



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

April 26, 2019

Group Chairman's Factual Report

AIR TRAFFIC CONTROL

ERA17FA136

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A. AIRCRAFT ACCIDENT

Location: Hayden, GA
Date: March 25, 2017
Time: 1433 central daylight time (CDT)¹
1933 coordinated universal time (UTC)
Airplane: Cessna 210L, N6563D

B. AIR TRAFFIC CONTROL GROUP

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C. SUMMARY

On March 25, 2017, about 1433 central daylight time (CDT), a Cessna 210L, N6563D, was destroyed during an uncontrolled descent and subsequent inflight breakup near Hayden, Alabama. The pilot and three passengers were fatally injured. Instrument meteorological conditions prevailed, and an instrument flight rules flight plan was filed. The flight originated at Kissimmee Gateway Airport (KISM) Orlando, Florida and was destined for McKellar-Sipes Regional Airport (KMKL) Jackson, Tennessee. The personal flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91.

D. DETAILS OF THE INVESTIGATION

The air traffic control group was formed on March 27, 2017. The group consisted of the chairman and senior meteorologist, both from operational factors, a subject matter expert from the Federal Aviation Administration (FAA), an air safety investigator (ASI) and ASI in training from the National Air Traffic Controllers Association (NATCA). A NTSB regional accident investigator was present during the Birmingham Air Traffic Control Tower (KBHM ATCT) portion only.

The FAA Compliance Services Group (CSG) was immediately notified, and controller schedules were requested for on-site investigative planning. On March 29, the FAA Event Investigation Manager (EIM) informed the group that one of the Atlanta Air Route Traffic Control Center (KZTL) controllers was on Office of Workers' Compensation Programs (OWCP) leave, and therefore would not be available to interview until after April 6. The EIM also stated that the KBHM ATCT controllers would not be available until about the same time due to their current

¹ All times are in central daylight time (CDT) unless otherwise noted.

work schedules. The importance of conducting timely interviews and on-site investigative work in an accident investigation was discussed and noted, and though not optimum, the group agreed to conduct the on-site investigation at KBHM ATCT on April 7 and 8, and at KZTL on April 10 and 11.

Via the FAA CSG, the group requested radar source data and ATC voice recordings covering the entire accident flight. Additionally, the group requested from both KBHM ATCT and KZTL copies of facility standard operating procedures (SOPs), controller training and qualification records, and various administrative documents from the day of the accident. It was also requested that displayed weather information be preserved from both facilities (ERAM² from KZTL and STARS³ from KBHM ATCT). The group also coordinated with the National Weather Service (NWS) in order to schedule visits and discussions at both the Birmingham Weather Forecasting Office (WFO), and KZTL Center Weather Service Unit (CWSU).

On April 7, the group met at KBHM ATCT and was provided with an in-brief from the acting air traffic manager (ATM) and several members of his staff. Also present at the in-brief were members from the FAA CSG, office of general counsel, and Eastern Service Area quality control group (ESA QCG).

On April 8, the group met at KBHM ATCT and reviewed controller training and qualification records, as well as other data that had been provided by KBHM ATCT management. The group then conducted interviews⁴ with the flight data (FD) controller and controller in-charge (CIC) that were on duty during the time of the accident, concluded on-site activities for the day, returned to the hotel, and worked on field notes.

On April 9, the group traveled to Hampton, Georgia.

On April 10, the group met at KZTL and was provided an in-brief by the quality assurance manager and several members of KZTL staff including the ATM. Also present at the in-brief were members from the FAA CSG, office of general counsel, and ESA QCG. The group was provided an operational tour of the radar control room, with emphasis on area 5 (the area that provided services to the accident aircraft), and afterward attended a stand-up briefing. The group was then provided an ERAM playback of the event, reviewed controller training and qualification records, and other documentation provided by KZTL management. The group then conducted an interview with the sector 13 radar (R13) controller that provided services to the accident aircraft at the time of the accident. The R13 controller was interviewed off-site at the local police station at his doctor's recommendation. The group then returned to KZTL and conducted an interview with the sector 13 radar associate (D13) controller before concluding on-site activities for the day.

² ERAM – En Route Automation Modernization - The Next Gen system designed to replace the En Route Host and backup system previously utilized at Air Route Traffic Control Centers and allows for faster processing of route requests and in-flight route changes.

³ STARS – Standard Terminal Automation Replacement System – A system that receives radar data and flight plan information and presents the information to air traffic controllers on high resolution, 20" x 20" color displays allowing the controller to monitor, control, accept hand-off of air traffic, and assist with weather avoidance.

⁴ Summaries of all interviews conducted are included in Attachment 1: Interview Summaries

On April 11, the group met at KZTL and reviewed data, and again watched the ERAM replay in order to capture screenshots of the WARP⁵ displayed weather that was present leading up to and during the time of the accident. The group conducted interviews with both the CIC and front-line manager (FLM) that were on duty at the time of the accident and afterward spent some time in the KZTL CWSU talking with the meteorologist in-charge (MIC). The group then concluded the on-site portion of the field investigation, returned to the hotel, finished field notes and obtained group concurrence.

1.0 History of Flight

The following is a timeline of the sequence of events leading up to the accident. Information was obtained from FAA certified audio re-recordings and the FAA ATC accident package⁶. All times are rounded to the nearest minute in this timeline; however, exact times can be found in the certified transcript in the FAA ATC accident package.

- 1152 The pilot of N6563D first called Central Florida Terminal Radar Approach Control (KF11 TRACON) and reported airborne off KISM and was instructed to climb and maintain 4,000 feet above mean sea level (msl)⁷. The pilot acknowledged.
- 1156 The KF11 controller initially instructed the pilot of N6563D to climb and maintain 5,000 feet, then subsequently instructed him to climb and maintain 8,000 feet. The pilot acknowledged.
- 1208 Control of N6563D was transferred to Jacksonville (KJAX) approach control.
- 1211 The pilot of N6563D requested to climb to 10,000 feet, and the KJAX controller instructed the pilot to climb and maintain 10,000 feet.
- 1230 Control of N6563D was transferred to KZJX.
- 1231 The pilot of N6563D checked in with KZJX and reported level at 10,000 feet. The controller acknowledged and issued the current altimeter setting, which the pilot read back correctly.
- 1248 The KZJX controller broadcasted convective SIGMETs 60C, 58C, and 55C, which were valid until 1455.⁸

⁵ WARP – Weather and radar processor - A device that provides real-time, accurate, predictive, and strategic weather information presented in an integrated manner in the National Airspace System (NAS). Details surface conditions as derived from METAR and other surface observations and is displayed on air traffic control radar displays.

⁶ Transcripts of ATC audio are included in Attachment 2: ATC Accident Package

⁷ All altitudes are in feet above mean sea level (msl) unless otherwise noted, and in the case of cloud ceilings which are in feet above ground level (agl).

⁸ SIGMET – Significant Meteorological Information - A weather advisory issued concerning weather significant to the safety of all aircraft. SIGMET advisories cover severe and extreme turbulence, severe icing, and widespread dust or sandstorms that reduce visibility to less than 3 miles.

- 1249 Control of N6563D was briefly transferred to Tallahassee (KTLH) approach control, where controllers provided no control instructions until transferring control back to KZJX at about 1305.
- 1309 The pilot of N6563D attempted contact with KZJX but the controller was on a landline and unable to respond.
- 1310 The KZJX controller established communications with the pilot of N6563D who reported level at 10,000 feet and on course. The controller acknowledged and issued the Dothan altimeter setting. The pilot acknowledged.
- 1330 Control of N6563D was transferred to Atlanta Terminal Radar Approach Control (KA80 TRACON).
- 1332 The pilot of N6563D checked in with KA80 and reported level at 10,000 feet. The controller acknowledged and issued the current altimeter setting. The pilot acknowledged.
- 1349 Control of N6563D was transferred to Montgomery (KMGM) approach control.
- 1350 The pilot of N6563D contacted KMGM approach control and reported level at 10,000 feet on course. The controller acknowledged and broadcasted SIGMET 63C.
- 1357 The pilot of N6563D requested to deviate right of course for weather. The controller approved the pilots request.
- 1400 The pilot of N6563D reported back on course and stated that he may need to deviate again in 10 minutes.
- 1403 The pilot of N6563D requested to deviate right of course for weather. The controller approved the pilot's request.
- 1404 Control of N6563D was transferred to KBHM approach control.
- 1406 The pilot of N6365D contacted KBHM approach control and reported that he was level at 10,000 feet and deviating right. *[While with KBHM approach control, the pilot of N6563D continued to deviate attempting to navigate around the weather, and air traffic control kept coordinating the various deviations amongst the affected facilities.]*
- 1420 The pilot of N6365D requested to climb to 12,000 feet. The controller instructed the pilot to climb and maintain 12,000 feet and to contact KZTL. Control of N6563D was transferred to KZTL.
- 1424 The pilot of N6563D checked in with KZTL deviating right and climbing through 10,800 feet for 12,000 feet to avoid storms. The controller advised the pilot of moderate to extreme precipitation from his nine o'clock at about 10 miles to his twelve o'clock at 5 miles, then northbound moderate to extreme precipitation from his one to two o'clock at 20 miles and explained that it all continued for about another 30-40 miles along his route of flight. The

pilot said that he was on a right deviation but would go anywhere that the controller thought might be a “quick ride across.”

- 1425 The controller responded to the pilot of N6563D that he really did not have a better option and advised the pilot to just keep picking his way through the precipitation and when able, to proceed on course and advise. The pilot acknowledged.

[FAA radar data indicated that N6563D had been on a straight northwesterly track, and over a span of several minutes began an erratic series of close proximity turns first to the left, then to the right, then back to the left, then losing altitude and indicating abrupt increases and decreases in ground speed. (see Attachment 3, Figure 3)]

- 1429 The controller advised the pilot of N6563D to watch his altitude and to maintain 12,000 feet. The pilot acknowledged that he was trying.
- 1430 The controller instructed the pilot of N6563D to check his altitude and to maintain 12,000 feet. There was no response initially, and after the controller queried again, the pilot responded again that he was trying, and that he was having some trouble.
- 1431 The controller advised the pilot of N6563D that he was losing altitude, and that he needed him to watch his altitude. The pilot said that he was doing the best he could. The controller then advised the pilot to try going back to the east/southeast and that it might be better, and again the pilot said he was working on it.
- 1432 The controller asked the pilot of N6563D how he was doing, and there was an unintelligible response. The controller then advised the pilot that he showed him descending and was at 5,800 feet and instructed him to check his altitude. There was no response. The controller attempted to contact the pilot several more times, but no further transmissions were received from the accident pilot.

2.0 Radar and Weather Radar Information

Radar data⁹ was provided by the FAA CSG which included source data from several long- and short-range surveillance radar sites in the Florida-Georgia area. The source data used to produce radar figures¹⁰ 1-3 were obtained the KBHM ASR-9 radar located in Birmingham, Alabama.

An ERAM playback of the event was provided by the FAA at KZTL, and from this replay, screen captures were taken at 1428 and 1429 and illustrate the weather information that was being displayed to the controller in the final minutes leading up to the accident time. These screen captures are presented as figures 4 and 5.

In ARTCCs, NEXRAD¹¹ data is fed through the WARP system that organizes the 16 NEXRAD levels into four reflectivity (dBZ) categories. Reflectivity returns of less than 30 dBZ

⁹ Radar data is included in Attachment 4: Radar Data

¹⁰ All figures are included in Attachment 3: Radar Figures and ERAM Screen Captures

¹¹ NEXRAD – Next Generation Radar - a system of Doppler radars across the US that is used to track the location

are classified as "light" and are filtered out of the ARTCC controller's display. The remaining three categories correlate to bands of dBZ values to assist pilots in evaluating the severity of flight conditions that might be associated with those precipitation returns. Reflectivity returns between 30-40 dBZ are classified as "moderate" and displayed in royal blue on the controller's radar display, returns between 40-50 dBZ are classified "heavy" and displayed in cyan with a black checkerboard pattern, and returns greater than 50 dBZ are classified "extreme" and displayed in cyan.

3.0 Weather Information

KBHM was the closest surface weather reporting station to the accident site located about 25 miles south of the accident site at an elevation of 650 feet. The airport had a federally installed Automated Surface Observing System (ASOS) which was also augmented by contracted NWS certified weather observers. The following are the Meteorological Aerodrome Reports (METARs) and Special Reports (SPECIs) surrounding the period of the accident. Cloud heights are reported in feet above ground level (agl).

*[1353 CDT] METAR KBHM 251853Z 16014G19KT 10SM FEW047 BKN060 26/13 A3010
RMK AO2 PK WND 20028/1807 LTG DSNT NW SLP187 T02560128=*

KBHM routine weather observation at 1353 CDT, wind from 160° at 14 knots gusting to 19 knots, visibility 10 miles, a few clouds at 4,700 feet, ceiling broken at 6,000 feet, temperature 26° Celsius (C), dew point temperature 13° C, altimeter 30.10 inches of mercury (Hg). Remarks: automated observation system with a precipitation discriminator, peak wind from 200° at 28 knots occurred at 1307 CDT, lightning distant northwest, sea level pressure 1018.7-hPa, temperature 25.6° C, dew point 12.8° C.

[1435 CDT] TIME OF ACCIDENT

*[1453 CDT] METAR KBHM 251953Z 26016KT 10SM BKN046 BKN055 21/12 A3009 RMK
AO2 SLP182 T02060117=*

KBHM routine weather observation at 1453 CDT, wind from 260° at 16 knots, visibility 10 miles, ceiling broken at 4,600 feet, broken at 5,500 feet, temperature 21° C, dew point temperature 12° C, altimeter 30.09 inches of Hg. Remarks: automated observation system with a precipitation discriminator, sea level pressure 1018.2-hPa, temperature 20.6° C, dew point 11.7° C.

The NWS Aviation Weather Center (AWC) and KZTL CWSU had also issued the following weather advisories surrounding the period of the accident:

*[1304 CDT] FAUS21 KZTL 251904
ZTL1 CWA 251905
ZTL CWA 101 VALID UNTIL 252010
FROM 40S BNA-25W MGM-45S MEI-40S BNA*

and movement of storm systems.

AREA HVY-EXTRM PCPN IN SHRA AND ISOLD EMBDD TS. MAX TOPS NR FL430. MOVG FROM 22035KTS. EXP LTL CHG IN COVRG/INTST THRU PD.=

*[1255 CDT] WSUS32 KKCI 251855
SIGC
MKCC WST 251855
CONVECTIVE SIGMET 63C
VALID UNTIL 2055Z
AL MS LA AND MS LA CSTL WTRS
FROM 40W MGM-40ESE HRV-110S LCH-20NNW LSU-40W MGM
AREA TS MOV FROM 30025KT. TOPS ABV FL450.*

*CONVECTIVE SIGMET 64C
VALID UNTIL 2055Z
MS LA
FROM 10ESE SQS-40ESE SQS-30NNW MCB-50ESE MLU-10ESE SQS
AREA TS MOV FROM 24020KT. TOPS TO FL380.*

*CONVECTIVE SIGMET 65C
VALID UNTIL 2055Z
MS LA CSTL WTRS
FROM 80E LEV-80SE LEV
LINE TS 20 NM WIDE MOV FROM 29020KT. TOPS ABV FL450.
NRN PTN MOV FROM 29010.*

Additionally, the group visited the NWS Weather Forecast Office in Birmingham, Alabama, as well as the KZTL CWSU. For summaries of interviews conducted with persons at these locations, and for detailed weather information, please see the *Meteorology Factual Report* in the public docket.

4.0 FAA ATC Directives

4.1 PIREP and Weather Dissemination

According to FAA Order JO 7110.65W, *Air Traffic Control, 2-6-2 HAZARDOUS INFLIGHT WEATHER ADVISORY SERVICE (HIWAS)*, controllers must advise pilots of hazardous weather that may impact operations within 150 NM of their sector or area of jurisdiction. The order stated in part:

Hazardous weather information contained in HIWAS broadcasts includes Airmen's Meteorological Information (AIRMET), Significant Meteorological Information (SIGMET), Convective SIGMET (WST), Urgent Pilot Weather Reports (UUA), and Center Weather Advisories (CWA). Facilities must review alert messages to determine the geographical area and operational impact for hazardous weather information broadcasts. The broadcast is not required if aircraft on your frequency(s) will not be affected.

a. Controllers within commissioned HIWAS areas must broadcast a HIWAS alert on all frequencies, except emergency frequency, upon receipt of hazardous weather information. Controllers are required to disseminate data based on the operational impact on the sector or area of control jurisdiction.

c. Terminal facilities have the option to limit hazardous weather information broadcasts as follows: Tower cab and approach control facilities may opt to broadcast hazardous weather information alerts only when any part of the area described is within 50 NM of the airspace under their jurisdiction.

With regard to PIREP solicitation and dissemination, FAA Order JO 7110.65W, *Air Traffic Control, 2-6-3 PIREP INFORMATION* discussed the conditions under which air traffic controllers are required to solicit and disseminate PIREP information, the order stated in part:

Significant PIREP information includes reports of strong frontal activity, squall lines, thunderstorms, light to severe icing, wind shear and turbulence (including clear air turbulence) of moderate or greater intensity, volcanic eruptions and volcanic ash clouds, detection of sulfur gases (SO₂ or H₂S) in the cabin, and other conditions pertinent to flight safety.

a. Solicit PIREPs when requested or when one of the following conditions exists or is forecast for your area of jurisdiction:

1. Ceilings at or below 5,000 feet. These PIREPs must include cloud base/top reports when feasible.

TERMINAL. Ensure that at least one descent/climbout PIREP, including cloud base(s), top(s), and other related phenomena is obtained each hour.

2. Visibility (surface or aloft) at or less than 5 miles.

3. Thunderstorms and related phenomena.

4. Turbulence of moderate degree or greater.

5. Icing of light degree or greater.

6. Wind Shear.

7. Volcanic ash clouds.

c. Obtain PIREPs directly from the pilot, or if the PIREP has been requested by another facility, you may instruct the pilot to deliver it directly to that facility.

d. Handle PIREPs as follows:

1. Relay pertinent PIREP information to concerned aircraft in a timely manner.

2. EN ROUTE. Relay all operationally significant PIREPs to the facility weather coordinator.

3. TERMINAL. Relay all operationally significant PIREPs to:

- (a) The appropriate intrafacility positions.
- (b) The FSS serving the area in which the report was obtained.
- (c) Other concerned terminal or en route ATC facilities, including non-FAA facilities.
- (d) Use the word *gain* and/or *loss* when describing to pilots the effects of wind shear on airspeed.

With regard to Weather dissemination, FAA Order JO 7110.65W, *Air Traffic Control, 2-6-4 WEATHER AND CHAFF SERVICES* discussed the controller's responsibility in disseminating pertinent weather information to pilots and stated in part:

a. Issue pertinent information on observed/reported weather and chaff areas by defining the area of coverage in terms of azimuth (by referring to the 12-hour clock) and distance from the aircraft by indicating the general width of the area and the area of coverage in terms of fixes or distance and direction from fixes.

NOTE – Weather significant to the safety of aircraft includes such conditions as funnel cloud activity, lines of thunderstorms, embedded thunderstorms, large hail, wind shear, microbursts, moderate to extreme turbulence (including CAT), and light to severe icing.

b. Inform any tower for which you provide approach control services of observed precipitation on radar which is likely to affect their operations.

c. Use the term “precipitation” when describing radar-derived weather. Issue the precipitation intensity from the lowest descriptor (LIGHT) to the highest descriptor (EXTREME) when that information is available. Do not use the word “turbulence” in describing radar-derived weather.

- 1. LIGHT
- 2. MODERATE
- 3. HEAVY
- 4. EXTREME

NOTE – Weather and Radar Processor (WARP) does not display light intensity.

g. When requested by the pilot, provide radar navigational guidance and/or approve deviations around weather or chaff areas. In areas of significant weather, plan ahead and be prepared to suggest, upon pilot request, the use of alternative routes/altitudes.

- 1. An approval for lateral deviation authorizes the pilot to maneuver left or right within the limits of the lateral deviation area.

3. If a pilot enters your area of jurisdiction already deviating for weather, advise the pilot of any additional pertinent weather which may affect his route.

4. If traffic and airspace (i.e., special use airspace boundaries, LOA constraints) permit, combine the approval for weather deviation with a clearance on course.

5. If traffic or airspace prevent you from clearing the aircraft on course at the time of the approval for weather deviation, instruct the pilot to advise when clear of the weather.

i. When forwarding weather deviation information, the transferring controller must clearly coordinate the nature of the route guidance service being provided. This coordination should include, but is not limited to: assigned headings, suggested headings, pilot-initiated deviations. Coordination can be accomplished by: verbal, automated, or pre-arranged procedures. Emphasis should be made between: controller assigned headings, suggested headings, or pilot-initiated deviations.

E. LIST OF ATTACHMENTS

Attachment 1: Interview Summaries

Attachment 2: FAA ATC Accident Package

Attachment 3: Radar Figures and ERAM Screen Captures

Attachment 4: Radar Data

Submitted by:

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