



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

July 31, 2019

Group Chairman's Factual Report

AIR TRAFFIC CONTROL

CEN18FA371

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A. AIRCRAFT ACCIDENT

Location: Port Huron, Michigan
Date: September 5, 2018 (September 6, 2018 UTC)
Time: 2347 eastern daylight time (EDT)¹
0347 coordinated universal time (UTC)
Airplane: C-GLKX, Cessna 340A

B. AIR TRAFFIC CONTROL GROUP

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C. SUMMARY

On September 5, 2018, about 2347 eastern daylight time, a Canadian registered Cessna 340A, C-GLKX, impacted terrain during an attempted approach to the St. Clair County International Airport (KPHN), Port Huron, Michigan. The pilot received fatal injuries, and the airplane sustained substantial damage. The airplane was owned by Flex Air Inc. and operated by the pilot as a business flight. Night visual meteorological conditions prevailed at the time of the flight, which was on an instrument flight plan. The flight departed the St. Thomas Municipal Airport (CYQS), St. Thomas, Ontario, Canada, about 2313, and was en route to KPHN.

D. DETAILS OF THE INVESTIGATION

The air traffic control workgroup was formed on September 6, 2018. The group consisted of the chairman and senior meteorologist, both from operational factors, a subject matter expert from the Federal Aviation Administration (FAA), and an air safety investigator from the National Air Traffic Controllers Association (NATCA).

The group requested and received Cleveland Air Route Traffic Control Center (ZOB) radar data, voice recordings, copies of various administrative documents from the day of the accident, standard operating procedures (SOP), facility logs, controller work schedules, controller training and qualification records, ERAM² playback of the event, and other documentation pertaining to the accident.

¹ All times are in eastern daylight time (EDT) unless otherwise noted.

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.

On September 7, 2018, the group met at the lodging facility and conducted a brief organizational meeting before heading to ZOB. The group was provided with an in-brief by the air traffic manager (ATM) and several members of his staff. Also present were members from the FAA's compliance services group (CSG), office of general counsel, Central Service Area quality control group (CSA QCG), and ZOB NATCA leadership. The group was provided with an ERAM replay of the event that was a re-recording taken with a digital camera and audio synchronized as closely as possible. The group then conducted interviews³ with the sector 12 radar (R12) controller that was providing services to the accident aircraft, as well as, the front-line manager (FLM) and operations manager in charge (OMIC) that were on duty at the time of the accident. The group reviewed controller training and qualification records, and other data collected from the day of the accident.

On September 8, 2018, the group was provided a detailed operational overview by the meteorologist in charge (MIC) of the Center Weather Service Unit (CWSU) located within KZOB. The group was then provided with an operational tour of the control floor with emphasis on area 1 which was the area that had provided services to the accident aircraft. The group then reviewed data and met with the ATM and staff for a short, informal discussion before concluding the on-site portion of the field phase of the investigation, finished field notes and obtained group concurrence.

E. FACTUAL INFORMATION

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 package⁴. All altitudes are in feet above mean sea level (msl) and all times are rounded to the nearest minute in this timeline.

- 2334 The ZOB R12 controller accepted the radar hand-off of C-GLKX from Toronto Area Centre (CZYZ), cleared direct WIGUK (initial approach fix for RNAV Runway 22 approach at KPHN) and the pilot had requested the RNAV RWY 22 approach to KPHN.
- 2335 The pilot of C-GLKX contacted the R12 controller, reported level at 4,000 feet and confirmed he was direct WIGUK. The R12 controller instructed the pilot of C-GLKX to report passing WIGUK and asked him to confirm he had the current weather at KPHN, and to contact flight service (FSS) for current NOTAMS⁵. The pilot requested the frequency for FSS and was advised the frequency was 122.2.
- 2337 The R12 controller again instructed the pilot of C-GLKX to report passing WIGUK and subsequently advised the pilot that radar contact was lost. No response was received from the pilot. Seconds later the pilot of C-GLKX informed the R12 controller that he was unable to reach FSS.

³ Summaries of all interviews conducted are included in Attachment 1: Interview Summaries

⁴ Transcripts of ATC audio re-recordings are included in Attachment 2: ATC Accident Package

⁵ NOTAM – Notice to Airman. A notice containing information concerning the establishment, condition, or change in any component of the National Airspace System which timely knowledge is essential to personnel concerned with flight operations.

- 2338 After first confirming the pilot had picked up the NOTAMs prior to departing, the R12 controller advised him there was only one applicable NOTAM for KPHN that reported a tower obstruction light out of service 3.1 nautical miles northeast of the airport. The pilot acknowledged.
- 2342 The R12 controller asked the pilot of C-GLKX if he had passed WIGUK, and the pilot confirmed he had and was inbound for RWY 22. The controller then instructed the pilot to cross ZORIX (final approach fix for the RNAV Runway 22 approach at KPHN) at or above 2,200 feet, cleared him for the RNAV RWY 22 approach to KPHN and approved a frequency change to advisory frequency with instructions to report his IFR⁶ cancellation in the air with ZOB, or on the ground with FSS. The pilot acknowledged.
- 2344 The pilot of C-GLKX advised the R12 controller he had just lost his right engine, and when asked if he would still make the landing at KPHN and the pilot said he was going to work on it.
- 2346 The pilot of C-GLKX advised the R12 controller that he did not see any lights, and that he had tried to turn them on with no success. The controller responded that he did not have control over them and did not show any NOTAMs indicating there was a problem. The controller then asked if he could see the airport, and the pilot responded that he could not, was over the airport and going to make a slow turn and try to re-shoot the approach. The controller again asked if he could see the airport and the pilot said there was nothing lit up.
- 2348 The R12 controller advised the pilot of C-GLKX that there was a small private strip about seven miles south and that he could attempt to get the lights on there, however there was no response from the pilot.

2.0 Radar Information

Radar detects the position of an object by broadcasting an electronic signal that is reflected by the object and returned to the radar antenna. These reflected signals are called *primary returns*. Knowing the speed of the radar signal and the time interval between when the signal was broadcast and when it was returned, the distance, or range, from the radar antenna to the reflecting object can be determined. Knowing the direction that the radar antenna was pointing when the signal was broadcast, the direction (or bearing, or azimuth) from the radar to the object can be determined. Range and azimuth from the radar to the object define the object's position.

To improve the consistency and reliability of radar returns, aircraft are equipped with transponders that sense beacon interrogator signals broadcast from radar sites, and in turn broadcast a response signal. Even if the radar site is unable to sense a weak reflected primary return, it will sense the response signal broadcast by the transponder and be able to determine the aircraft position. The response signal can also contain additional information, such as the identifying "beacon code" for the aircraft, and the aircraft's pressure altitude (also called "Mode

⁶ IFR - Instrument Flight Rules [ICAO]- A set of rules governing the conduct of flight under instrument meteorological conditions.

C” altitude). Transponder signals received by the radar site are called secondary returns. C-GLKX was assigned a beacon code of 6334.

Radar data⁷ was provided by the Department of Defense (DoD) and the source radar was the Selfridge GPN-20 Airport Surveillance Radar (ASR) located on Selfridge Air National Guard Base (KMTC) in Mt. Clemens, MI. The KMTC plot playback (PPB) data was of good quality and was part of the Standard Terminal Automation Replacement System (STARS) and was used to produce figures⁸ 1-4. It is important to note that KMTC was closed at the time of this accident, and approach control services were being provided by ZOB, whose radar system did not include the KMTC radar. Without the KMTC radar feed, the radar coverage available to the ZOB controller was significantly limited at low altitude around the airport.

3.0 Weather Information

3.1 Surface Observations

An Automated Weather Observing System was located at KPHN in Port Huron, Michigan, and was located within about 1 mile of the accident location at an elevation of about 650 feet. Automated reports from KPHN during the times surrounding the accident time are presented here. The following observations were taken and disseminated during the time surrounding the accident:

[2315 EDT] METAR KPHN 060315Z AUTO 0000KT 10SM -RA BKN050 BKN070 BKN090 21/20 A3017 RMK AO2=

[2335 EDT] METAR KPHN 060335Z AUTO 0000KT 10SM RA SCT050 SCT070 BKN120 21/20 A3016 RMK AO2=

[2355 EDT] METAR KPHN 060355Z AUTO 0000KT 7SM -RA SCT060 BKN085 BKN100 21/20 A3016 RMK AO2=

[0015 EDT] METAR KPHN 060415Z AUTO 02003KT 10SM -RA SCT050 SCT060 BKN100 21/20 A3015 RMK AO2=

[0035 EDT] METAR KPHN 060435Z AUTO 0000KT 10SM -RA BKN012 BKN050 BKN075 21/20 A3016 RMK AO2=

At 2355 EDT, KPHN reported a calm wind, visibility of 7 statute miles, light rain, scattered clouds at 6,000 feet above ground level (agl), ceiling broken at 8,500 feet agl, broken clouds at 10,000 feet agl, temperature of 21° Celsius (C) and a dew point temperature of 20°C, altimeter setting of 30.16 inches of mercury; remarks: station with a precipitation discriminator.

An automated reporting station of unknown type was located at Sarnia Chris Hadfield Airport (CYZR) in Sarnia, Ontario, Canada, and was located about 11 miles northeast of the accident location at an elevation of about 600 feet. Automated reports from CYZR during the times surrounding the accident time are presented here.

⁷ Radar data is included in Attachment 3: Radar Data

⁸ All figures are included in Attachment 4: Radar Graphics

[2316 EDT] SPECI CYZR 060316Z AUTO 23004KT 220V020 9SM FEW075 SCT100 BKN120 22/20 A3015 RMK LTNG DIST SE S SW PRESRR RVR MISG SLP209 DENSITY ALT 1200FT=

[2318 EDT] SPECI CYZR 060318Z AUTO VRB05KT 9SM TS FEW060 SCT087 BKN110 BKN130 22/21 A3015 RMK LTNG DIST SE S SW PRESRR RVR MISG SLP210 DENSITY ALT 1200FT=

[2338 EDT] SPECI CYZR 060338Z AUTO VRB02KT 9SM -TSRA SCT060 BKN110 BKN140 22/21 A3016 RMK LTNG DIST E S RVR MISG SLP211 DENSITY ALT 1200FT=

[2351 EDT] SPECI CYZR 060351Z AUTO VRB02KT 9SM -RA FEW011 SCT060 SCT110 OVC140 22/20 A3016 RMK LTNG DIST E SE RVR MISG SLP211 DENSITY ALT 1200FT=

[2354 EDT] SPECI CYZR 060354Z AUTO VRB02KT 9SM FEW011 SCT060 SCT110 OVC140 22/20 A3015 RMK LTNG DIST E SE RVR MISG SLP210 DENSITY ALT 1200FT=

[2358 EDT] SPECI CYZR 060358Z AUTO 35004KT 250V360 9SM -RA FEW011 SCT060 BKN100 OVC140 22/21 A3015 RMK LTNG DIST E SE RVR MISG SLP208 DENSITY LT 1200FT=

[0000 EDT] METAR CYZR 060400Z AUTO 35004KT 250V360 9SM -RA FEW011 SCT055 BKN100 OVC140 22/21 A3015 RMK LTNG DIST E SE RVR MISG SLP208 DENSITY ALT 1200FT=

[0038 EDT] SPECI CYZR 060438Z AUTO 02009KT 9SM SCT009 BKN150 BKN180 22/21 A3015 RMK RVR MISG SLP207 DENSITY ALT 1200FT=

At 2351 EDT, CYZR reported a variable wind at 2 knots, visibility of 9 statute miles, light rain, few clouds at 1,100 feet agl, scattered clouds at 6,000 feet agl, scattered clouds at 11,000 feet agl, ceiling overcast at 14,000 feet agl, temperature of 22°C and a dew point temperature of 20°C, altimeter setting of 30.16 inches of mercury; remarks: lightning distant to the east and southeast, runway visual range information missing, sea level pressure of 1021.1 hectopascals, density altitude of 1,200 feet.

3.2 Weather Radar

WSR-88D Level-II reflectivity weather radar imagery from Detroit, Michigan (KDTX), is presented in figure 5 below. KDTX was located approximately 42 miles west-southwest of the accident site at an elevation of about 1,065 feet. Assuming standard refraction and considering the 0.95° beam width for the WSR-88D radar beam, the KDTX 0.468° tilt would have “seen” altitudes between about 2,100 and 6,300 feet above mean sea level over the accident location. The KDTX weather radar depicted reflectivity values consistent with light rain at the accident location about the accident time.

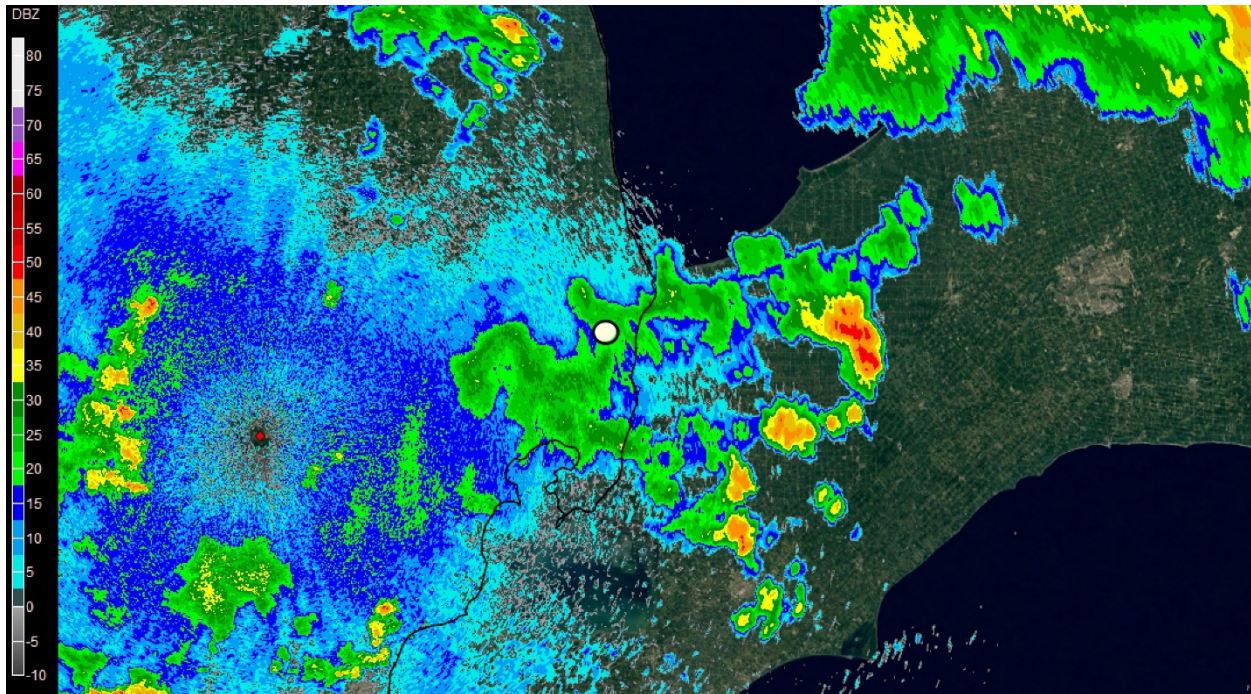


Figure 5 – KDTX 0.44° Level-II reflectivity product from 2348 EDT. Accident location denoted by white circle.

3.3 Aviation Section of the Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 2349 EDT by the National Weather Service Weather Forecast Office in Detroit/Pontiac, Michigan. The aviation portion of the AFD is presented here.

FXUS63 KDTX 060349

AFDDTX

Area Forecast Discussion

National Weather Service Detroit/Pontiac MI

1149 PM EDT Wed Sep 5 2018

.AVIATION...

Mid level forcing north of cold front will maintain a stream of showers and occasional thunder into the overnight hours. Trend will be for less tsra coverage with time with this activity generally confined to KPTK south. Ceilings will be difficult to pin down this forecast, but some degree of post-frontal MVFR to lower VFR stratus looks to be a decent bet into Thursday morning with a trend to solid VFR by Thursday afternoon as low clouds scatter out. Unfortunately, late evening observations run the gamut in ceiling categories and lend little help.

For KDTW...Showers are expected overnight with a few thunderstorms still possible early. While timing is tricky, a gradual trend to lower cigs still seems plausible with MVFR conditions eventually. Lower cigs late tonight into Thursday morning will lift Thursday afternoon.

KDTW THRESHOLD PROBABILITIES...

** Medium in ceilings aob 5000 feet into Thursday morning.*

** Low in thunderstorms impacting the terminal through 08z.*

3.4 AIRMETs

There were no AIRMET⁹ advisories for turbulence or icing active below 10,000 feet for the accident location at the accident time.

The following AIRMET for IFR conditions was issued at 2245 PST and was active for the accident location at the accident time. It advised of ceilings below 1,000 feet and visibilities below 3 statute miles with mist.

WAUS43 KPCI 060245

WA3S

CHIS WA 060245

AIRMET SIERRA FOR IFR VALID UNTIL 060900

.

AIRMET IFR...NE KS IA MO WI LM MI LH IL IN OK TX

*FROM 60SSW SSM TO 30ESE ECK TO DXO TO FWA TO 40E UIN TO COU TO 20W
SGF TO 30S OKC TO 30SE LBL TO 40ENE MCK TO 50NW PWE TO 40W DSM TO
40E MCW TO 40S GRB TO 60SSW SSM*

CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 09Z THRU 15Z.

3.5 SIGMETs

There were no non-convective SIGMET¹⁰ advisories active for the accident location at the accident time.

At 2255 EDT, the following Convective SIGMET was issued and was active for the accident location at the accident time. It advised of an area of thunderstorms with cloud tops to FL440. The advisory polygon was moving from 250° true at 30 knots.

WSUS31 KPCI 060255

SIGE

MKCE WST 060255

CONVECTIVE SIGMET 8E

VALID UNTIL 0455Z

OH MI IN IL LE LH LM

⁹ AIRMET – Airmen’s Meteorological Information - In-flight weather advisories issued only to amend the area forecast concerning weather phenomena which are of operational interest to all aircraft and potentially hazardous to aircraft having limited capability because of lack of equipment, instrumentation, or pilot qualifications.

¹⁰ 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.

**FROM 30ENE ECK-10SE DXO-40WNW BVT-20E ORD-30ENE ECK
AREA TS MOV FROM 25030KT. TOPS TO FL440.**

3.6 CWSU Products

There were no Center Weather Advisories issued by the CWSU at the ZOB that were active for the accident location at the accident time.

At 2045 EDT, the ZOB CWSU issued the following Meteorological Impact Statement that was valid until 0800 EDT on September 6, 2018, which advised for central through east Michigan: scattered thunderstorms moving from the west-southwest at 35 knots with tops to FL450 and conditions ending 0500 EDT on September 6, 2018.

*FAUS20 KZOB 060045
ZOB MIS 03 VALID 060045-061200
...FOR ATC PLANNING PURPOSES ONLY...
CNTRL-E MI..SCT TS MOV FROM WSW 35KT..TOPS TO FL450..ENDG 09Z.
EXTRM SE MI/LK ERIE/N OH..ISOL TS POSS MOV FROM WSW 20KT..TOP TO
FL350. EXTRM NE OH/EXTRM NW PA/EXTRM W NY..AFT 09Z WDLY SCT TS MOV
FROM WSW 35KT..TOPS TO FL350. NO UPDT AFT 0130Z.*

4.0 ATC Procedures

C-GLKX was cleared for the RNAV RWY 22 approach at KPHN. The notes on the standard instrument approach procedure state that the approach is not authorized at night. FAA Order JO 7110.65Y, *Air Traffic Control*, Chapter 4. IFR stated in part:

4-8-1. APPROACH CLEARANCE

2. Approach clearances are issued based on known traffic. The receipt of an approach clearance does not relieve the pilot of his/her responsibility to comply with applicable Parts of Title 14 of the *Code of Federal Regulations* and the notations on instrument approach charts which levy on the pilot the responsibility to comply with or act on an instruction; for example, "Straight-in minima not authorized at night," Procedure not authorized when glideslope/glidepath not used," "Use of procedure limited to aircraft authorized to use airport," or "Procedure not authorized at night" or Snowflake icon with associated temperature.

F. LIST OF ATTACHMENTS

Attachment 1: Interview Summaries and Record of Conversation

Attachment 2: ATC Accident Package

Attachment 3: Radar Data

Attachment 4: Radar Graphics

Submitted by:

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