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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

AIR TRAFFIC CONTROL GROUP CHAIRMAN'S FACTUAL REPORT

(9 PAGES)

American Airlines flight 1420
Little Rock, Arkansas
June 1, 1999

DCA99MA060

NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, DC 20594

November 15, 1999

Group Chairman's Factual Report

AIR TRAFFIC CONTROL GROUP

DCA-99-MA-060

A. ACCIDENT

Location: Little Rock, Arkansas

Date: June 1, 1999

Time: 23:51 Central Daylight Time (CDT) / 04:51 Universal Coordinated Time (UTC) [1]

Aircraft: American Airlines 1420 (AAL1420), McDonnell-Douglas MD-82, N215AA

B. AIR TRAFFIC CONTROL GROUP

Chairman: Mr. Scott J. Dunham
National Transportation Safety Board
Washington, D.C. 20594

Member: Mr. Randy L. Graham
Federal Aviation Administration
Little Rock, Arkansas

Member: Mr. Samuel Smith
American Airlines
Fort Worth, Texas

Member: Mr. William Shea
National Air Traffic Controllers Association
Fort Worth, Texas

Member: Captain Patrick Gallagher
Allied Pilots Association
Fort Worth, Texas

[1] All times will be expressed in local time based on 24 hour clock with the exception of "History of Flight" which is expressed in Coordinated Universal Time (UTC).

C. SUMMARY

On June 1, 1999, at 2351 Central Daylight Time (CDT), a McDonnell Douglas MD-82, N215AA, operated by American Airlines as flight 1420, regularly scheduled passenger service from Dallas, Texas, overran the end of runway 4R and collided with the approach light stanchion at the Little Rock National Airport, in Little Rock, Arkansas. The captain and 10 passengers sustained fatal injuries; the remaining 134 passengers and crewmembers sustained various injuries. Shortly before the accident, the weather conditions at the airport were reported as: wind from 180 degrees at 9 knots, visibility 7 miles with thunderstorms, few clouds at 7,000 feet in cumulonimbus clouds, ceiling broken at 10,000 feet; temperature 77 degrees F, dewpoint 73 degrees F; altimeter, 29.86 Hg: Remarks - ASOS observation - thunderstorm began at 23 minutes after the hour, frequent lightning in clouds, and cloud-to-cloud, located from the west through the northwest; thunderstorms west through northwest moving northeast. The airplane was being operated in accordance with 14 CFR 121, and an instrument flight rules (IFR) flight plan had been filed.

D. DETAILS OF THE INVESTIGATION

The air traffic control (ATC) group was formed at Little Rock Air Traffic Control Tower (ATCT) on June 2, 1999. It included members from the Safety Board, the National Air Traffic Controllers Association, the Federal Aviation Administration (FAA), the Allied Pilots Association, and American Airlines. The ATC group began its activities on June 3, 1999, by reviewing a tape and draft transcript of all voice communications between Little Rock ATCT and AAL1420. The tape also included post-accident communications between LIT ATCT and airport rescue and firefighting (ARFF) crews. The group also examined training records for the controllers involved, reviewed airport weather reports germane to the accident, and viewed a preliminary Safety Board plot of radar data for the period AAL1420 was operating under LIT ATCT control. The group also toured the tower cab, receiving an explanation of the airport layout and the equipment being used by the controller.

The ATC group also interviewed Mr. Kenneth L. Kaylor, the LIT ATCT local/radar controller at the time of the accident, and Mr. Michael Q. Holland, the midnight shift controller-in-charge, who assisted Mr. Kaylor with various activities after the crash occurred. Summaries of their interview statements are provided in section 3.

1. History of Flight

AAL1420 departed from DFW for Little Rock at 0340, approximately two hours later than scheduled. The flight was handled by controllers at Dallas/Fort Worth terminal radar approach control (TRACON), Fort Worth Air Route Traffic Control Center (ARTCC), and Memphis ARTCC before arriving in the Little Rock area.

AAL1420 left DFW TRACON airspace and contacted the Fort Worth ARTCC Quitman sector at 0358. At 0401, the Quitman radar controller broadcast the following advisory:

"attention all aircraft convective sigmet 15C valid until 0600 zulu for arkansas and oklahoma available hiwas, flight watch, or flight service." At 0402, AAL1420 was instructed to contact the Fort Worth ARTCC Texarkana/Sulphur Springs sector. AAL1420 contacted the Texarkana sector at 0403. At 0404, the Texarkana sector controller broadcast the following advisory: "attention all aircraft convective sigmet 15 central valid until 0555 zulu for arkansas and oklahoma from four zero miles east of razorback to three zero miles southeast of little rock one zero miles north northwest of eldorado seven zero miles south of mcallister four zero miles east of razorback area of severe thunderstorms moving from 300 at 20 knots tops above flight level four five zero hail to two inches and wind gusts to seven zero knots possible additional hazardous weather information for arkansas and oklahoma available from flight service flight watch or hiwas frequencies."

AAL1420 was instructed to contact the Forth Worth ARTCC Eldorado sector at 0413, and did so at 0414. At 0428, AAL1420 was cleared to descend to 10,000 feet[2] and given the LIT altimeter setting, 29.86". The Eldorado controller transferred AAL1420 to Memphis ARTCC's Jackson low altitude sector at 0429. AAL1420 checked in at 0429 and was again issued the LIT 29.86" altimeter setting. The flight was told to contact LIT ATCT by the Jackson sector at 0434.

LIT ATCT was operating with midnight shift staffing, with all approach and tower control positions combined in the tower cab. The ATIS broadcast current from 0426 to 0531 UTC was as follows:

> "good evening little rock adams field information romeo zero four two two zulu special observation wind one niner zero at one four visibility seven thunderstorm few clouds at seven thousand cumulonimbus ceiling one zero thousand broken temperature two five dew point two three altimeter two niner eight eight frequent lightning in cloud cloud to cloud west through northwest thunderstorm west through northwest moving northeast ils runway two two left approach in use notices to airmen runway two two right four left ils out of service attention all aircraft hazardous weather information for the little rock area available on hiwas flight watch or flight service departing aircraft contact tower one one eight point seven for clearance and taxi advise on initial contact you have romeo"

AAL1420 contacted LIT ATCT at 0434:06, reporting that the flight was descending through 11,300 feet for 10,000 feet. The controller acknowledged the initial transmission, advised AAL1420 that there was a thunderstorm northwest of the airport, and reported that the wind was 280 degrees at 28 knots gusting to 44 knots. AAL1420 reported seeing lightning, and asked for the wind information to be repeated. The controller again provided the winds, and told AAL1420 to expect an ILS approach to runway 22L. At 0439:00, AAL1420 was cleared to descend to 3,000 feet. The controller then asked AAL1420 about the weather conditions on the final approach for runway 22.

[2] All altitudes in this report are expressed in feet above mean sea level (MSL).

AAL1420 responded that they could see the airport and thought they could make it to runway 22, and that the thunderstorm reported earlier by the controller was, "...moving this way like your radar says, but it's a little farther off than you thought."

The controller offered a visual approach, but AAL1420 declined because of poor visibility. At 0439:33, the controller advised that the wind was 330 degrees at 11 knots. He then transmitted a wind shear alert, reporting that the center field wind was 340 degrees at 10 knots, the north boundary wind was 330 degrees at 25 knots, and the northwest boundary wind was 010 degrees at 15 knots. AAL1420 then requested runway 4. The controller told AAL1420 to fly heading 250 for vectors to the runway 4R ILS final approach course and recleared AAL1420 to maintain 3,300 feet. The controller then advised AAL1420 that the wind was 340 degrees at 16 knots. At 0443:00, AAL1420 reported the airport in sight. The controller again offered a visual approach, and AAL1420 accepted it.

At 0444:05, the controller cleared AAL1420 to land and advised that the wind was 330 degrees at 21 knots. At 0444:33, AAL1420 reported losing sight of the airport. The controller then cleared AAL1420 to fly heading 220 degrees for the ILS approach to runway 4R, and to descend to 2,300 feet. At 0445:47, AAL1420 stated, "...we know you're doing your best, but we're getting pretty close to this storm. We'll keep this in tight if we have to." The controller then told AAL1420 to fly heading 270, and assigned two more heading changes before issuing clearance for the ILS 4R approach at 0446:39, advising the crew that they were three miles from the outer marker.

At 0446:52, the controller advised AAL1420 that there was heavy rain at the airport, the ATIS was no longer correct, the visibility was less than a mile, and that the runway 4R runway visual range (RVR)[3] was 3000 feet. AAL1420 acknowledged. At 0447:08, the controller again cleared AAL1420 to land, and reported that the wind was 350 degrees at 30 knots, gusting to 45 knots. AAL1420 read back the wind report. At 0447:54, the controller reported a wind shear alert with center field wind 350 degrees at 32 knots gusting to 45 knots, the north boundary wind 310 degrees at 29 knots, and the northeast boundary wind 320 degrees at 32 knots. This alert was not acknowledged by AAL1420. At 0448:12, the controller advised AAL1420 that the RVR had decreased to 1,600 feet. At 0448:26, AAL1420 responded that they were "established inbound."

At 0448:27, the controller repeated the landing clearance, and advised AAL1420 that the wind was 340 degrees at 31 knots, north boundary wind was 300 degrees at 26 knots, northeast boundary wind 320 degrees at 25 knots, and that the RVR was 1,600 feet. AAL1420 acknowledged. At 0449:12, the controller reported the wind as 330 degrees at 28 knots. Twenty-one seconds later he reported the wind as 330 degrees at 25 knots. At 0449:54, he reported the wind as 320 degrees at 23 knots. These transmissions were broadcast but not specifically directed to AAL1420, and were not acknowledged by the crew.

[3] Runway visual range is a measurement of the visibility near the runway surface.

According to FAA radar data supplied to the Safety Board, AAL1420 crossed the runway 4R threshold at approximately 0450:03. At 0450:55, the controller asked AAL1420 to report clear of the runway. There was no response. The controller tried to contact AAL1420 five more times without success, with the last attempt occurring at 0453:23. The controller called out the ARFF services at approximately 0452, and the aircraft was located by them off the departure end of runway 4R at approximately 0503. A transcript of the radio exchanges between LIT ATCT and AAL1420 is included in attachment 1 to this report.

2. Airport and Air Traffic Control Information

Little Rock National Airport has three runways: 18/36, 4L/22R, and 4R/22L. There are published ILS approaches for runways 4L, 4R, 22R and 22L. On the date of the accident, the ILS equipment for runway 4L/22R was not usable because it had recently been upgraded and had not yet been flight checked. Therefore, the only ILS approaches available were to runways 4R or 22L. Runway 4R is equipped with a medium intensity approach lighting system and runway alignment indicator lights. LIT ATCT also has a Low Level Windshear Alert System (LLWAS) that uses six sensors in the vicinity of the airport to assist tower controllers in warning flightcrews of potentially hazardous windshear conditions. The airport is also equipped with an Automated Surface Observation System (ASOS) weather sensor providing information on wind, cloud cover, temperature, precipitation, and visibility. ASOS observations are augmented by a contract weather observer 24 hours a day.

LIT ATCT is located on the terminal building, and includes a terminal radar approach control (TRACON) on the third floor. The tower cab has positions for cab coordinator, local control-1, local control-2, ground control, and flight data. The local control-1 position and ground control positions both have panels showing readings for the LLWAS system sensors. The Local control-1 position also has a Digital Bright Radar Indicator Terminal Equipment (DBRITE) radar display. There is a System Atlanta Information Display System-4 monitor to the right of the flight data position, which contains various items of airport-related information and displays the official hourly weather when it becomes available. ATC radar data is provided by an ASR-8 sensor located on the airport north of the terminal building between runways 4L and 4R. Radar data processing is performed by an Automated Radar Tracking System (ARTS) IIE system that feeds both the TRACON and the DBRITE in the cab. The tower is not equipped with a ground movement radar system.

Equipment monitor logs show that the 4R ILS was operating normally before the accident. Hourly runway visual range system logs show that at 0444 UTC the runway 4R edge lights were set at step 3. Because the ILS localizer antenna was damaged by the aircraft, a post-accident flight check could not be conducted.

Inspection of the Facility Daily Record of Operation for June 1, 1999, showed no unusual events or equipment outages. Log entries show that the emergency power generator

feeding the ASR-8 system was in operation at the time of the accident. According to LIT ATCT staff, this is normal practice when thunderstorm activity in the area of the airport raises the possibility of interrupted commercial power supplies. The tower and TRACON have a separate battery powered uninterruptible power supply system that operated normally throughout during the period AAL1420 was under LIT control.

3. Personnel Interviews

Kenneth L. Kaylor **Air Traffic Control Specialist**

Review of Mr. Kaylor's training records showed that he entered on duty with the FAA on 10/11/88 at the Midway (Chicago) tower, achieving full performance level on 6/29/90. He came to LIT ATCT on 11/23/92, reaching full performance level on 9/22/93. Mr. Kaylor holds control tower operator certificate [redacted] issued 12/19/86.

Mr. Kaylor was interviewed by the ATC group on June 3, 1999, and provided the following information in response to questions:

Mr. Kaylor's last medical certification was completed in October, 1997. Before his FAA employment, Mr. Kaylor served as an air traffic controller at Mather Air Force Base tower for three years. On the day of the accident, Mr. Kaylor worked from 0600-1400 local time, went home, and returned at 2250 local time for a 2300-0700 shift. During his off time, he slept about four hours. When he arrived at the tower, he signed on, checked the read-and-initial binder[4], and received a position relief briefing from the evening shift controller. He then called the TRACON to combine the radar positions at the local control 1 (LC1) position in the tower cab. He does not recall any discussion of weather.

After he took over the LC1 position, a Baron landed on runway 18. There were other operations by two helicopters, but AAL1420 was the first air carrier operation of the shift. When AAL1420 first called, the wind was 200 to 220 degrees at 14 to 16 knots. The aircraft was routed direct to the LIT VOR, and Mr. Kaylor planned to vector it to downwind for the runway 22 ILS. He did not notice a gradual change in the wind direction: at 0439 he received an LLWAS wind shear alert indicating that the wind had shifted to the northwest. He informed AAL1420 of the alert, and the pilot then requested runway 4.

Mr. Kaylor issued the aircraft a right turn to heading 250 in order to set up the approach to 4R, activated the localizer, and turned on the approach lights. He also turned on both the local and ground position runway visual range displays. The pilot requested a visual approach, which Mr. Kaylor approved. He told the pilot to advise if he lost sight of the airport. At the time, Mr. Kaylor estimated that the visibility was about 7 miles. AAL1420 later reported entering a cloud and losing sight of the airport. Mr. Kaylor then issued a turn to heading 220 for the ILS to runway 4R and cleared the flight to 3,300 feet,

[4] The read-and-initial binder contains various informational items for controllers, and they are required to familiarize themselves with its contents on a regular basis.

the minimum vectoring altitude in the area. The new heading put the aircraft closer than normal to the airport, so Mr. Kaylor advised the crew to expect one turn on to final. While on the 220 heading the pilot made a comment about weather ahead, so Mr. Kaylor turned AAL1420 to heading 270 and then turned the aircraft further right to intercept the localizer. During the approach, the weather deteriorated. Mr. Kaylor advised the pilot of the conditions at the airport. At the time, visibility was restricted by heavy rain that began just as AAL1420 intercepted the localizer and continued until after the crash.

As the aircraft passed the outer marker, Mr. Kaylor issued another wind shear alert. A few seconds later, Mr. Kaylor advised the crew that the runway visual range was 1,600 feet and again cleared them to land. There were no more wind shear alerts before AAL1420 landed, but Mr. Kaylor issued three more wind checks because he was concerned about the velocity of the wind. He first saw the aircraft at about one mile final, and did not notice anything unusual. He does not recall if the landing lights were operating. The landing appeared normal and within the touchdown zone. Because of the reduced visibility, he lost sight of the aircraft during the rollout as it passed taxiway T. He told the crew to report clear of the runway, but received no answer.

Mr. Kaylor attempted to contact the aircraft several more times without success. He called the fire department on the crash phone and asked them to find the aircraft. They reported that there would be a slight delay because of trouble with the doors, and Mr. Kaylor asked them to hurry. He also called Mr. Holland to come to the tower to assist. Mr. Kaylor told the fire crews to go to the end of runway 4R. Mr. Holland arrived at the tower and answered a phone call from the American Airlines LIT operations office inquiring about the aircraft. Mr. Kaylor retrieved the notification binder to start making calls. Mr. Holland then told Mr. Kaylor that the fire crews had gone to the wrong end of runway 4R, and Mr. Kaylor told them to go to the other end of the runway. Mr. Kaylor lost sight of the trucks as they proceeded up the runway. A few minutes later, the fire crews advised that they had located the aircraft, and that it had crashed and was on fire. Mr. Kaylor was unable to see the accident site until after the storm passed. He was relieved from position by Mr. Holland at about 0015 and took over the administrative notification activities.

Mr. Kaylor has not previously had difficulty in getting fire units to locations on the airport, but he has also never before been involved in an incident such as this. There are established geographical reference points on the airport, but they are usually used by the fire department to inform the tower of their destination on the field, not by ATC to direct fire crews to a particular location. He has not experienced any significant problems with tower equipment in the past.

Michael Q. Holland **Air Traffic Control Specialist**

Review of Mr. Holland's training records showed that he entered on duty on 11/14/82 at the Fort Smith, Arkansas tower, achieving full performance level on 4/19/83. He came to

Little Rock ATCT on 5/27/84, reaching full performance level on 10/30/84. He received control tower operator certification at Fort Smith on 12/4/82, and at Little Rock on 8/13/84. His control tower operator certificate number is [redacted]

Mr. Holland was interviewed by the ATC group on June 3, 1999, and provided the following information in response to questions:

Mr. Holland's last medical certification was completed in July, 1998. In addition to the FAA experience noted in his training records, Mr. Holland was an air traffic controller in the Air Force from January 1974 until August 1982, serving at Scott Air Force Base, Sondestrom, Greenland, and Patrick Air Force Base.

On the night of the accident, he arrived at the tower at 2215 local time for his scheduled 2300-0700 shift. He engaged in some personal activities until the beginning of his shift, and signed in at 2300. Mr. Kaylor had also arrived by then, and went up to the tower cab to begin work. Mr. Holland went to the TRACON control room to count strips and perform other administrative duties. He had no interaction with the evening shift controllers. He noticed that the backup generators were on, which is standard practice when severe weather is expected to affect the airport. While in the TRACON, he noticed AAL1420 on approach at about four to five mile final. He saw the outline of the weather on the radar, but doesn't recall seeing anything that would affect the aircraft. He heard thunder outside and rain hitting the building. He left the TRACON area at 2345, intending to relieve Mr. Kaylor at midnight. While in the tower break room, Mr. Holland received a call from Mr. Kaylor asking him to come to the tower immediately.

When Mr. Holland got to the cab, Mr. Kaylor told him that he believed there had been an accident. Mr. Holland estimated the visibility to the NE of the tower at one half mile, the approximate distance to the intersection of runway 4R and taxiway T. The fire trucks were still in the station, so Mr. Holland asked if the fire department had been called out. Mr. Kaylor said that they had, but that there would be a delay in response because of power trouble with the firehouse doors. Mr. Kaylor said that he had lost visual contact with AAL1420 as the aircraft passed taxiway T on runway 4R, and that the aircraft had not responded to several calls. Mr. Holland then answered a telephone call from the American Airlines airport operations office inquiring about the status of AAL1420. After that call, Mr. Holland noticed that the fire trucks had gone to the approach end of runway 4R rather than the departure end where he believed the aircraft was. He told Mr. Kaylor, who then told the trucks to proceed up the runway to locate the crash site.

A short time later, the fire crews found AAL1420 and reported that the aircraft had crashed and was on fire. Mr. Holland started the accident notification checklists, called Memphis ARTCC to inform them of the accident, and told them to hold LIT arrivals outside LIT airspace. Mr. Holland then called Howard Lewis, the tower's assistant air traffic manager, and the FAA regional office. He also called the airport weather observer to request a special weather observation be taken. Mr. Holland subsequently relieved Mr. Kaylor on the LC1 position and had Mr. Kaylor continue the notification process. Mr.

Holland accepted a handoff on an arriving Southwest Airlines flight, but was then told by the airport management that the airport was closed. The Southwest pilot elected to return to St. Louis.

Mr. Holland stated that he does not recall having had any problems with the LLWAS system, or any negative comments from pilots about LLWAS performance. He believes that two controllers are adequate staffing for the midnight shift under normal circumstances. He has not had any problems in coordinating with the fire department, but the terminology to be used in coordinating with them has not been formalized and he has not had any specific training on the subject.

[redacted]
Scott J. Dunham
Air Traffic Control Group Chairman

[redacted] 11/19/99
Paul Misencik, Chief, AS-30

Attachment: LIT ATCT Transcript