studies were negative for performance-impairing drugs. According to the medical examiner's reports, the quantities of ethanol detected in the captain's and the copilot's specimens were "believed to be postmortem fermentation artifact."

ORGANIZATIONAL AND MANAGEMENT INFORMATION

MFAA, which was located in Albuquerque, owned the airplane and employed the captain, the copilot, and the medical crewmembers. MFAA had an aviation services agreement with ATIJ (from September 1, 2004, to August 31, 2005) under which ATIJ leased the airplane from MFAA and used MFAA's crewmembers to conduct charter operations under ATIJ's Part 135 certificate. According to 14 CFR 119.3, a "wet lease" is "any leasing agreement whereby a person agrees to provide an entire aircraft and at least one crewmember." Further, 14 CFR 119.53(b) states, in part, "no certificate holder…may wet lease from…any person not authorized to engage in common carriage." MFAA did not hold a certificate to conduct common carriage. The Safety Board notes that the agreement was approved by the FAA principal operations inspector (POI) for ATIJ prior to the accident. On June 10, 2005, the FAA issued Notice 8400.83 to its inspectors clarifying the regulation that such wet lease agreements are prohibited.

ATIJ, which was located in El Paso, held a Part 135 certificate to conduct on-demand common carriage operations. The FAA POI who approved ATIJ's operations specifications was located at the Albuquerque Flight Standards District Office. A review of the operations specifications revealed that ATIJ was authorized to perform flights under Part 91 without obtaining an FAA letter of authorization for the purposes of flight crewmember training, maintenance testing, ferrying, repositioning, and carrying company officials, provided that these flights were not performed for compensation or hire and that no charge of any kind was made for the conduct of the flights.

Although ATIJ's operations specifications stated that the company was authorized to conduct repositioning flights under Part 91, the aviation services agreement between ATIJ and MFAA stated that ATIJ "shall retain operational control[12] of the aircraft under Part 135 during lease periods." During the investigation, the Safety Board made repeated requests to the FAA to determine which company was the operator of the Part 91 accident flight. The FAA did not make such a determination. In the absence of an answer from the FAA, it was the joint position of MFAA and ATIJ that, at the time of the accident, MFAA was the operator.

According to the aviation services agreement, ATIJ was also responsible for ensuring that the required maintenance of the airplane was performed by an authorized facility, the flight crewmembers were appropriately trained in accordance with their approved training program, and a log of all maintenance and pilot records was maintained while the airplane was operated under the terms of the agreement. In return, MFAA paid ATIJ a management fee of $2,500 per month and maintained insurance on the airplane.

According to MFAA personnel, publications on board the airplane that were available to the flight crewmembers included world aeronautical charts, high- and low-altitude en route instrument charts, the U.S. Government Flight Information Publication of U.S. Terminal Procedures, and the Jeppesen Sanderson instrument approach procedures for Canada and Mexico.

ADDITIONAL INFORMATION

Pilot Responsibilities

Title 14 CFR 91.103, "Preflight Action," states, "each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight." Title 14 CFR 91.119, "Minimum Safe Altitudes: General," states in paragraph (c) that no person may operate an aircraft below an altitude of 500 feet agl over noncongested areas.

When the captain and the copilot flew the airplane from MMZO to SDM with a medical patient on board, that leg of the flight was operated under the provisions of 14 CFR 135. Title 14 CFR 135.299 paragraph (c) states the following:

[12] The FAA defines operational control of a flight as the exercise of authority over initiating, conducting, or terminating a flight.

> Each certificate holder shall establish in the manual required by [14 CFR] 135.21 a procedure which will ensure that each pilot who has not flown over a route and into an airport within the preceding 90 days will, before beginning the flight, become familiar with all available information required for the safe operation of the flight.

ATIJ's Standard Operating Procedures Manual, states, under the section "Crew Takeoff Briefing (Lear[jet] 35)," "the pilot in command will brief any special or unusual conditions that may arise such as high terrain, windy conditions, etc."

FAA Aeronautical Information Manual (AIM) chapter 4-4-8, "VFR/IFR Flights," states the following:

> A pilot departing VFR, either intending to or needing to obtain an IFR clearance en route, must be aware of the position of the aircraft and the relative terrain/obstructions. When accepting a clearance below the MEA [minimum en route altitude]/MIA [minimum IFR altitudes]/MVA/OROCA [off-route obstruction clearance altitude], pilots are responsible for their own terrain/obstruction clearance until reaching the MEA/MIA/MVA/OROCA. If pilots are unable to maintain terrain/obstruction clearance, the controller should be advised and pilots should state their intentions.

FAA AIM chapter 5-1-2, "Follow IFR Procedures Even When Operating VFR," states the following:

> When flying VFR at night, in addition to the altitude appropriate for the direction of flight, pilots should maintain an altitude which is at or above the minimum en route altitude as shown on the charts. This is especially true in mountainous terrain, where there is usually very little ground reference. Do not depend on your eyes alone to avoid rising unlighted terrain.

FAA AIM chapter 5-5-14, "Instrument Departures," states that pilots should do the following:

> 1. Prior to departure consider the type of terrain and other obstructions on or in the vicinity of the departure airport. 2. Determine if obstruction avoidance can be maintained visually or that the departure procedure should be followed. 3. Determine whether a departure procedure and/or DP is available for obstruction avoidance.

Air Traffic Control Procedures

According to FAA Order 7110.65P, chapter 4-2-8, "IFR-VFR and VFR-IFR Flights," procedures for personnel who provide ATC services include the following:

b. Treat an aircraft planning VFR for the initial part of flight and IFR for the latter part as a VFR departure. Issue a clearance to this aircraft when it requests IFR clearance approaching the fix where it proposes to start IFR operations.

d. When a VFR aircraft, operating below the minimum altitude for IFR operations, requests an IFR clearance and you are aware that the pilot is unable to climb in VFR conditions to the minimum IFR altitude:

1. Before issuing a clearance, ask if the pilot is able to maintain terrain and obstruction clearance during a climb to the minimum IFR altitude.

NOTE - Pilots of pop-up aircraft are responsible for terrain and obstacle clearance until reaching…MIA…or…MEA. Pilot compliance with an approved FAA procedure or an ATC instruction transfers that responsibility to the FAA; therefore, do not assign (or imply) specific course guidance that will (or could) be in effect below the MIA or MEA.

2. If the pilot is able to maintain terrain and obstruction separation, issue the appropriate clearance as prescribed in paragraph 4-2-1, Clearance Items, and paragraph 4-5-6, Minimum En Route Altitudes.

3. If unable to maintain terrain and obstruction separation, instruct the pilot to maintain VFR and to state intentions.

According to FAA Order 7110.65P, chapter 5-15-7, "Inhibiting Minimum Safe Altitude Warning (MSAW)," procedures for personnel who provide ATC services include the following: "a. Inhibit MSAW processing of VFR aircraft and aircraft that cancel…IFR flight plans unless the pilot specifically requests otherwise."

According to FAA Order 7110.65P, chapter 2-1-6, "Safety Alert," the procedures for personnel who provide ATC services include the following:

Issue a safety alert to an aircraft if you are aware the aircraft is in a position/altitude, which, in your judgment, places it in unsafe proximity to terrain, obstructions, or other aircraft.

NOTE - 1. The issuance of a safety alert is a first priority…once the controller observes and recognizes a situation of unsafe aircraft proximity to terrain, obstacles, or other aircraft. Conditions, such as workload, traffic volume, the quality/limitations of the radar system, and the available lead time to react are factors in determining whether it is reasonable for the controller to observe and recognize such situations. While a controller cannot see immediately the development of every situation where a safety alert must be issued, the controller

must remain vigilant for such situations and issue a safety alert when the situation is recognized.

2. Recognition of situations of unsafe proximity may result from MSAW…automatic altitude readouts…observations on a [radar] scope, or pilot reports.

3. a. Terrain/Obstruction Alert. Immediately issue/initiate an alert to an aircraft if you are aware the aircraft is at an altitude which, in your judgment, places it in unsafe proximity to terrain/obstructions. Issue the alert as follows:

PHRASEOLOGY-

(Identification) LOW ALTITUDE ALERT, CHECK YOUR ALTITUDE IMMEDIATELY. THE (as appropriate) MEA/MVA/MOCA [minimum obstruction clearance altitude]/MIA IN YOUR AREA IS (altitude).

FAA AIM chapter 5-5-14 states that controllers should do the following:

2. At locations without airport traffic control service but within Class E surface area when necessary to specify direction of takeoff, turn, or initial heading to be flown, obtains pilot's concurrence that the procedure will allow the pilot to comply with…terrain and obstruction avoidance.

SDM Instrument Approach Procedures

A review of SDM's instrument approach procedures published by Jeppesen Sanderson and the U.S. Government Flight Information Publication of U.S. Terminal Procedures revealed that terrain contours were not depicted, and were not required to be depicted, in the graphics portion of the procedures. On the U.S. Terminal Procedures graphics, the peak elevation of 3,566 feet msl was depicted as a dot with the elevation number about 7 nm east of SDM. Since the time of the accident, the graphics portion of the U.S. Terminal Procedures for SDM was revised to include terrain contour graphics.

The GPS RWY 8L instrument approach procedures listed a minimum safe altitude of 7,400 feet msl in all sectors within 25 nm of the runway. The VOR or GPS–A instrument approach procedure indicated the following minimum safe altitudes for each sector within 25 nm of the Poggi very high frequency omnidirectional range/tactical navigation aid (VORTAC), which is located 3 nm north of SDM: 7,600 feet msl for the northeast sector, 5,300 feet msl for the southeast sector, 2,500 feet msl for the southwest sector, and 4,700 feet msl for the northwest sector.

The published instrument approach procedures for SDM also included "Takeoff Minimums and (Obstacle) Departure Procedures" for IFR aircraft. According to the publication,

airport departure procedures are designed "specifically to assist pilots in avoiding obstacles during the climb to the minimum enroute altitude."

The takeoff minimums at SDM showed that, for a departure from runway 8L or 8R in a category C or D aircraft, which includes the Learjet 35A, pilots are required to have ceilings of at least 3,100 feet agl and 3 miles visibility or standard requirements with a minimum climb of 520 feet per nm to 3,900 feet msl. The departure procedures for aircraft departing from runway 8L or 8R included a climbing left turn. The procedures stated that all aircraft must climb on a heading of 280º to intercept the 160º degree radial of the Mission Bay VORTAC and fly northwest to the VORTAC.

Previous Accident Near SDM

A review of Safety Board accident data revealed that, on March 16, 1991, at 0143 Pacific standard time, a Hawker Siddeley DH125-1A/522 transport-category turbojet airplane crashed into mountainous terrain about 8 nm northeast of SDM, killing 10 people.[13] The Hawker accident site was located within 1.5 miles of the Learjet accident site. The Hawker accident site was at the 3,300-foot level of Otay Mountain and about 172 feet below the mountain's top.

The flight crew of the Hawker filed an IFR flight plan with the San Diego FSS, and the FSS briefer suggested that the pilot depart under VFR and pick up his IFR clearance in the air. The pilot stated that he was not familiar with SDM's departure procedures. The pilot later telephoned the FSS again and informed the briefer that he could not find information regarding a standard instrument departure procedure for SDM, and the FSS briefer then read to the pilot the departure procedures for runways 8 and 26. The pilot later telephoned the FSS a third time and informed the same briefer that, if he followed the procedures, he would enter the terminal control area (now class B airspace) without a clearance. The pilot stated that it would be better if he headed northeast and stayed below 3,000 feet, and the briefer responded, "yeah, sure that'll be fine."

The flight crew of the Hawker departed runway 8L under VFR, contacted terminal radar approach control, and informed the controller that the flight was waiting for its IFR clearance. When the controller asked the flight crew about the flight's position, no response was received.

The Safety Board determined that the probable cause of the Hawker accident was the pilot's improper planning/decision, the pilot's failure to maintain proper altitude clearance over mountainous terrain, and the copilot's failure to adequately monitor the progress of the flight. Contributing to the accident were the insufficient terrain information provided by the FSS specialist during the preflight briefing after the pilot inquired about a low-altitude departure, both pilots' lack of familiarity with the geographical area, and the dark night conditions.

[13] Additional information about this accident, LAX91FA132, can be found on the Safety Board's Web site at <http://www.ntsb.gov>.

ANALYSIS

The airplane departed under VFR at night and was being handled by an air traffic controller when it crashed into terrain at the 2,256-foot level of a mountain that was located 8 nm east of SDM. The initial impact was about 100 feet below the base of an overcast cloud layer. The flight crew decided to depart under VFR from runway 8L after unsuccessful attempts to obtain an IFR clearance using the communication radios. The flight crew did not attempt to obtain the IFR clearance by telephone, even though they had cellular and satellite telephones on board the airplane.

According the FAA's AIM chapter 5-5-14, the recommended procedure for departing under VFR at night in areas of mountainous terrain is to adhere to the airport's takeoff minimums and departure procedures for IFR aircraft. The published departure procedures for runway 8L included a climbing left turn to a heading of 280º, which was a nearly complete course reversal to avoid the mountains east and northeast of SDM. The accident captain and copilot did not follow the recommended departure procedure and instead flew the airplane straight out on a heading toward the mountains and leveled off at an altitude of 2,300 feet msl, presumably to maintain VFR below the cloud ceiling.

The CVR recording revealed that the captain and the copilot did not listen to the weather portion of the ATIS, which reported overcast ceilings at 2,100 feet agl. The CVR recording revealed, however, that they had some awareness of the cloud cover; specifically, during his takeoff briefing to the copilot, the captain stated, "if you can't punch up through a nice hole then just…stay at a reasonably safe altitude and…I'll do the best I can to get somebody's attention."

Shortly after the VFR takeoff, the captain contacted an air traffic controller at the SCT TRACON to obtain the flight's IFR clearance. The controller identified the airplane on his radar screen and instructed the flight crew to turn to a heading of 020º, maintain VFR, and expect an IFR clearance above 5,000 feet. The captain acknowledged the heading instructions; however, the heading issued by the controller resulted in a flight track that allowed the airplane to continue directly toward mountains that included terrain elevations as high as 3,566 feet msl. At the time the controller issued the heading, the airplane was about 4.5 nm east of SDM and was no longer climbing after having leveled off at 2,300 feet msl, yet the controller took no action to warn the flight crew of the airplane's proximity to the rising terrain. Also about that time, the controller's computer system generated aural and visual MSAW alerts on his display, yet the controller took no action to warn the flight crew about the MSAW alerts. The last radar return from the flight was received about 19 seconds later.

During a postaccident interview, the controller stated that he was aware of the mountainous terrain east of SDM. When asked why he took no action to warn the flight crew of the rising terrain, he stated that it was the flight crew's responsibility to avoid terrain when operating under VFR. The controller also stated that he was aware of the cloud ceiling at 2,100 feet agl and that he expected the flight crew to maintain VFR and to advise him if they were unable to do so. The controller stated he did not distinguish between day or night operations when providing VFR advisories to pilots and that he did not think it was necessary to

do so. The Safety Board notes that such a distinction is necessary because the horizon is less visible and less distinct at night than during the day. At night, clouds and terrain are difficult for pilots to see, and a gradual loss of visual cues can occur as flight is continued toward darker terrain. Given that the accident flight occurred at night, over rural terrain, and with few visual cues and that the overcast cloud layer would have prevented moonlight from illuminating the terrain, it is likely that the flight crew did not see the rising terrain as the airplane continued toward it.

When the controller was asked why he did not advise the flight crew of the MSAW alerts, he stated that he did not hear or observe the MSAW alerts because he was talking with a controller at another control facility when the alerts began. A review of radar and communications data, however, did not support the controller's statement. The data revealed that the MSAW alerts occurred 34 seconds before the controller initiated the call to the other control facility, and radar contact with the flight had been lost for 15 seconds before the controller began coordinating the accident airplane's position with the other controller. Moreover, the controller was not handling any other aircraft for the duration of the accident flight; thus, it is unlikely that workload demands distracted him from his display. These data suggest that the controller may have been aware of the MSAW alerts but disregarded them because of his belief that it was not his responsibility to provide alerts to flight crews operating under VFR. According to FAA Order 7110.65P, chapter 2-1-6, the issuance of a safety alert is a controller's first priority regardless of whether the flight is operating under VFR or IFR.

Although the flight crew is responsible for maintaining terrain clearance while operating under VFR, FAA Order 7110.65P, chapter 4-2-8, states that, when an aircraft is operating under VFR below minimum IFR altitudes and the flight crew requests an IFR clearance, the controller should ask the crewmembers if they would be able to maintain terrain and obstruction clearance during the climb to the minimum IFR altitude. The order also states that, if the controller provides an instruction (such as turn to a heading of 020º), the responsibility for terrain clearance is transferred to the FAA. The order advises controllers not to "assign (or imply) specific course guidance that will (or could) be in effect below the MIA or MEA." During a postaccident interview, the controller stated he was unaware of this responsibility.

Regardless of his failure to appropriately apply the procedures for handling a VFR-IFR flight, the controller was aware of the topography near SDM and that the airplane was quickly approaching a mountainous area; thus, he should have taken action to alert the flight crew. The controller's explanation that he was not required to monitor or provide terrain clearance assistance to a VFR flight is contrary to the primary purposes of ATC, which are to prevent a collision and to remain vigilant for situations that warrant the issuance of alerts to flight crews regarding hazardous proximity to terrain, obstacles, and other aircraft. The controller's apparent perception that flight crews operating under VFR are always able to avoid terrain and obstacles regardless of flight conditions is incorrect, and his failure to take appropriate action placed the airplane in an unsafe situation. The controller had the knowledge and opportunity to alert the flight crew to an unsafe condition, but he failed to do so.

At the time of the accident, the captain had been awake about 17.5 hours, the copilot had been awake about 16 hours, and both pilots had accumulated about 11 hours duty time. The CVR transcript revealed that the copilot yawned five times within 6 minutes during the departure discussion with the captain. Although the duty and rest times of both flight crewmembers were in compliance with 14 CFR 135.267 (which was applicable to the trip legs before the accident flight that were subject to Part 135 rules), the accident flight departed about 3 hours past both crewmembers' normal bedtimes at the end of a long duty day.

Research indicates that the normal waking day is between 14 and 16 hours and that, if the normal waking day were extended, human performance could be degraded.[14] A Safety Board study of major aviation accidents demonstrated that procedural tactical decision and monitoring/challenging errors were the most common errors for flight crewmembers who had been awake for more than 11 hours.[15] On the basis of the time of the accident and the number of hours that the captain and the copilot had been awake, it is likely that physiological and psychological fatigue had adversely affected the ability of both pilots to properly plan the departure and assess the risks associated with it. Research has shown that fatigue can cause pilots to make risky, impulsive decisions and to become fixated on one aspect of a situation. Additionally, research has shown that people who are fatigued become less able to consider options and are more likely to become fixated on a course of action or a desired outcome.[16]

The airplane was not equipped with a TAWS, which was not required equipment at the time of the accident but is required now for all U.S.-registered turbine-powered airplanes configured with six or more passenger seats. The accident flight was the second accident in which a transport-category airplane collided with the mountains east of SDM while departing under VFR to pick up an IFR clearance during night conditions.

The aviation services agreement under which ATIJ leased the airplane from MFAA stated that ATIJ "shall retain operational control of the aircraft under Part 135." According to the agreement, MFAA, which owned the airplane and employed the captain, the copilot, and the medical crewmembers, paid ATIJ a management fee of $2,500 per month and maintained insurance on the airplane. Because of conflicting language between ATIJ's operating specifications (which stated that the company was authorized to perform repositioning flights under Part 91) and the aviation services agreement with MFAA (which referred only to Part 135 flights), the Safety Board requested repeatedly that the FAA determine which company was the operator of the Part 91 accident flight. The FAA did not make such a determination. In the absence of an answer from the FAA, it was the joint position of MFAA and ATIJ that, at the time of the accident, MFAA was the operator. ATIJ has since amended its aviation services agreement with MFAA to state that ATIJ is the operator of Part 91 repositioning flights.

[14] G.P. Kruger, "Sustained work, fatigue, sleep loss, and performance: A review of the issues," *Work and Stress* (1989), vol. 3, pp. 129 – 141.

[15] National Transportation Safety Board, *A Review of Flightcrew-Involved Major Accidents of U.S. Air Carriers, 1978 Through 1990*, Safety Study NTSB/SS-94-01 (Washington, DC: NTSB, 1994).

[16] J.A. Caldwell, "Fatigue in the aviation environment: An overview of the causes and effect as well as recommended countermeasures," *Aviation, Space, and Environmental Medicine*, vol. 68, pp. 932-938.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the flight crew to maintain terrain clearance during a VFR departure, which resulted in controlled flight into terrain and the air traffic controller's issuance of a clearance that transferred the responsibility for terrain clearance from the flight crew to the controller, failure to provide terrain clearance instructions to the flight crew, and failure to advise the flight crew of the MSAW alerts. Contributing to the accident was the pilots' fatigue, which likely contributed to their degraded decision-making.

Member Kathryn O'Leary Higgins, concurring:

I have concurred in this aircraft accident brief in which the NTSB determined that the probable cause of the accident was failure of the Learjet 35A to maintain terrain clearance and the failure of the air traffic controller to provide terrain clearance instructions and altitude awareness alerts to the flight crew. I am pleased that the NTSB investigation disclosed corrective action taken by the company operating the aircraft and by the FAA before the NTSB board meeting to enhance safety of night visual flight rules operations out of Brown Field Municipal Airport. Specifically in the FAA's case, terrain information is now depicted in the FAA airport/facility directory listing for Brown Field.

There were no recommendations made in this accident brief as a result of this investigation. And I am concerned about that omission in this case. The investigation and the accident brief detail the performance of the controller with respect to the accident aircraft he controlled that morning. The Southern California TRACON west radar position controller was responsible for airspace up to 17,000 feet and 40 nautical miles surrounding the airport in the early morning hours of October 24, 2004, with little air traffic in that airspace. The controller identified the transponder code of the aircraft and, more importantly, issued heading and expected IFR clearance information. Yet, this controller failed to issue a terrain safety warning despite knowledge of the surrounding terrain, awareness of the cloud cover, and two distinct warnings generated by the minimum safe altitude warning (MSAW) system.

The investigation disclosed that the controller was very familiar with the position, the airspace, the operations, and the surrounding terrain at Brown Field. The controller's workload certainly seems manageable given that the accident airplane was the only airplane traversing the controller's airspace at the time. The investigation also disclosed that the controller worked an 8-hour shift the day before the accident, and returned 7-1/2 hours later, without any sleep, to work through the midnight shift. As part of the investigation, we stated that fatigue likely contributed to degraded decision-making by the crew, leading to the accident. Despite information regarding the controller's back-of-the-clock schedule, we make no similar statements regarding the performance implications of fatigue for the controller.

I am deeply concerned that the possibility of controller fatigue may have been a critical factor that led to degraded air traffic service for the accident airplane. I understand that the FAA has procedures for placing on leave and retraining a controller involved in a serious incident or accident. I have asked staff for information about any subsequent action taken by the FAA with respect to this controller. I am specifically interested in any MSAW alert recognition retraining. I am also interested in programs and initiatives the FAA has undertaken to help controllers recognize and manage fatigue.

I also am concerned that the Southern California TRACON staff generally seem unaware of the serious safety responsibilities they have for flight crews operating under night visual flight rules, particularly in circumstances involving hazardous terrain. I have asked for information regarding what, if any, consequences, resulted from the controller's

failure to provide safety information that may well have averted this accident. I have also asked for information regarding an air traffic supervisor's responsibilities in a similar situation. I understand that staff is working on a series of recommendations to the FAA concerning issues related to MSAW alerts that have been identified in this and other accidents. While these recommendations may improve the performance of the MSAW system, they likely will not address issues of controller fatigue and controller responsibilities to provide important safety guidance to night VFR pilots. I hope the FAA will review this report, take a good hard look at the air traffic control issues identified here, and take any action that will improve safety.

Member Hersman joined Member Higgins in this concurring statement.

Kathryn O'Leary Higgins
May 31, 2006