NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

March 17, 2015

AIR TRAFFIC CONTROL FACTUAL REPORT

ERA14FA112

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A. AIRPLANE ACCIDENT

Location: Bellevue, Tennessee
Date/Time: Monday, February 3, 2014, 1656, central standard time (CST)
Monday, February 3, 2014, 2256 coordinated universal time (UTC)
Airplane: N840V, a Gulfstream Commander 690C

B. AIR TRAFFIC CONTROL GROUP

Ms. Betty Koschig
National Transportation Safety Board
Washington, DC

Mr. Paul Suffern
National Transportation Safety Board
Washington, DC

Ms. Michelle Wrobleski
National Air Traffic Controllers Association
Green Bay, WI

Ms. Karena Marinas
National Air Traffic Controllers Association
Los Angeles, CA

Mr. Johnny Edwards
Federal Aviation Administration
Washington, DC

C. SUMMARY

On February 3, 2014, about 1656 central standard time, a Gulfstream Commander 690C, N840V, operated by a private pilot, was destroyed when it impacted the ground near Bellevue, Tennessee, while on approach to the John C. Tune airport (JWN), Nashville, Tennessee. The private pilot and three passengers were fatally injured. Instrument meteorological conditions (IMC) prevailed, and an instrument flight rules (IFR) flight plan had been filed for the flight that departed Great Bend Municipal airport (GBD), Great Bend, Kansas. The personal flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

D. DETAILS OF THE INVESTIGATION

On Tuesday, February 11, 2014, the air traffic control (ATC) group convened at Nashville International airport (BNA) terminal radar approach control facility (TRACON), Nashville, TN and conducted an inbrief. Attending the inbrief was Mr. James Drury, air traffic manager (ATM); Mr. Chris Perdue, National Air Traffic Controllers Association (NATCA) representative; Ms. Cathleen North, support specialist; Mr. Rick Downey, operations manager; Mr. Irving Washington, Eastern Service Area quality control group; Mr. Steve Osit and Mr. R. Brooke Lewis, office of the chief counsel; and Mr. Larry Johnson, FAA event investigations manager (EIM). Facility management provided the group a brief summary of the accident and a tour of the facility. The group reviewed controller records and all associated data related to the accident, and then conducted an interview with the front line manager (FLM).

On Wednesday, February 12, 2014, the group reconvened at BNA and conducted interviews with the controllers assigned to the departure radar west (DRW) position.

On Thursday, February 13, 2014, the group reconvened at BNA and conducted an out brief. Attending the out brief, were Mr. Drury, Mr. Washington, Mr. Downey, Ms. North, and Mr. Johnson. The group completed the field notes and concluded the onsite investigation.

1.0 History of Flight

About 1445, N840V departed Great Bend Municipal airport (GBD), Great Bend, Kansas enroute to John C. Tune airport (JWN), Nashville, Tennessee. The pilot checked in with Kansas City air route traffic control center (ZKC), and was instructed to climb to flight level (FL) 230.

About 1537, the pilot informed the ZKC controller that he needed to temporarily leave the frequency to obtain weather information. The ZKC controller approved the request, and the pilot stated he would report back within five minutes.

About 1552, Memphis ARTCC (ZME) contacted the ZKC controller requesting they switch N840V to their frequency. The ZKC controller attempted to contact N840V, but the pilot did not respond. The ZME Paducah low and Jonesboro low sector controllers attempted to contact N840V on their frequencies, but did not receive a response from the pilot.

About 1605, the pilot made a blind transmission on guard frequency (121.5), stating that he was on guard. The ZME Paducah low controller established communication with N840V, and informed the pilot that he had been NORDO (no radio) for approximately 150 to 200 miles. The ZME controller asked the pilot what frequency he had been on during that time, and the pilot apologized stating he had erased it from his radio. The remainder of the flight with ZME was uneventful.

At 1621:08, the pilot of N840V checked in with BNA TRACON stating, "Nashville approach turbo commander eight four zero victor through ten for nine." The BNA radar departure west (DRW) controller instructed the pilot to expect vectors for the area navigation (RNAV) approach into JWN, issued the BNA altimeter, and directed the pilot to fly a 130 degree heading. Three minutes later, the DRW controller instructed the pilot to turn right ten degrees and to descend to 3,000 feet. The pilot acknowledged these transmissions.

About 1628, the DRW controller cleared N840V direct to FUNJO[1]. The pilot replied, "What is it?", and the DRW controller responded by spelling out the individual letters of the word FUNJO. Subsequently, the DRW controller instructed the pilot to maintain 3,000 feet until FUNJO, and cleared him for the RNAV runway 2 approach at JWN. The pilot did not respond. The controller repeated the clearance, and the pilot acknowledged.

At 1629:27, the pilot stated, "I'd like to climb and uh review the approach and uh do it again."

At 1629:38, the DRW on-the-job training instructor (OJTI) directed the pilot to maintain 3,000 feet and turn right heading 020 degrees. The pilot responded "right heading zero two zero."

[1] FUNJO was the initial approach fix (IAF) for the RNAV runway 2 approach at JWN and was located 12.7 nm south of JWN airport.

According to the DRW OJTI, the pilot correctly read back the assigned heading of 020; however, he turned the airplane to a 200 heading. She noticed the pilot turning to an incorrect heading, but did not correct the pilot because the 200 heading would not have created a conflict with any other aircraft in the airspace.

About 1631, the pilot informed the DRW controller, "you can direct me back; I've got FUNJO on my system." The DRW controller provided the pilot a clearance for the RNAV runway 2 approach at JWN.

About 1637, the DRW controller asked the pilot if he was established on the RNAV approach. The pilot responded that he was established on the approach.

About 1638, the DRW controller advised the pilot, "we're showing you about a half a mile to the east of the uh approach, change to advisory frequency approved, radar service terminated, report your cancellation in the air this frequency, on the ground one two four point five five." The pilot requested that the controller repeat that transmission. The DRW OJTI controller informed the pilot that his airplane was about a half mile east of the final approach course, and explained "that's why we were asking if you were showing yourself established on the uh approach." The pilot responded, "That's correct I'm a little east of course." The DRW OJTI controller advised N840V that radar services were terminated and instructed the pilot to report canceling his IFR when he landed. Figure 1 illustrates N840V's flight path for the first approach into JWN.

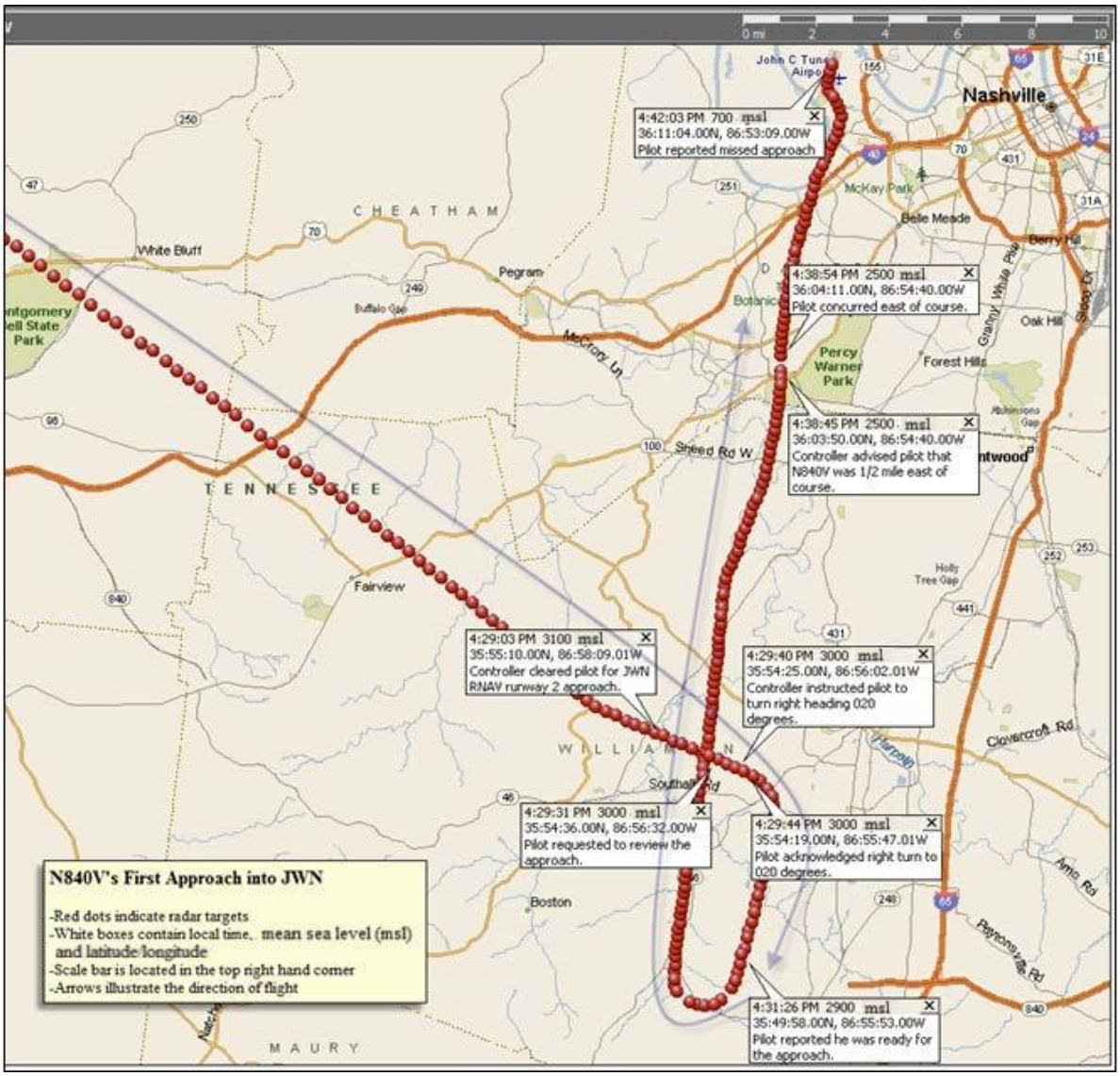

Figure 1. Flight path of N840V's first approach into JWN.

About 1642, the pilot reported he was executing a missed approach. The DRW controller instructed N840V to fly runway heading and climb to 3,000 feet. The DRW controller subsequently provided the pilot additional vectors for the RNAV runway 2 approach at JWN.

About 1648, the DRW controller asked the pilot if he wanted the full approach for the RNAV. The pilot replied that radar vectors would be fine, and confirmed that the approach would be a full stop. The DRW controller provided the pilot radar vectors to FUNJO.

About 1653, the DRW controller informed the pilot that N840V was three miles from FUNJO, then instructed the pilot to cross FUNJO at 3,000 feet and cleared him for the RNAV runway 2 approach at JWN. Pilot responded, "Cross FUNJO three thousand, cleared for RNAV runway 2."

At 1655:37, the DRW controller informed the pilot that radar services were terminated, instructed him to report cancellation of IFR in the air or on the ground, and advised him that traffic was ten miles in trail. The pilot did not respond.

The DRW controller made several more attempts to contact the pilot. There were no further transmissions from the pilot of N840V. Figure 2 shows N840V's flight path after the missed approach at JWN, until the time of the accident.

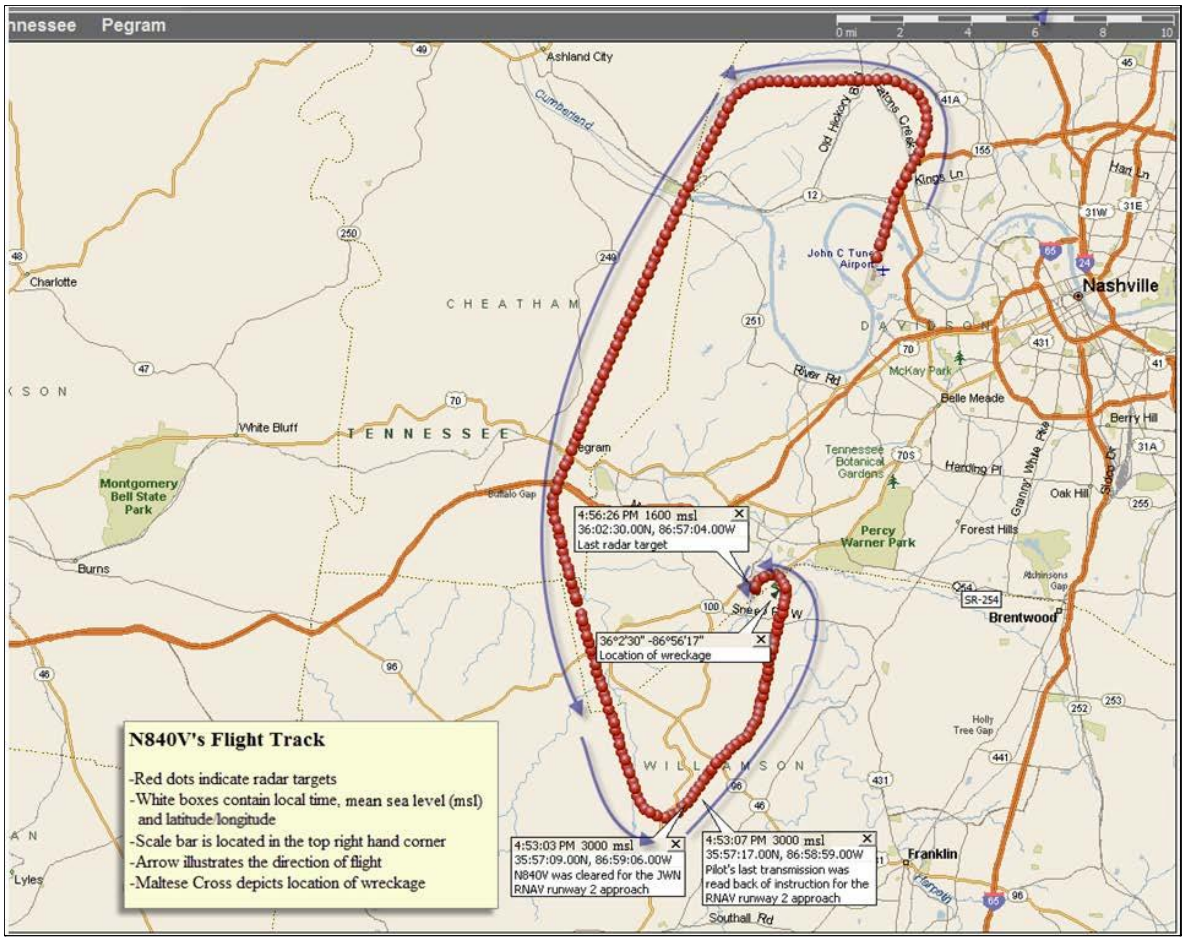

Figure 2. N840V's flight path subsequent to missed approach at JWN.

2.0 Weather Information

2.1 JWN Weather Observations

The JWN weather on February 3, 2014, was obtained from the JWN automated weather observing system (AWOS[2]). KJWN was located 9 miles north-northeast of the accident site, and

[2] AWOS is equipped with meteorological instruments to observe and report temperature, dew point, wind speed and direction, visibility, cloud coverage and ceiling up to twelve thousand feet, and altimeter setting.

one mile northwest of Nashville, TN. It was the closest official weather station to the accident site.

KJWN 032255Z AUTO 36005KT 5SM OVC008 05/M04 A3029 RMK A01 T00501044 $

JWN weather at 1655 CST was wind 360 degrees at 5 knots, 5 miles visibility, overcast ceiling 800 above ground level (agl), temperature 5 degrees Celsius (C), dew point temperature -4 degrees C, and altimeter setting of 30.29 inches of mercury. Remarks: automated station without precipitation discriminator, temperature 5.0 degree C, dew point temperature -4.4 degrees C, maintenance needed on the system.

KJWN 032300Z AUTO 35004KT 6SM OVC008 05/M04 A3029 RMK A01 $

JWN weather at 1700 CST was wind from 350 degrees at 4 knots, 6 miles visibility, overcast ceiling 800 agl, temperature 5 degree C, dew point temperature -4 degree C, and altimeter setting of 30.29 inches of mercury. Remarks: automated station without precipitation discriminator, maintenance needed on the system.

2.2 BNA Weather Observations

The BNA weather for February 3, 2014, was obtained from the BNA automated surface observing system (ASOS[3]) and was supplemented by an official weather observer. BNA was located 14 miles east-northeast of the accident site and 5 miles southeast of Nashville, TN.

METAR KBNA 032153Z 04007KT 5SM BR OVC009 00/M02 A3026 RMK AO2 SLP252 T00001022

BNA weather at 1553 CST was wind from 040 degrees at 7 knots, 5 miles visibility, and mist, an overcast ceiling at 900 feet agl, temperature of 0 degrees C, dew point temperature of -2 degrees C, and an altimeter setting of 30.26 inches of mercury. Remarks: automated station with precipitation discriminator, sea level pressure 1025.2 hectopascal (hPa), temperature 0 degrees C, dew point temperature -2.2 degrees C.

METAR KBNA 032253Z 06008KT 5SM BR OVC009 00/M03 A3028 RMK AO2 SLP258 T00001028

BNA weather at 1653 CST was wind from 060 degrees at 8 knots, 5 miles visibility, mist, overcast ceiling at 900 feet agl, temperature of 0 degrees C, dew point temperature of -3 degrees C, and an altimeter setting of 30.28 inches of mercury. Remarks: automated station with precipitation discriminator, sea level pressure 1025.8 hPa, temperature 0 degree C, and dew point temperature -2.8 degrees C.

3.0 Radar Data

Radar data for this report was obtained from the BNA ASR-9 sensor.

[3] ASOS is equipped with meteorological instruments to observe and report wind, visibility, ceiling, temperature, dew point, altimeter, and barometric pressure.

4.0 Personnel Interviews

4.1 Departure Radar West (DRW)

Mr. William Mitchell began working for the FAA in January 2007. Before transferring to BNA in 2013, he worked at ZME from 2007 to 2013. His medical certificate was current with no restrictions. Mr. Mitchell certified on all positions in the BNA airport traffic control tower (ATCT), and was training on the radar approach control positions.

On Monday, February 3, 2014, Mr. Mitchell worked his regularly scheduled shift and was the certified professional controller in training (CPC-IT) assigned to the DRW position. The on-the-job training instructor (OJTI) assigned to the position was Ms. Bridgett Rogers. The final radar east (FRE) position was combined with the DRW position during that time. Mr. Mitchell worked one session in the tower and took a break before signing on to the DRW position. He described the traffic level as moderately busy at that time of the accident.

When N840V reported on his frequency, Mr. Mitchell instructed the pilot to expect the RNAV runway 2 approach to JWN. After the pilot read back the approach instructions, he provided the pilot descent instructions, and then vectored the airplane to the south of the RNAV initial approach fix, FUNJO. The wind appeared to push N840V to the north, so Mr. Mitchell instructed the pilot to turn an additional ten degrees right. Subsequently, he instructed the pilot to proceed direct FUNJO, maintain 3,000 feet, and cleared N840V for the RNAV runway 2 approach into JWN.

When N840V had not turned in for the approach, Mr. Mitchell said that he felt the pilot “seemed to be having a hard time.” When the pilot requested a climb to review the approach chart, Mr. Mitchell looked at his OJTI and said, "Are you kidding me?" Mr. Mitchell recalled that the pilot “seemed confused” about the instructions and the approach procedure. Ms. Rogers took control of the frequency and instructed the pilot to turn to a heading of 020 degrees. Mr. Mitchell observed the airplane take a reciprocal heading of approximately 200 degrees. He did not feel that the incorrect turn was an issue because there was no conflicting traffic going into JWN. The other traffic was inbound to BNA.

When the pilot reported that he was ready for the approach, Mr. Mitchell cleared N840V to FUNJO. The pilot did not read back the clearance instruction; therefore, Mr. Mitchell gave the pilot a heading to FUNJO and subsequently reissued the clearance instructions to the pilot. Mr. Mitchell said the pilot seemed overwhelmed, so he decided to provide him step-by-step instructions for the approach.

Mr. Mitchell normally switched a pilot to advisory frequency sooner than he did N840V. However, he felt it was better to leave the pilot on the approach frequency a little longer, and not switch him too soon. As he observed N840V fly toward JWN, Mr. Mitchell noticed that the airplane was tracking about one-half mile east of course. He advised the pilot of that course deviation, but the pilot did not respond. The OJTI took control of the frequency and informed the pilot of his position in relationship to the final course. The pilot responded “Yes, east of course." At that point, Mr. Mitchell switched N840V to advisory frequency and observed the airplane’s radar target drop from the radar display. This was normal, and he assumed the airplane had descended for landing. Mr. Mitchell did not recall the airplane’s altitude at that time. The

previous inbounds to JWR, also on IFR flight plans, had cancelled their IFR clearances when they reached about 1,200 feet. Mr. Mitchell did not recall what the cloud bases or tops were at that time.

When the pilot of N840V reported on the approach frequency, Mr. Mitchell did not understand what the pilot said, but asked the pilot if he was cancelling IFR. The pilot responded that he would like to conduct the approach again, and Mr. Mitchell issued the pilot a heading and altitude.

The normal position relief occurred at this point, and Mr. Luis Gonzalez signed on as the DRW controller, relieving Mr. Mitchell and Ms. Rogers.

During the position relief brief, Mr. Mitchell told Mr. Gonzales to be cautious with N840V. He did not state that on a recorded line, but wished he had recorded that during the overlap brief. Mr. Mitchell did not recall if the minimum safe altitude warning (MSAW) alerted, but added that MSAW alerts were a normal occurrence in the approach environment.

Mr. Mitchell forgot to ask N840V if he had the weather for JWN when the pilot reported in on his frequency, and he did not recall if the OJTI mentioned that to him.

He did not recall if he got a weather briefing before signing on the position, and did not look for pilot reports (PIREPs) on the integrated display systems replacement (IDS-R). He normally obtained weather information during the position relief brief and from the pilots. The supervisor did not ask him to solicit PIREPs that session.

Mr. Mitchell did not recall any specific classroom training at BNA that pertained to soliciting PIREPs, but he was aware of those requirements. The PIREP process at BNA consisted of completing the PIREP form and giving it to supervisor. The same PIREP reporting process applies for the controllers in the TRACON and the ATCT.

Weather information for JWN was not available to the controller at the sector position, and Mr. Mitchell would like to have that capability. Changes since the accident include new PIREPs being flashed on the IDS-R display, and the controllers being instructed to solicit more PIREPs.

Mr. Mitchel overheard the departure radar east (DRE) controller receive a couple of PIREPs, including icing reports. He believed those PIREPs were pertinent to aircraft going into BNA and the area east of BNA, not JWN. There were no PIREPs to the west of BNA, or pertinent to JWN. Mr. Mitchell did not recall receiving any PIREPs west of BNA that day. He solicited a PIREP from Cirrus at 5,000 feet and asked the pilot if he had encountered icing; the pilot reported that he had not.

4.2 Front Line Manager (FLM)

Mr. Robin C. Rutherford began working for the FAA in November 1990, at the FAA academy. Mr. Rutherford served as an air traffic controller in the United States Navy from 1980 to 1990. Before transferring to BNA in 1999, he worked as a CPC at Houston ARTCC (ZHU), Houston, TX, from 1991 to 1997, ZME from 1997 to 1999, and BNA from 1999 to 2012. Mr. Rutherford had worked as an FLM at BNA since November 2012. His medical certificate was current with a

restriction to have corrective lenses in his possession. He was in compliance with the restriction at the time of the accident.

On Monday, February 3, 2014, Mr. Rutherford worked his regularly scheduled shift and was assigned to the FLM position. Mr. Rutherford began his shift at 1330 CDT. During the shift, he occasionally opened up and worked the FRE position. The FRE position had been opened two or three times during that shift.

Mr. Rutherford explained that when he started a shift, his routine was to review information on the satellite page and IDS-R, and observed the traffic situation from the radar arrival position. During the relief briefing, he would obtain information on items such as expected traffic workload, staffing, and personnel. Mr. Rutherford had no concerns about shift staffing that day. He normally staffed the tower with six controllers and the TRACON with four or five controllers.

Mr. Rutherford did not recall PIREPs being part of the discussion during his relief briefing. He verbally instructed the controllers to solicit PIREPs; but he did not input that requirement in the IDS-R. He received numerous verbal and some written PIREPs from the controllers that day. He turned in all of the PIREP forms that he received with the daily documents. He did not recall what the weather conditions were that day, but had no reason to suspect icing.

He recalled the traffic volume had been light at the time of the accident, but it had been moderate about 30 to 40 minutes before the accident occurred.

Mr. Rutherford recalled that the pilot of N840V seemed confused when he made that first approach into JWN. He overheard the OJTI turn N840V to a 020 degree heading, but saw the airplane turn to a 200 degree heading. After the pilot was cleared for the approach, he noticed that the airplane had tracked about one-half mile east of the final approach course. Mr. Rutherford instructed the controller to inform the pilot that his airplane was one-half mile east of course. The OJTI informed the pilot of his position, and the pilot responded that he was correcting. The DRW controller then switched the pilot to advisory frequency.

Mr. Rutherford then stepped out of the radar room with the OJTI to discuss a previous training session she had with the CPC-IT. When he returned, about three minutes later, the accident had just occurred or was occurring at that time. The DRW controller, Mr. Luis Gonzalez, told him “we have a problem here.” Mr. Rutherford looked at the radar display to see what he was talking about and saw the coast data tag. (When there is a loss of transponder reception "CST" will appear in the altitude field of the data block.)

Mr. Rutherford called the airport operator at JWN to find out if N840V had landed there, and learned that it had not. He then contacted the Davidson County police department, but received a recording stating there was a 15-minute wait; therefore, he called the 911 operator. At the same time, a BNA tower controller called Mr. Rutherford advising him that the 911 operator called the tower informing them that 19 phone calls had come in about a crash. Mr. Rutherford notified the regional operations center (ROC) and the domestic events network (DEN), and completed the accident checklist.

Mr. Rutherford instructed the DRW controller to discontinue arrivals into JWN until they obtained more information on what occurred. The DRW controller put JWN arrivals into a holding pattern or diverted them to BNA.

Mr. Rutherford contacted the JWN airport manager and requested that a runway check for debris be completed. Approaches into JWN had been discontinued for about 30 minutes following the accident.

About 15 to 20 minutes after the accident occurred, Ms. Rogers returned to the radar room and relieved Mr. Gonzalez from the DRW position. Mr. Rutherford did not believe it was a priority to relieve the DRW controller immediately, because he did not believe the controller was responsible for the accident.

Numerous PIREPs were solicited that day, and Mr. Rutherford did not recall if they were all documented on PIREP forms. Normally, when a PIREP was received, the controller filled out the PIREP form and gave it to the supervisor. The supervisor would then call it in to the flight service station (FSS). He noted that about 30 percent of the time the FSS did not answer the phone; therefore, when that happened he wrote "no answer" on the PIREP form. There were no requirements to keep PIREP forms, but he made an effort to fill out the PIREP form, because the form followed the sequence that the FSS wanted to receive the information. Workload permitting he would fill out a PIREP form.

Approximately 90 percent of the PIREPS they received the day of the accident indicated that the cloud bases were 800 feet and the tops were 3,300 feet, with some reports of trace to light icing. Two of the PIREPS indicated moderate icing near Smyrna airport, Smyrna, TN (approximately 20 nautical miles southeast of JWN), and one indicated moderate icing on final approach to BNA. He did not recall if the moderate icing report to BNA occurred before or after accident.

Mr. Rutherford said that the facility did not conduct training on weather or on weather information resources available to controllers. (The ATC group's review of training folders revealed that there had not been any new or recurrent training on PIREPs in the past year.)

Mr. Rutherford used the integrated terminal weather system (ITWS), the traffic situation display (TSD), and information provided by Fort Campbell approach control to obtain weather information. He was prompted to check the status of the weather when the automatic terminal information service (ATIS) code changed, and when he observed or heard a pilot deviate for weather.

Mr. Rutherford explained that it was common for some controllers to bring up the RNAV and minimum vectoring altitude (MVA) map on their radar display for a quick reference; it all depended on the controller's preference. Mr. Rutherford believed that CPC-IT had the RNAV map displayed while working the position, because the instrument landing system (ILS) at JWN was out of service. There had been changes in the MVAs so some of the controllers brought the MVA map up on their display, but they usually had it set on a dim setting.
Mr. Rutherford believed that the controllers should have the ability to pull up weather information from their satellite airports, but they do not. There are approximately 40 to 60

arrivals per day into JWN and the only way they can get weather information for JWN is to call the automated weather observing system (AWOS) phone number.

About an hour before the localizer went out of service, FSS informed Mr. Rutherford that the localizer would be out of service for 24 hours. He believed that was a planned outage but was not sure. The FAA did not maintain the equipment at JWN; therefore, he could not prevent them from taking the localizer out of service.

When asked how often they receive MSAW alerts, Mr. Rutherford responded that they frequently receive alerts on JWN departures and BNA arrivals.

Mr. Rutherford explained that they do not have radar coverage on flights into or out of JWN, below 800 or 900 feet. He noted that they do have good radio communication with the pilots as soon as they lift off the runway at JWN.

4.3 Departure Radar West (DRW) On the Job Training Instructor (OJTI)

Ms. Bridget Catignani Rogers began working for the FAA in 1987 as a co-op employee assigned to Jacksonville ARTCC (ZJX), Jacksonville, FL. After she attended the FAA academy in 1989, Ms. Rogers worked at ZJX from 1989 to 2001, BNA from 2001 to 2011, and ZJX from 2011 to 2013. Her medical certificate was current, with a restriction to have corrective lenses. She was in compliance with the restriction at the time of the accident.

On Monday, February 3, 2014, Ms. Rogers worked her regularly scheduled shift and was assigned to provide training on the DRW position. Mr. William Mitchell was the DRW CPC-IT. During the two minutes of pre-position overlap, Ms. Rogers reviewed information on the ITWS and the IDS-R. She described the traffic complexity before the accident as being light to moderate.

Ms. Rogers recalled that when N840V checked in on their frequency, the CPC-IT had to re-issue instructions to the pilot two or three times before the pilot provided a complete read back. She felt the pilot "seemed unsure of himself."

The CPC-IT instructed the pilot to expect the RNAV approach to runway 2 at JWN. He provided the pilot a heading of 130 degrees, and then followed up by instructing the pilot to turn an additional 10 degrees on the heading; this was to provide the pilot sufficient space to intercept the final approach course at FUNJO. As N840V got closer to the approach course, the CPC-IT issued the pilot the approach clearance. The CPC-IT had to repeat it two or three times before the pilot provided a correct read back. After the pilot provided a correct read back, he stated that he needed to climb out and review the approach.

Ms. Rogers overrode the CPC-IT's frequency and told the pilot to maintain 3,000 feet and turn to a 020 degree heading. Instead of turning to 020, the pilot turned to a 200 degrees heading. Although that was not the assigned heading, she allowed the airplane to remain on that 200 heading because it did not create any conflicts with the other aircraft. She thought the pilot might need another altitude since he had already been cleared on the approach, so she reiterated to the pilot to maintain 3,000 feet at that time. She then stopped a BNA arrival's descent at 5,000 feet

leaving 4,000 feet vacant in case N840V required a climb. However, after a couple of minutes, the pilot of N840V reported that he was ready for the approach.

The CPC-IT cleared N840V for the RNAV runway 2 approach into JWN. As N840V progressed on the approach, she noticed that the airplane was about one-half mile east of the final approach course. The CPC-IT asked the pilot if he was established on the approach, and the pilot responded that he was. Before the pilot was switched to the advisory frequency, Ms. Rogers overrode the frequency and informed the pilot that his airplane was one-half mile east of the final approach course.

When N840V came back up on their approach control frequency (after conducting a missed approach at JWN), the CPC-IT thought the pilot was cancelling his IFR, so she told the CPC-IT that the pilot reported he was on a missed approach. The CPC-IT then instructed the pilot to climb to 3,000 feet and fly runway heading. Shortly after that, the CPC-IT gave the pilot a vector downwind for another approach.

About that time, the relieving controller, Mr. Luis Gonzalez, plugged in to assume the duties of the position. During the two-minute overlap, Ms. Rogers had a discussion with the CPC-IT about techniques she used when a pilot executed a missed approach.

Ms. Rogers believed that Mr. Gonzalez may have assumed that N840V had been conducting practice approaches, and speculated that was the reason he asked N840V if that would be a full stop.

After they completed their two-minute overlap, Ms. Rogers said she felt more comfortable with the situation because the pilot sounded more confident about the approach. After being relieved, she left the radar room and went on break. Ms. Rogers was not certain when the airplane crashed because she just returned to the TRACON after a 45 minute break.

Ms. Rogers was Mr. Mitchell's primary instructor. She had been on the position for about 2 hours and 10 minutes that session, and she had trained Mr. Mitchell for about 1 hour and 40 minutes that session.

Ms. Rogers recalled the weather at BNA was IFR due to overcast. The FLM instructed the controllers to solicit PIREPs. They received a PIREP from Cirrus that was inbound to JWN, but the pilot did not report icing. When the Cirrus cancelled IFR at 1,200 feet, she assumed the JWN airport was marginal VFR. However, after the accident occurred, she listened to the replay and realized that the Cirrus pilot had provided a subsequent PIREP when he cancelled IFR. The Cirrus pilot reported that he had light rime icing at 3,000 feet. Ms. Rogers did not hear that report originally because she had been discussing a technique with the CPC-IT.

When asked what the PIREP handling procedures were, Ms. Rogers said that when PIREPs were received the information was written down on the PIREP form, and either the controller or the FLM would call the FSS with that information. The TRACON and ATCT controllers are verbally informed about PIREPs. The controllers would bunch PIREPs together when the PIREPs were provided by pilots with the same type of aircraft and in the same type of situation. When PIREPs were received that involved different type aircraft or situations, they were

reported separately to FSS. Ms. Rogers estimated that approximately 25 percent of the time the FSS does not answer the phone when they call in a PIREP.

Since the accident, the FLMs have directed controllers to solicit more PIREPs, and to use the IDS-R, instead of verbal coordination, to disseminate PIREPs to the controllers in the TRACON and ATCT.

Ms. Rogers thought it would be helpful if the flight data input/output (FDIO) was adapted to receive satellite airport information, and if weather information and training was available from the center weather service unit (CWSU).

4.4 Departure Radar West (DRW)

Mr. Luis Gonzalez began working for the FAA in May 2002, at the FAA academy. Mr. Gonzalez served in a non- air traffic control field in the United States Army for eight years, and currently serves in the Army Reserves. Before transferring to BNA in 2008, Mr. Gonzales worked at DeKalb-Peachtree ATCT (PDK), Atlanta, GA, from 2002 to 2004, Greensboro ATCT (GSO), Greensboro, NC, from 2004 to 2006, and Atlanta Large TRACON (A80), Peachtree City, GA, from 2006 to 2008. His medical certificate was current with no restrictions. Mr. Gonzalez held a current private pilot license.

On Monday, February 3, 2014, Mr. Gonzalez worked his regularly scheduled shift and was assigned to the DRW position. Mr. Gonzalez relieved Ms. Rogers and Mr. Mitchell at 1645. He had been signed on the position when the accident occurred. Before signing on the DRW position, he worked a session on the DRE position, and then took a break. While on the DRE position, he received PIREPs that described the cloud tops between 3,300 to 3,500 feet, and a few reports of moderate icing and trace icing.

Before conducting the position relief brief, Mr. Gonzalez completed the required two minute pre-position relief overlap brief. On the job training had been in progress when he accepted the position. During the relief brief, Ms. Rogers informed him that N840V had attempted to conduct the RNAV runway 2 approach at JWN, and that the pilot seemed uncomfortable and unfamiliar with the approach. She told him to keep his transmissions brief and avoid issuing the pilot any abrupt turns, and suggested he give the pilot an extended final to assist him in transitioning to the final approach course. The position relief brief was recorded and he accepted responsibility for the sector.

Mr. Gonzalez asked N840V if he preferred the full approach and the pilot responded that he preferred vectors. Mr. Gonzalez instructed the pilot to turn to a 160 degree heading, because that would provide the pilot the direction and time to set his airplane up for a straight in configuration to runway 2. When N840V was approximately five miles southwest of FUNJO, Mr. Gonzalez instructed the pilot to proceed direct FUNJO to join the RNAV final approach course, and then issued the approach clearance.

Mr. Gonzalez observed N840V join the final approach course before switching the pilot to advisory frequency. The pilot did not respond. He then observed N840V make a tight left turn at 2,500 feet. Mr. Gonzalez was confused with what N840V was doing, but his initial thought was that the pilot was executing a procedure turn at FUNJO. As he watched N840V, Mr. Gonzalez

provided control instructions to a Bonanza on a west downwind to JWN and sequenced to follow N840V. He continuously attempted to contact N840V, and was concerned about a possible conflict between the Bonanza and N840V. Mr. Gonzalez then turned the Bonanza to a 200 degree heading in order to prevent a conflict. He called N840V two more times and then climbed the Bonanza to 4,000 feet. He made several attempts to contact the pilot, but the pilot never responded. Mr. Gonzales observed N840V's radar tag go into coast. At that point, he began providing holding instructions for other inbound aircraft he was controlling.

Mr. Gonzalez understood that the other pilots would ask questions as to why they were being put into holding; therefore, he felt he had been very careful not to say over the frequency, that an aircraft had crashed. He advised the pilots that had been put into holding for JWN that they might want to divert to another airport.

The traffic volume and complexity had been light up to the time and during the accident. However, afterward the situation became more complex because he had aircraft in holding and the traffic level had increased. When the FLM opened the final radar position, Mr. Gonzalez could concentrate on the traffic associated with JWN. As soon as the final radar position was opened, the traffic volume and complexity became light again, which allowed him more time to figure out what happened to N840V.

Mr. Gonzalez did not recall feeling uneasy or having any concerns about the pilot. Before switching N840V, he made sure the pilot was established on the approach, and the pilot appeared to be doing what he was expected to do.

Mr. Gonzalez explained that the standard terminal automated replacement system (STARS) allows the radar data tag to remain on the radar display until removed by the controller. After Mr. Gonzalez made several unsuccessful attempts to contact N840V, he advised the FLM that there might be a problem with N840V, and put in a STARS ZZ entry on N840V's data tag. Doing that insured that the radar data tag would be held in that position. Mr. Gonzalez noted that they had good radar coverage that day, using single sensor radar. Mr. Gonzalez was not sure if the FLM was in the TRACON during the accident, but when he turned around to inform the FLM there was a problem, the FLM was not far away. Mr. Gonzalez remained on the DRW position for about 25 to 30 minutes following the accident.

When asked to describe PIREP handling procedures, Mr. Gonzalez said that PIREPs were solicited once an hour if the cloud bases were below 5000 feet and/or the visibility was below five miles, and when other conditions prescribed in the procedures warrant solicitation. He normally obtained additional reports when the weather conditions frequently changed, but he would only fill out one PIREP form unless the report was a significant change to previous reports. There were occasions when PIREPs were passed verbally to controllers on positions, but he would normally fill out the PIREP form. Although the form is easy to complete, if his workload were such that he could not fill out the form, he would inform the FLM verbally about the PIREP. He believed that all PIREPs were disseminated to the controllers in the TRACON and the tower. He estimated that about 20 percent of the time FSS did not answer the phone when called to pass on a PIREP.

Mr. Gonzalez recalled while working on the DRE position earlier that shift, he received a PIREP from a small business jet that had reported moderate icing. He filled out the PIREP form and gave it to the FLM, and wrote the information on a flight progress strip, so he could have that information available to him as a reminder to provide the relieving controller during the position relief brief. He was not sure if the FLMs updated the PIREP information in the IDS-R, and did not know if the IDS-R had been updated before the accident.

When asked why he did not issue the aircraft a PIREP for icing, Mr. Gonzalez felt that since the pilot had been flying around in the airspace, providing him a PIREP associated with icing would have been redundant. He did not know if the previous controller issued a PIREP on icing. Mr. Gonzalez relied on the information in the IDS-R and position relief briefing to prepare him about weather issues for a session, but he noted that he relied mostly on the pilots' reports.

Mr. Gonzalez noticed that the read and initial binder had been updated to include information on requirements for controllers soliciting PIREPS, and information on where that PIREP information should be displayed in the IDS-R.