NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

September 16, 2020

Group Chairman's Factual Report

AIR TRAFFIC CONTROL

DCA19FA089

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A. ACCIDENT

Location: Northern Maine Regional Airport, Presque Isle, Maine
Date: March 4, 2019
Time: 1129 eastern standard time (EST)
1629 coordinated universal time (UTC)
Airplane: CommutAir flight 4933 (UCA4933), Embraer EMB-145XR, N14171

B. AIR TRAFFIC CONTROL GROUP

Andy Olvis
Group Chairman
Operational Factors Division (AS-30)
National Transportation Safety Board

Sarah Owens
Air Safety Investigator
Kansas City Air Route Traffic Control Center
National Air Traffic Controllers Association

Brian Soper
Air Traffic Investigator
Operational Factors Division (AS-30)
National Transportation Safety Board

Chris Kerrigan
Operations Manager
Indianapolis Air Route Traffic Control Center
Federal Aviation Administration

C. SUMMARY

On March 4, 2019, at 1129 eastern standard time, CommutAir flight 4933, an Embraer EMB-145XR, N14171, d.b.a. United Express, landed between runway 1 and taxiway A in moderate snow at Northern Maine Regional Airport at Presque Isle (PQI), Presque Isle, Maine. This was the second approach to runway 1 after having conducted a missed approach during the first approach. Radar track data show that the airplane was aligned right of runway 1 during both approaches. Of the 31 passengers and crew onboard, three passengers and one crewmember received minor injuries. The airplane was substantially damaged. The flight was operating under the provisions of Title 14 Code of Federal Regulations Part 121 as a regularly scheduled domestic passenger from Newark International Airport (EWR), Newark, New Jersey, to PQI.

D. DETAILS OF THE INVESTIGATION

On Sunday March 17, the air traffic control (ATC) workgroup met at Boston Air Route Traffic Control Center (ZBW ARTCC) and was provided an in-brief from the air traffic manager (ATM) and several members of the air traffic staff. Also present at the in-brief were members from the Federal Aviation Administration (FAA) compliance services group, eastern service area quality control group (ESA QCG), FAA office of chief counsel, FAA Boston district, and ZBW ARTCC technical operations. The group was then provided with an operational tour of the control floor including areas “C” and “D”, the Traffic Management Unit (TMU), Center Weather Service Unit (CWSU), and Flight Data (FD). The workgroup then interviewed the operations manager in-charge (OMIC) in support of the KPQI accident investigation.

On Monday March 18, the workgroup again met at ZBW ARTCC and interviewed the national airspace operations manager (NOM) from the systems control center (SCC) in support of

the KPQI accident investigation (see attachment 1). The workgroup continued to gather additional investigative materials and concluded the onsite portion of the investigation.

E. FACTUAL INFORMATION

1.0 History of Flight

UCA4933 departed KEWR at about 1004 EST and turned northbound on the filed route of flight to KPQI. The airplane climbed to a cruise altitude of 35,000 feet (FL350[1]) mean sea level (msl)[2], and at about 1045 EST began an en route descent.

At about 1049, UCA4933 contacted ZBW ARTCC sector 16 and reported descending through FL310 to FL290. The ZBW ARTCC sector R16 controller responded by instructing the pilot of UCA4933 to "descend at your discretion maintain eight thousand Presque Isle altimeter two nine seven one". The pilot read back the altitude and altimeter.

At 1049:40, the R16 controller instructed the pilot of UCA4933 "let me know when you have the Presque Isle weather you can contact flight service for the NOTAMs[3]". The pilot responded, "alright will advise commute air forty-nine thirty-three".

At 1050:51, the R16 controller instructed the pilot of UCA4933 to advise when they had the approach request; the pilot acknowledged.

At 1050:10, the R16 controller transmitted "commute air forty-nine thirty-three at your 12 o'clock three miles extending ah pretty much for the next seventy miles areas of moderate precipitation no icing has been reported in association". The pilot of UCA4933 responded "okay precipitation all the way down to the lights commute air forty-nine thirty-three thanks for your help we're working the ah runway now we'll probably be ah zero one". The R16 controller acknowledged.

At 1050:40, the R16 controller advised the pilot of UCA4933 that the KPQI airport required a ten-minute prior permission required (PPR) call prior to landing and offered the appropriate frequency if needed. The pilot of UCA4933 responded "yeah we're aware it's one twenty-two eight we've gotta call ten minutes out for ah ground ops before they let us come in because they're cleaning the runway down there commute air forty-nine thirty-three". The R16 controller acknowledged.

At 1051:18, the R16 controller instructed the pilot of UCA4933 to set-up for runway one and to proceed direct CORAC[4]. The pilot acknowledged.

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[1] A flight level is a level of constant atmospheric pressure related to a reference datum of 29.92 "Hg. Each flight level is stated in three digits that represents hundreds of feet.
[2] All altitudes for this approach are in msl unless otherwise noted.
[3] A Notice To Airmen or NOTAM is a notice containing information (not known sufficiently in advance to publicize by other means) concerning the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System) the timely knowledge of which is essential to personnel concerned with flight operations.
[4] Initial approach fix for the PQI ILS Runway 1.

At 1055:24 the R16 controller transmitted "and commute air forty-nine thirty-three I'm required to read this to you this FICON NOTAM[5] (see attachment 2) for runway one, they have ah field condition of three, three, three, hundred percent, quarter inch dry snow and ah yep that should be it so ah there's also quarter inch dry snow on ah all the taxiways as well braking action has been reported as medium and ah half inch of dry snow on the aprons". The pilot of UCA4933 acknowledged the information.

At 1056:23, The R16 controller issued the pilot of UCA4933 a discretionary descent to 4,100 feet. The pilot read back the altitude assignment.

At 1057:20, the R16 controller advised the pilot of UCA4933 that a previous arrival into KPQI about one-hour prior had reported breaking out of the clouds at around 1,100 or 1,200 feet and had the runway in sight by 700 feet. The pilot of UCA4933 acknowledged.

At 1101:42, the R16 controller instructed the pilot of UCA4933 to cross CORAC at or above 3,200 feet and cleared the flight for the ILS Runway 1 approach at KPQI. The pilot read back the clearance.

At 1105:35, the R16 controller terminated radar services on UCA4933, switched the flight to advisory frequency[6] and instructed the pilot to cancel the IFR flight plan on the ground.

At 1111:01, the pilot of UCA4933 contacted the R16 controller and advised she was executing the missed approach and requested "another try". The R16 controller acknowledged and asked the pilot if they were executing the published missed approach; the pilot responded, "yes sir".

At 1111:36, the R16 controller instructed the pilot of UCA4933 to ident[7].

At 1112:22, the R16 controller again instructed the pilot of UCA4933 to ident.

At 1112:41, the R16 controller advised the pilot of UCA4933 they were radar contact eight miles north of the KPQI VOR[8] at 3,000 feet and asked the pilot if they could maintain terrain and obstruction clearance through 3,100 feet. The pilot advised they could do 3,100 feet now. The R16 controller climbed UCA4933 to 3,200 feet. The pilot acknowledged.

At 1113:55, the R16 controller asked the pilot of UCA4933 if they were again requesting the ILS Runway 1 approach. There was no reply from the pilot.

[5] FICON (field conditions) NOTAMs are used to report surface conditions and braking action on runways, taxiways, and aprons/holding bays. The Runway Condition Assessment Matrix (RCAM) is the assessment tool airport operators will use to identify and report runway surface conditions into the FNS.
[6] Common traffic advisory frequency when no control tower operations are present at the airfield.
[7] A function of the transponder that when activated by the pilot displays concentric shrinking circles over the airplanes radar target on the controllers' display.
[8] Very High Frequency Omni-Directional Range (VOR) is a ground-based electronic system that provides azimuth information for high and low altitude routes and airport approaches.

At 1114:21, the R16 controller asked the pilot again if they were requesting to the ILS Runway 1 approach, the pilot responded, “yes sir we are”.

At 1114:31, the R16 controller asked the pilot of UCA4933 if they were requesting vectors to CORAC or if they would like to proceed direct to CORAC. The pilot responded they would like vectors in order to get “set up for now”. The R16 controller instructed the pilot of UCA4933 to fly heading 205° vectors for the ILS Runway 1 approach. The pilot acknowledged the instructions.

At 1119:20, the R16 controller instructed the pilot of UCA4933 to turn left heading 190°, the pilot acknowledged.

At 1121:17, the R16 controller instructed the pilot of UCA4933 to turn left heading 100°, the pilot acknowledged.

At 1123:41, the R16 controller advised the pilot of UCA4933 “you are eight miles south of EXCAL[9] turn left heading zero four zero maintain three thousand two hundred until established on the localizer cleared ILS Runway 1 approach into Presque Isle”. There was no reply from the pilot of UCA4933.

At 1123:58, the R16 controller repeated the approach clearance and the pilot of UCA4933 responded “yeah sorry about that we were on the other frequency zero four zero cleared for the ILS runway 1 commute air forty-nine thirty-three”. The R16 controller acknowledged the pilot of UCA4933 and instructed them to report established on the localizer.

At 1125:33, the pilot of UCA4933 transmitted “Commute air forty-nine thirty-three is ah established on the localizer for runway 1 Presque Isle”. The R16 controller acknowledged and approved a change to the advisory frequency and provided instructions for the cancellation of the IFR flight plan.

At 1133:00, there was a broken transmission received by the R16 controller. The R16 controller attempted to contact the pilot of UCA4933 but there was no reply.

No further communications were recorded regarding UCA4933.

2.0 Surveillance Data

In general, two types of radar are used to provide position and track information for aircraft cruising at high altitudes between airport terminal airspaces, and for those operating at low altitude and speeds within terminal airspaces. Additionally, surveillance data may be obtained through Automatic Dependent Surveillance-Broadcast (ADS-B). ADS-B data is aircraft global positioning system (GPS) derived position reports and other aircraft information transmitted by the airplane and received through a ground infrastructure and shared with other users within the national airspace system (NAS). Air traffic controllers monitor aircraft using both ground-based radar and ADS-B.

[9] Locator outer marker/alternate initial approach fix for the PQI ILS Runway 1 approach.

Air route surveillance radars (ARSRs) are long range (250 nm) radars used to track aircraft cruising between terminal airspaces. ARSR antennae rotate at 5 to 6 rotations per minute (rpm), resulting in a radar return every 10 to 12 seconds. Airport surveillance radars (ASRs) are short range (60 nm) radars used to provide air traffic control services in terminal areas. ASR antennas rotate at 13 to 14 rpm, resulting in a radar return every 4.6 to 5 seconds.

To improve the consistency and reliability of ADS-B and radar returns, airplanes are equipped with transponders. For ADS-B equipped airplanes, the transponders are assigned a unique Mode-S address for each airplane. The accident airplanes assigned Mode S transponder address was A0A9CE and the accident flight was assigned a transponder beacon code of 1123.

ADS-B data for this report was obtained from the FAA. Radar data for this report was obtained from ZBW and was derived from ARSR sensors. All surveillance data was of good quality and utilized by air traffic control.

Figure 1 illustrates the ADS-B track of the accident flight as it made the first attempt on the ILS followed by a missed approach and second ILS approach. Figure 2 illustrates a close-up of the ADS-B data for UCA4933 on the first ILS approach as the airplane flew along the final approach course adjacent to the runway centerline for runway 1. ADS-B data indicated the airplane overflew the grassy area between the runway and the parallel taxiway A before executing a missed approach.

Figure 3 illustrates a close-up of the ADS-B data for UCA4933 on the second attempt for the ILS as it flew along the final approach course adjacent to the runway centerline for runway 1. The accident occurred after completing the second ILS, and the final ADS-B target was in the grassy area just short of taxiway C. Figure 4 illustrates the airfield diagram and taxiway identifiers.

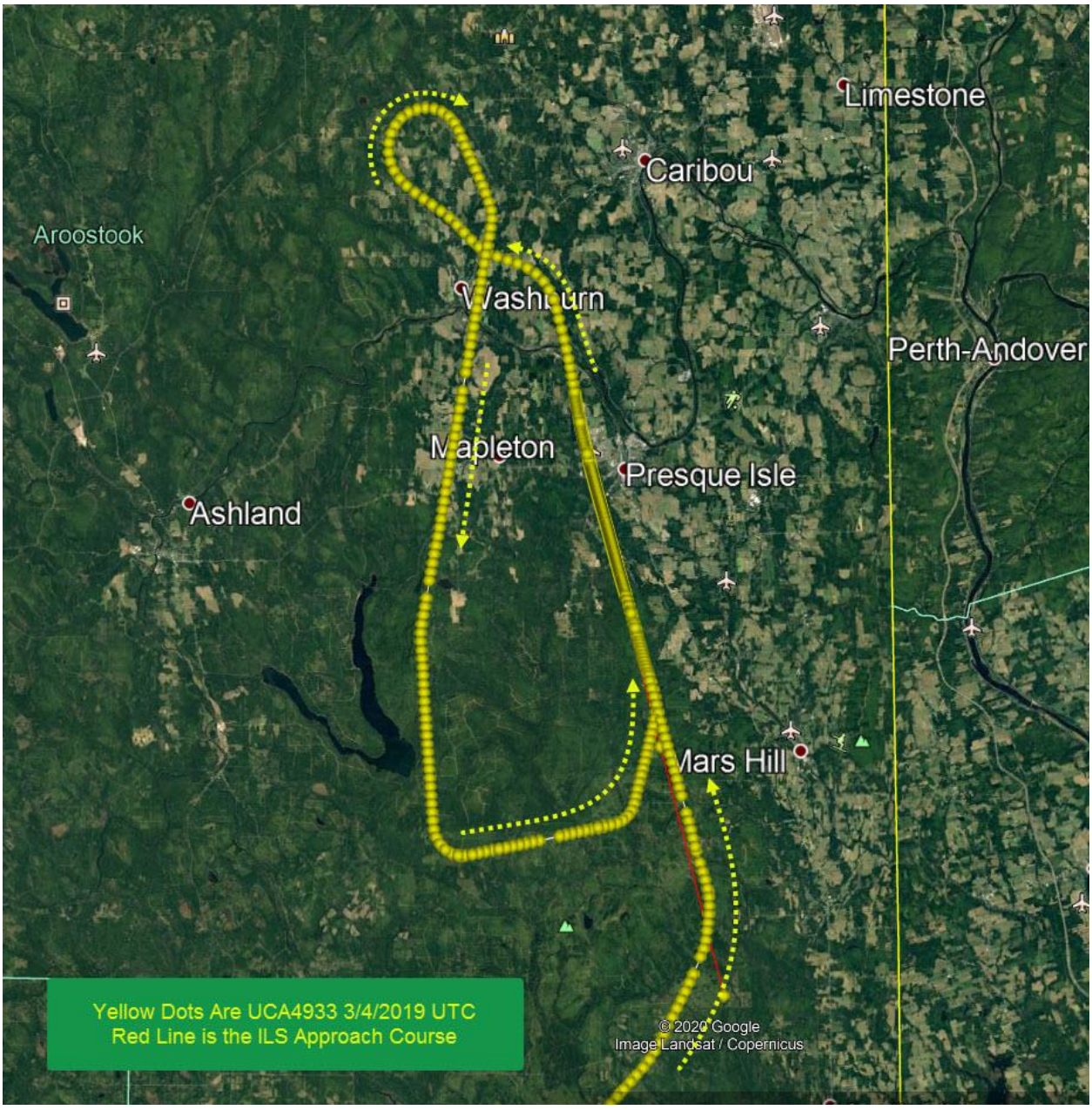

Figure 1 - Graphic showing the accident airplanes flight track as it conducted the two ILS approaches.

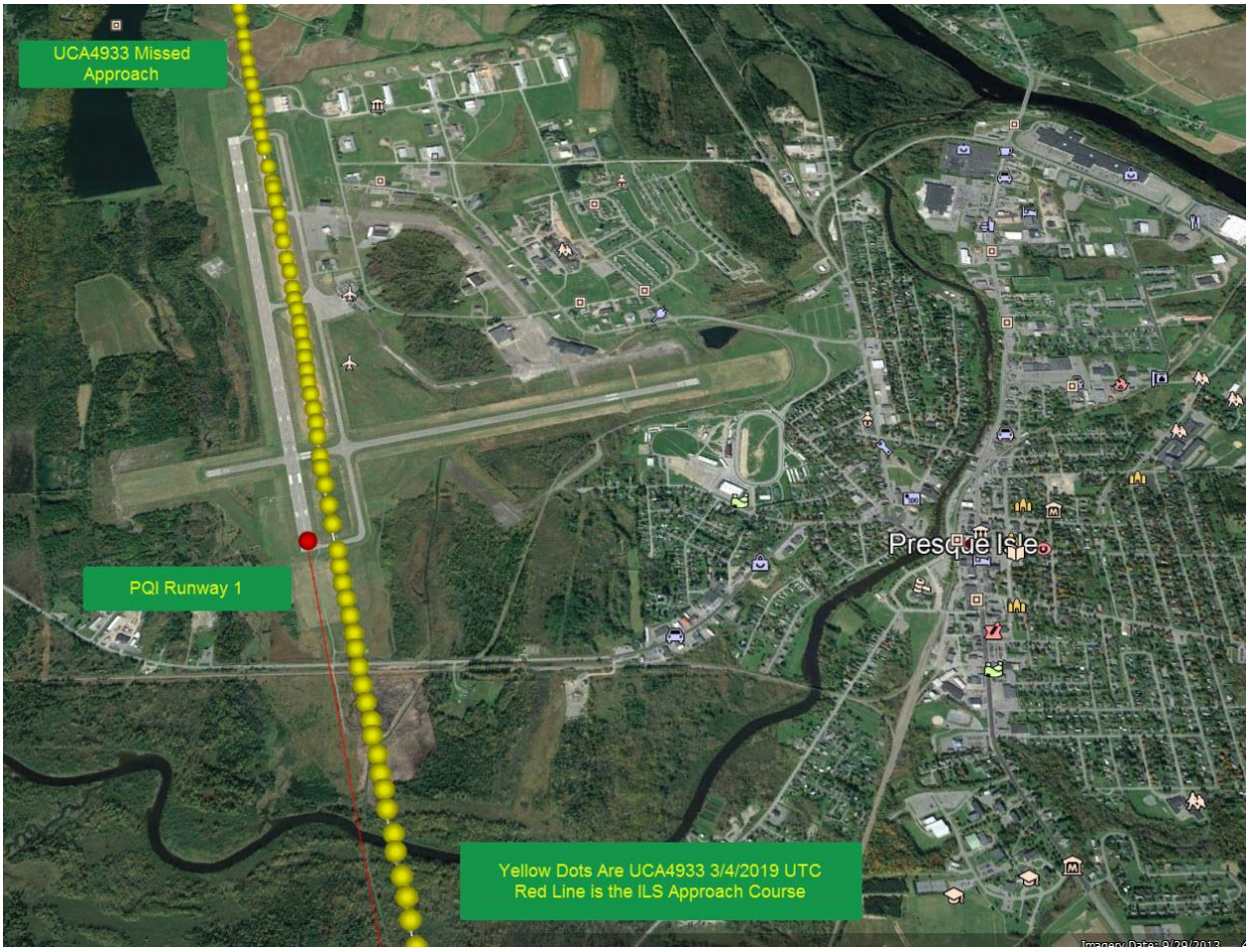

Figure 2 - ADS-B data showing the first approach to the grassy area between the runway and taxiway A followed by a missed approach.

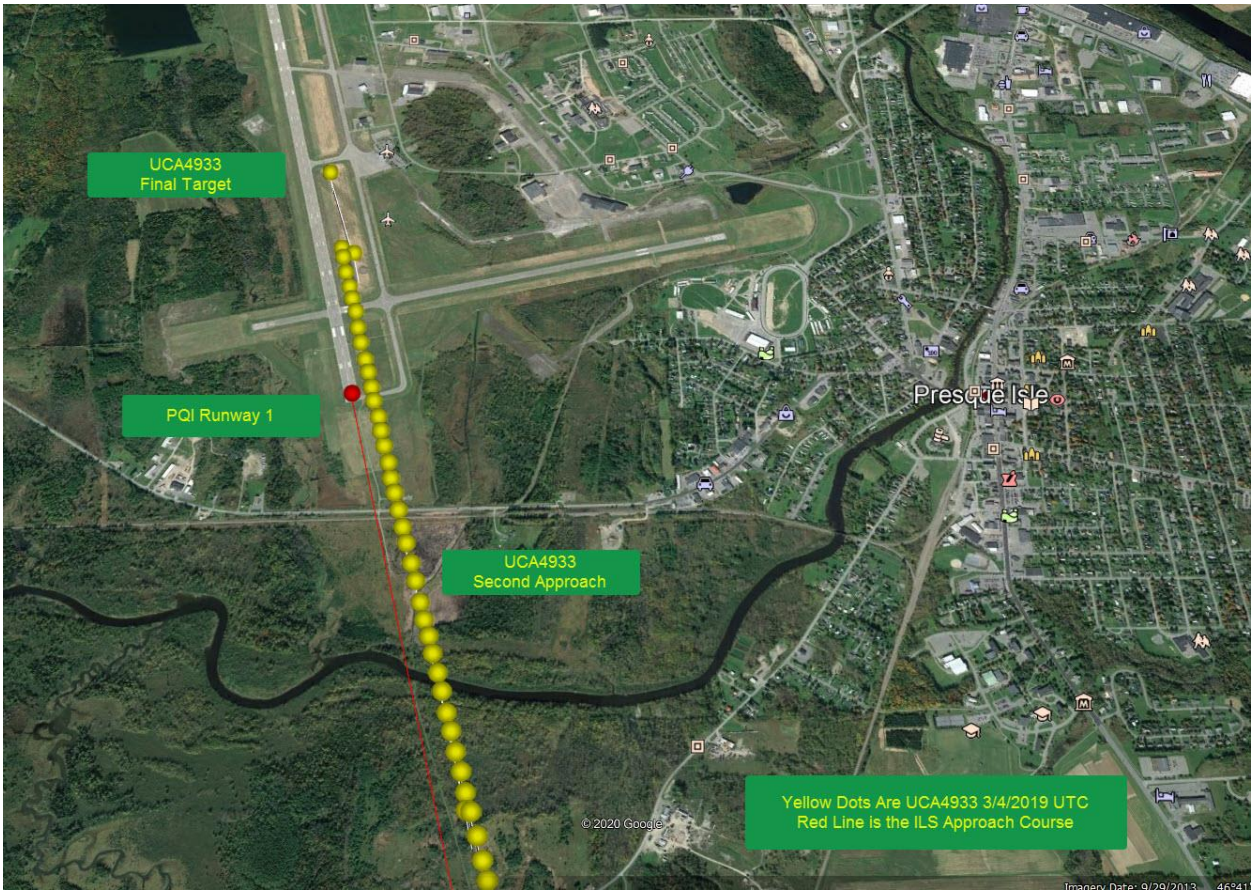

Figure 3 - ADS-B data showing the second approach grassy area between taxiway A and the runway ending at the accident site.

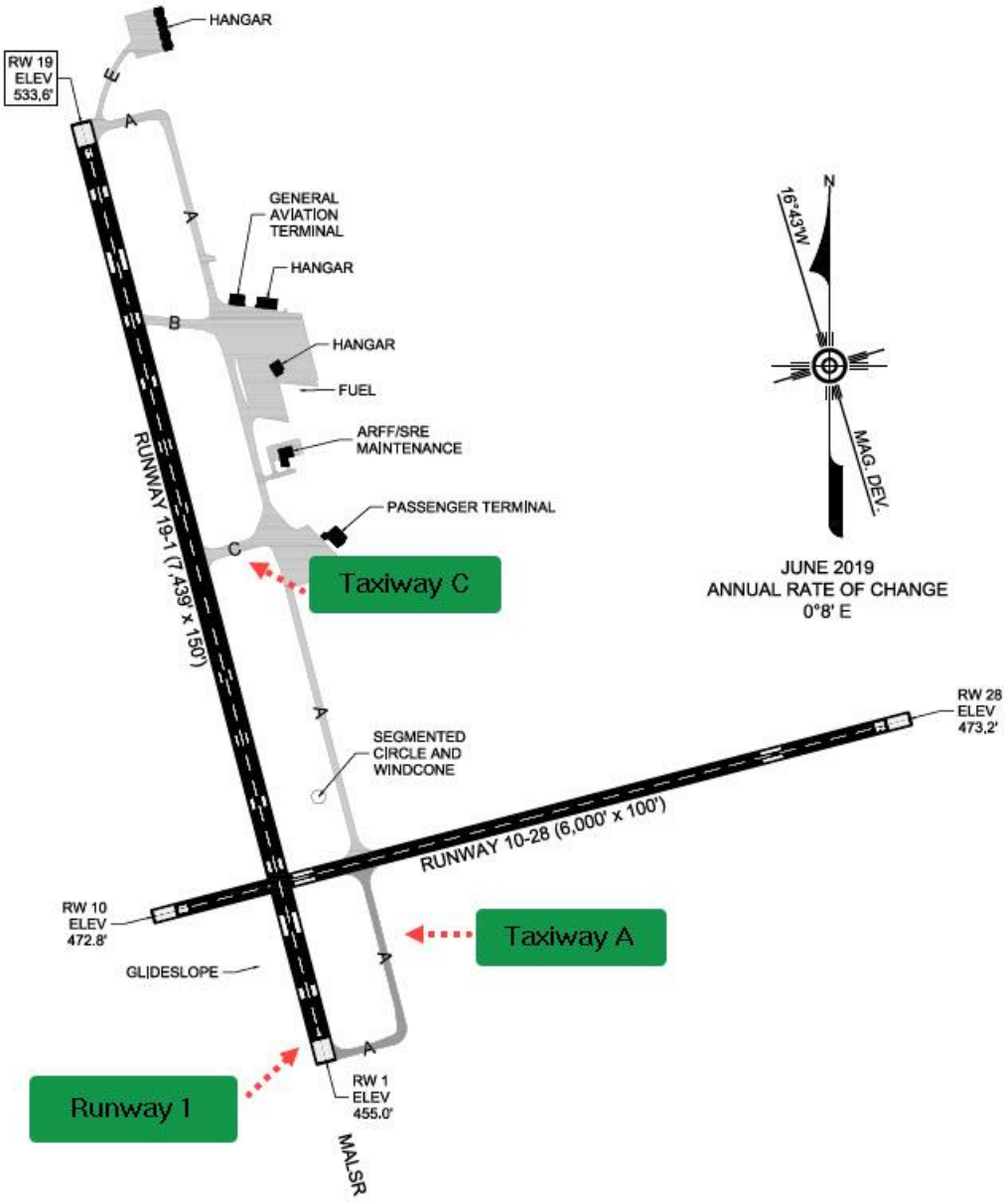

Figure 4 - Airfield diagram of PQI airport.

3.0 Weather Data

The KPQI March 4, 2019 1118 special local weather observation was auto reporting wind 060° at 4 knots, visibility ½ statute miles in snow, freezing fog, temperature -3°C (26.6 F), dewpoint -4°C (24.8 F), altimeter 29.68 inHg (1005.08hPa), 0 inches of rain fell in the last hour, freezing rain information not available, RVR equipped but no RVR report.

SPECI KPQI 041618Z AUTO 06004KT 1/2SM SN FZFG M03/M04 A2968 RMK AO2 P0000 FZRANO RVRNO=

4.0 KPQI ILS Runway 01

4.1 Standard Instrument Approach Procedure (SIAP) Runway 01

A SIAP is a series of predetermined maneuvers for the transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. The SIAP in use at the time of the accident was the Presque Isle, Maine, ILS RWY 1, Amendment 6 effective February 28, 2019 to March 28, 2019 (see figure 5).

An ILS is defined as a precision runway approach aid based on two radio beams which together provide pilots with both vertical and horizontal guidance during an approach to land. The two main components of an ILS landing system are the localizer and the glideslope.

The ILS localizer generates and radiates signals to provide final approach azimuth navigation information to landing aircraft. The antenna sends a VHF carrier signal with 90-Hz and 150-Hz sideband signals that the aircraft instruments determine as left and right of the centerline. The aircraft interprets the signal and displays them on the cockpit indicator guiding the pilot until the runway is in sight.

The ILS glideslope sends a UHF carrier signal with the same two 90-Hz and 150-Hz sideband frequencies that aircraft instruments determine as above or below the desired glide path. This is approximately 3 degrees to the horizon which gives the aircraft a descent rate of about 500 feet per minute.

Each SIAP has associated weather minimums of visibility and sky conditions that determine how low an airplane may travel while flying down the final approach course. If the pilot conducting the SIAP reaches the published minimums for that approach, and has the runway environment in sight, they may continue to land visually. Conversely, if the airplane reaches the published minimums without the runway in sight, the pilot should execute the published missed approach. The published minimums for the KPQI ILS Runway 1 approach were 200 feet above ground level (AGL) and ½ statute mile.

The KPQI ILS equipment was not capable of remote equipment/status monitoring by ZBW ARTCC air traffic control or technical operations personnel. The KPQI ILS equipment was monitored, maintained, and inspected by FAA technical operations personnel from the Bangor Maine B System Service Center and the Atlantic Operations Control Center (AOCC) in Atlanta, Georgia (see attachment 3).

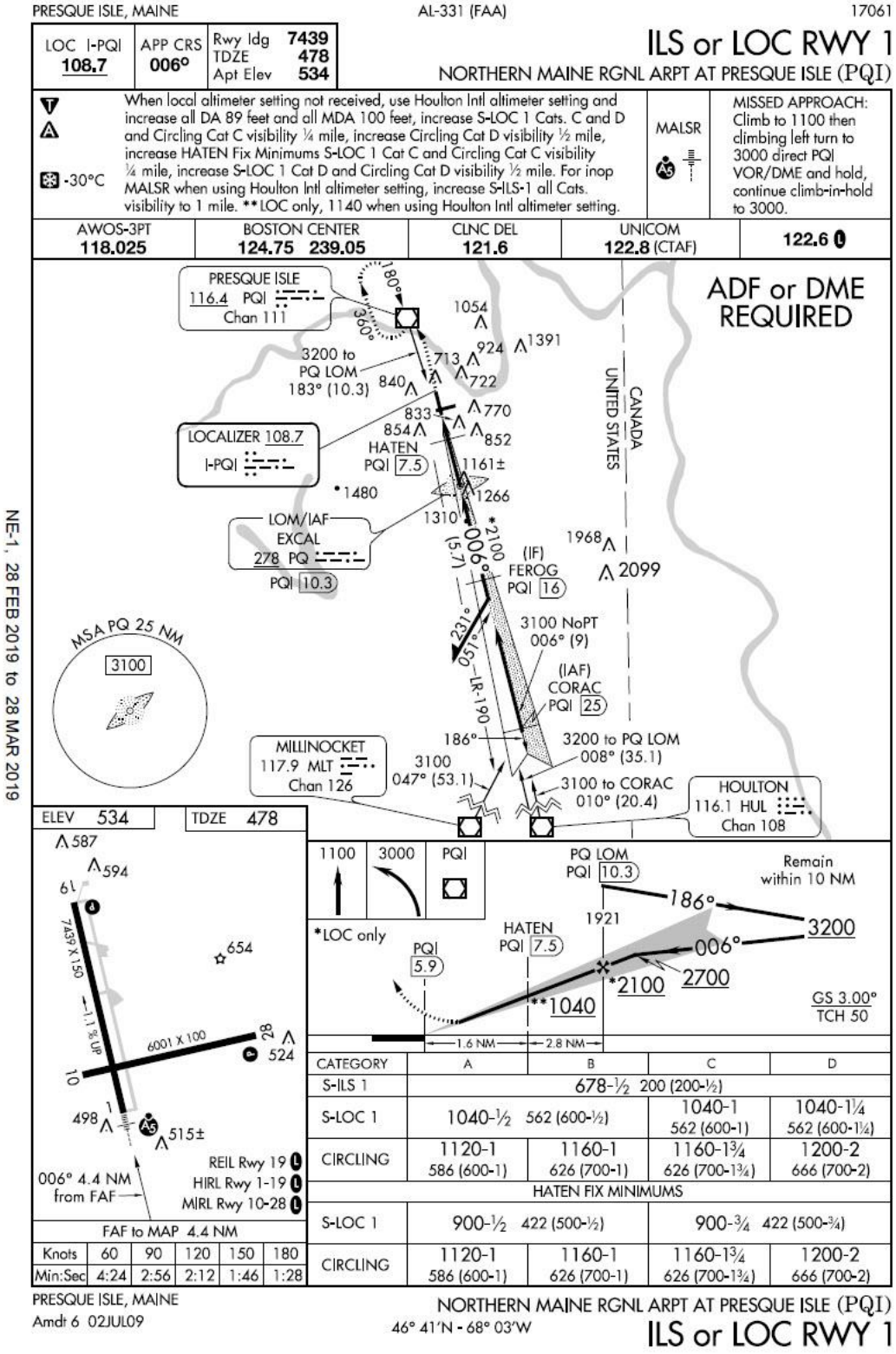

Figure 5 - Image of the SIAP ILS Runway 01 for PQI

4.2 Report of SIAP Discrepancy

On March 2, 2019 at about 2345 EST, UCA4939 conducted an ILS Runway 01 approach to KPQI (see attachment 4) runway 1. The pilot reported that as the aircraft was descending through 2,500 feet msl, it appeared the aircraft was aligned right of the runway centerline with the airplanes ILS indicating it was centered on the runway (see figure 6). The pilot discontinued the ILS approach when the runway was acquired visually. Once visually aligned with the runway centerline, the pilot noted that the airplane ILS instrument was indicating three quarters of a "dot" off course. Once on the ground, the First Officer called and advised the R16 controller of the ILS discrepancy. According to the pilot, the ZBW R16 controller advised "that he will forward that information onward."

A review of ATC communications from March 2, 2019 between the pilot of UCA4939 and the R16 controller indicated the pilot reported there was a "good offset about ah half dot from the centerline". He went on to add "there was a good offset to the right of the localizer there all the way down ah became visual about ah two thousand five hundred or so and ah once we were center with the runway ah the localizer was about half dot off all the way to the ground". The R16 controller acknowledged the report and advised they would pass it on.

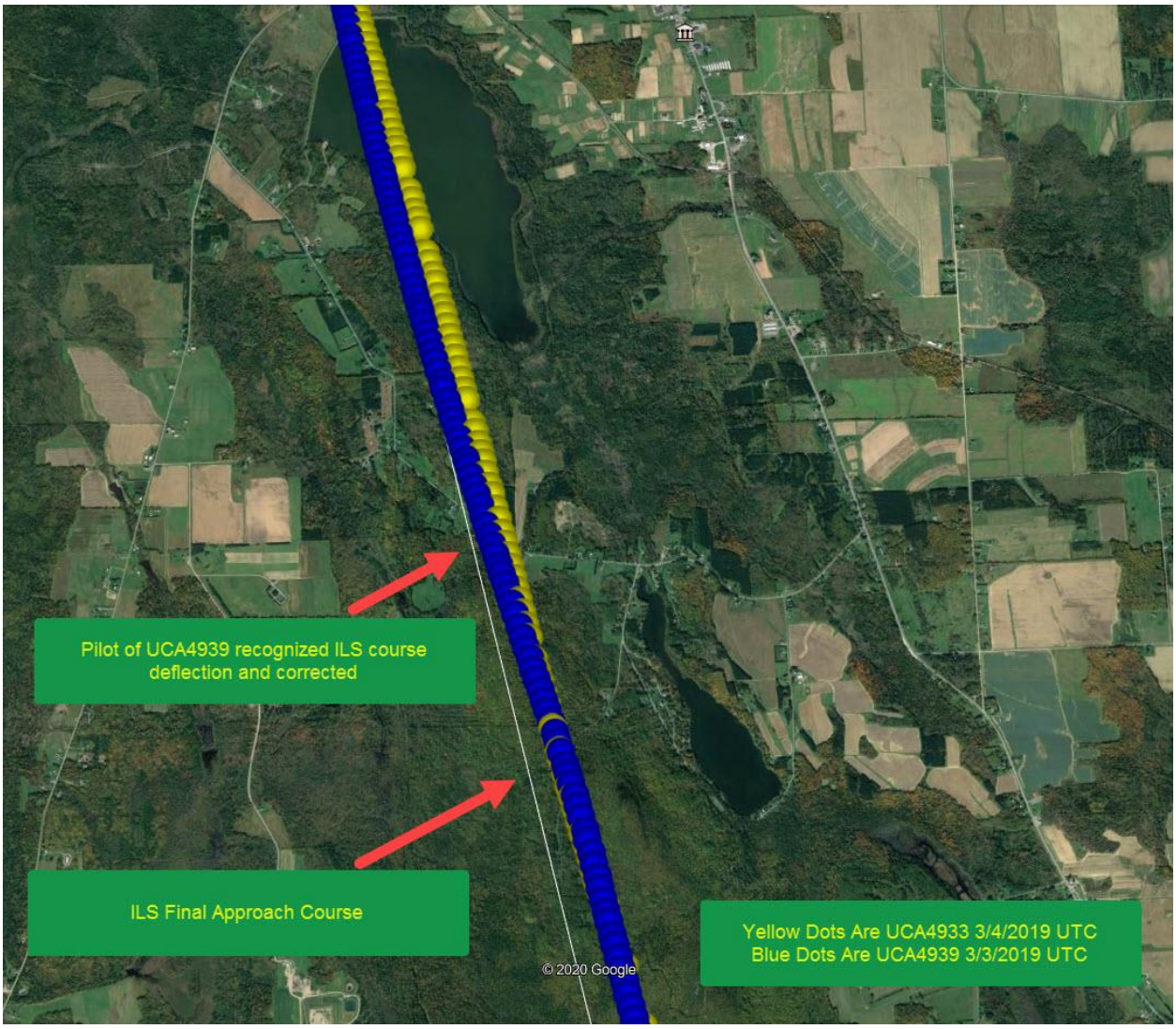

Figure 6 - Flight track of UCA4939 as it was established on the ILS Runway 01 and right of course.

4.3 Post-Accident Inspection Report

On March 7, 2019 at about 1130 EST, the FAA conducted a post-accident flight inspection (see attachment 5) of the KPQI ILS Runway 01 using a Raytheon Beechcraft BE-300 King Air in accordance with the FAA Technical Issuance (TI) 8200.52, *Flight Inspection Handbook*. The flight inspection examined both the localizer and glideslope accuracy. The inspection revealed the localizer portion to be out of tolerance by 87 micro amps right of course which resulted in the localizer for the ILS being about 200 feet right of course[10] (see attachment 6). Additionally, the glideslope indicated a glideslope reversal[11] at 890 feet msl.

On March 13,2019, the FAA conducted another flight inspection after snow around the localizer and glideslope antennas was removed (see attachment 7). The examination revealed the

[10] From an email by FAA Technical Operations investigator dated March 27, 2019.
[11] Instead of the required "fly down" signal, the ILS antenna will send out a "fly up" signal.

localizer and glideslope were within tolerance and all NOTAMs indicating the KPQI Runway 01 ILS was unusable were cancelled.

5.0 FAA ATC Personnel

5.1 National Airspace System Operations Manager (NOM)

The NOM began with the FAA as a technician in June 2002 at Boston Terminal Radar Approach Control (A90 TRACON). In January 2013, he transferred to ZBW ARTCC where he has remained.

According to FAA Order JO 6100.1H, *Maintenance of NAS En Route Stage A – Air Traffic Control System*, the NOM's position is the central maintenance authority for the air traffic control watch. Navigational aids (NAVAIDs) are monitored by ATC or maintenance facilities, convenient to their locations, such as flight service stations and control towers. Changes in the status of NAVAIDs are reported to the NOM at the systems operations center (SOC).

5.2 Operations Manager In-Charge (OMIC)

The OMIC began with the FAA in May 1998 at Akron-Canton Airport Traffic Control Tower (KCAK ATCT). In August 2000 he transferred to Manchester (KMHT) ATCT and in March 2004 he transferred to A90 TRACON. In October 2012, he transferred to ZBW ARTCC. The OMIC was current and proficient on the position he was working in accordance with facility standards and had no documented operational incidents or history of suspensions at ZBW ARTCC.

The OMIC is responsible for the day to day and shift by shift management of the control room operation.

6.0 FAA ATC Procedures

6.1 FAA Order JO 7110.65X, *Air Traffic Control*

FAA Order JO 7110.65X prescribed air traffic control procedures and phraseology for use by personnel providing air traffic control services.

6.1.1 Airport Conditions

Chapter 4 section 7, directs the procedures to be used by air traffic controllers when working an aircraft into an airport. Paragraph 4-7-12 addresses airport conditions and states [in part]:

> **4−7−12. AIRPORT CONDITIONS**
> **a. EN ROUTE**. Before issuing an approach clearance or en route descent, and subsequently as changes occur, inform an aircraft of any abnormal operation of approach and landing aids and of destination airport conditions that you know of which might restrict an approach or landing.
> **NOTE−**
> 1. Airport conditions information, in the provision of en route approach control service, does not include information pertaining to cold temperature compensation or the airport surface environment other than the landing area(s) or obstruction information for aircraft that will be cleared for an instrument approach. Accordingly, D NOTAMs that contain the

keywords TAXIWAY (TWY), RAMP, APRON, or SERVICE (SVC) are not required to be issued. Additionally, Obstruction NOTAMs (OBST) are not required to be issued if an aircraft will be cleared for an instrument approach.

c. Issue RwyCC[12] contained in a FICON NOTAM to aircraft in accordance with one of the following:

1. Before or when an approach clearance is issued.
2. Before an en route descent clearance is issued.
3. TERMINAL. Prior to departure.
4. As soon as possible after receipt of any subsequent changes in previously issued RwyCC information.

. RwyCC may be issued in lieu of the complete FICON NOTAM. Issue the complete FICON NOTAM upon pilot request, workload permitting.

EXAMPLE−

Boston Runway Two Seven, field condition, three, three, three, one hundred percent, two inches dry snow over compacted snow. Observed at one five three zero zulu.

6.1.2 Approach Clearance

Chapter 4 section 8, directs the procedures to be used by air traffic controllers when issuing an approach clearance into an airport. Paragraph 4-8-12 states [in part]:

a. Clear aircraft for "standard" or "special" instrument approach procedures only.

1. To require an aircraft to execute a particular instrument approach procedure, specify in the approach clearance the name of the approach as published on the approach chart. Where more than one procedure is published on a single chart and a specific procedure is to be flown, amend the approach clearance to specify execution of the specific approach to be flown. If only one instrument approach of a particular type is published, the approach needs not be identified by the runway reference.
2. An aircraft conducting an ILS or LDA approach must be advised at the time an approach clearance is issued when the glideslope is reported out of service, unless the title of the published approach procedure allows (for example, ILS or LOC Rwy 05).
3. Standard instrument approach procedures (SIAP) must begin at an initial approach fix (IAF) or an intermediate fix (IF) if there is not an IAF.
4. Where adequate radar coverage exists, radar facilities may vector aircraft to the final approach course in accordance with Paragraph 5-9-1, Vectors to Final Approach Course, and Paragraph 5-9-2, Final Approach Course Interception.
5. Where adequate radar coverage exists, radar facilities may clear an aircraft to any fix 3 NM or more prior to the FAF, along the final approach course, at an intercept angle not greater than 30 degrees.
6. Controllers must not disapprove a pilot request to cold temperature compensate in conjunction with the issuance of an approach clearance.

PHRASEOLOGY−
CLEARED (type) APPROACH.

[12] Runway Condition Codes

(To authorize a pilot to execute his/her choice of instrument approach),

CLEARED APPROACH.

(Where more than one procedure is published on a single chart and a specific procedure is to be flown),

CLEARED (specific procedure to be flown) APPROACH.

b. For aircraft operating on unpublished routes, issue the approach clearance only after the aircraft is:
1. Established on a segment of a published route or instrument approach procedure, or
2. Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure.

6.1.3 NAVAID Malfunctions

Chapter 2, Section One, paragraph 2-1-10 *NAVAID Malfunctions* prescribes procedures to be taken when a navigational aide malfunction has been reported and states [in part]:

2−1−10. NAVAID MALFUNCTIONS

a. When an aircraft reports a ground based NAVAID malfunction, take the following actions:
1. Request a report from a second aircraft.
2. If the second aircraft reports normal operations, continue use and inform the first aircraft. Record the incident on FAA Form 7230−4 or appropriate military form.
3. If the second aircraft confirms the malfunction or in the absence of a second aircraft report, activate the standby equipment or request the monitor facility to activate.

6.2 FAA Order JO 7210.3AA, *Facility Operation and Administration*

FAA JO 7210.AA provides direction and guidance for the day-to-day operation of facilities and offices under the administrative jurisdiction of the Federal Aviation Administration's Air Traffic Organization.

6.2.1 Records

Chapter 4, *Correspondence, Conferences, Records, and Reports,* addresses the need for FAA Form 7230-4 Daily Record of Facility Operation. The pilot reported localizer deviation was received on March 2, 2019 UTC. See attachment 8 for a copy of the March 3, 2019 ZBW 7230-4 Record of Facility Operation. Section 6, paragraph 4-6-5 of the 7210.3AA discussed preparation of FAA Form 7230-4 and states [in part]:

4−6−5. PREPARATION OF FAA FORM 7230−4

Personnel responsible for preparation of the Daily Record of Facility Operation, FAA Form 7230−4, must ensure that entries are concise, yet adequately describe the operation of the facility, including any abnormal occurrences. Prepare FAA Form 7230−4 as follows:

i. Place a large letter "E" in the lefthand margin beside entries on equipment malfunctions. The "E" must also be used when equipment is restored to service. The "E" is not required for facilities using local forms if procedures are established in accordance with subparagraph g.

NOTE− The "E" is to be used on entries related to equipment problems which require Technical Operations involvement. The "E" is not required for routine maintenance items or for carryover entries on previously entered equipment malfunctions.

6.2.2 Navigational Aids

Chapter 3 Section 5, paragraph 3-5-1, *NAVAID Monitoring*, addresses the procedures for reporting malfunctioning NAVAID's and states [in part]

3−5−1. NAVAID MONITORING

When a facility is assigned responsibility for monitoring NAVAIDs, the air traffic manager must issue monitoring instructions in a facility directive. Notification procedures must be coordinated with the appropriate sector manager.

NOTE− Monitoring assignments are made by air traffic offices in the Service Centers.

f. ILS

1. Check the ILS monitor panel at the beginning of each watch and record the system status in accordance with subparagraph 4−6−5h, Preparation of FAA Form 7230−4.
2. Apply the procedures described in Paragraph 3−5−2, System Component Malfunctions, when there are indications that a component has failed.
3. If you suspect that the indication is caused by a control line or a control station monitor failure rather than a malfunction of the component itself, take appropriate action as indicated in FAA Order JO 7110.65, Paragraph 2−1−10, NAVAID Malfunctions. If a malfunction is confirmed, discontinue use of the component involved.

NOTE− Not all ILS components are provided with remote monitor and control lines (on/off capability). If the failure indication is caused by a control line or a control station monitor failure, the Technical Operations technician must advise if that component will be restored to operation and the monitor status.

F. LIST OF ATTACHMENTS

Attachment 1: Interview summaries.
Attachment 2: NOTAMS March 4, 2019.
Attachment 3: FAA KPQI technical operations log.
Attachment 4: Pilot report of KPQI ILS localizer discrepancy.

Attachment 5: Post accident ILS inspection report.
Attachment 6: FAA email dated March 7, 2019 regarding accident summary.
Attachment 7: KPQI ILS return to service inspection report.
Attachment 8: FAA Form 7230-4 Daily Record of Facility Operations

Submitted by:

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Andy Olvis
Senior Air Traffic Investigator