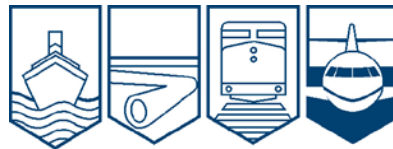


Transportation Safety Board
of Canada



Bureau de la sécurité des transports
du Canada

**AVIATION INVESTIGATION REPORT
A11O0239**



LOSS OF CONTROL – COLLISION WITH TERRAIN

**CESSNA CARDINAL 177A, C-FEFQ
OTTAWA/MACDONALD-CARTIER INTL, ONTARIO 1.9 NM W
14 DECEMBER 2011**

Canada

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

Aviation Investigation Report

Loss of Control – Collision with Terrain

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Ottawa/MacDonald-Cartier Intl, Ontario 1.9 nm W

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Summary

The privately owned Cessna 177A (registration C-FEFQ, serial number 17701289) departed Wilkes-Barre Airport, Pennsylvania, United States, with 2 persons on board, on an instrument flight rules flight plan to Ottawa/Carp Airport, Ontario. Approximately 44 nautical miles from destination, because of low visibility and ceilings at destination, the aircraft diverted to its filed alternate of Ottawa Macdonald-Cartier International Airport, Ontario. The aircraft was then cleared for the instrument landing system approach to Runway 07. At about 1912 Eastern Standard Time, while flying the approach in instrument meteorological conditions at night, the aircraft collided with the ground approximately 1.9 nautical miles west of the threshold of Runway 07. The aircraft was destroyed, and both occupants were fatally injured. There was no fire. The 406-megahertz emergency locator transmitter activated on impact.

Ce rapport est également disponible en français.

Factual Information

History of the Flight

The aircraft (C-FEFQ) was returning to Ottawa/Carp Airport (CYRP) from a 12-day trip to southern Florida and the Bahamas. Both persons on board were licensed pilots, and generally shared the flying duties throughout the trip.

On 13 December 2011, the 2 pilots checked out of their hotel at 0700,¹ and departed Marsh Harbour International Airport (MYAM), Bahamas, at 0957 for Newport News/Williamsburg International Airport (KPHF), Virginia. The flight consisted of 3 stops and 10.5 hours of flight time, arriving at KPHF at 0016 on 14 December 2011. The pilots checked into a hotel at 0055.

At 1215 on 14 December 2011, the aircraft departed KPHF, and arrived in Wilkes-Barre Wyoming Valley Airport (KWBW), Pennsylvania, at 1451. At approximately 1707, after civil twilight, the aircraft departed KWBW on an instrument flight rules (IFR) flight plan destined for CYRP. At 1840, approximately 44 nautical miles (nm) south of CYRP, the pilot-in-command (PIC) requested a diversion to Ottawa Macdonald-Cartier International Airport (CYOW) for the instrument landing system (ILS)² approach. CYOW is located 15 nm east of CYRP. An ILS approach is unavailable at CYRP.

At 1906, Ottawa Terminal Air Traffic Control (ATC) cleared C-FEFQ for the ILS approach to Runway 07 and issued radar vectors to intercept the final approach course. The aircraft intercepted the localizer approximately 8 nm from the threshold, and the terminal controller instructed C-FEFQ to contact the Ottawa tower controller. The tower controller informed C-FEFQ that the aircraft was number one in the landing sequence. At approximately 4.5 nm from CYOW, while on the ILS approach, the aircraft began to deviate north of the localizer. The tower controller informed C-FEFQ of the deviation. The pilot acknowledged the information, and informed the tower controller that they were trying to get back on track. A minute later, as the aircraft was approaching the center of the localizer, the tower controller cleared C-FEFQ to land. Shortly after receiving the landing clearance, the aircraft began to deviate northbound again; the controller informed C-FEFQ of the deviation. There was a brief, unrecognizable transmission on the tower frequency, but it could not be confirmed that it came from C-FEFQ. Eighteen seconds later, the controller instructed C-FEFQ to pull up and go around. There was no response.

At approximately 1912, the aircraft entered a steep right turn with a rapid descent, and struck power lines before impacting the ground 1.9 nm west of the threshold of Runway 07.

¹ All times are Eastern Standard Time (Coordinated Universal Time minus 5 hours), unless otherwise noted.

² The Transport Canada [TC] *Instrument Procedures Manual* (4th Edition, 1997), Appendix, page 5, defines an instrument landing system (ILS) as “an electronic system designed to provide an approach path for precise alignment and descent of aircraft consisting of a localizer and a glide path transmitter.”

Radar data shows that, while on the approach, the aircraft twice deviated significantly from the localizer to a point that would have caused the localizer indications on the aircraft instruments to go to full deflection. Airspeed on the approach was maintained above 100 knots until the loss of control (Figure 1).

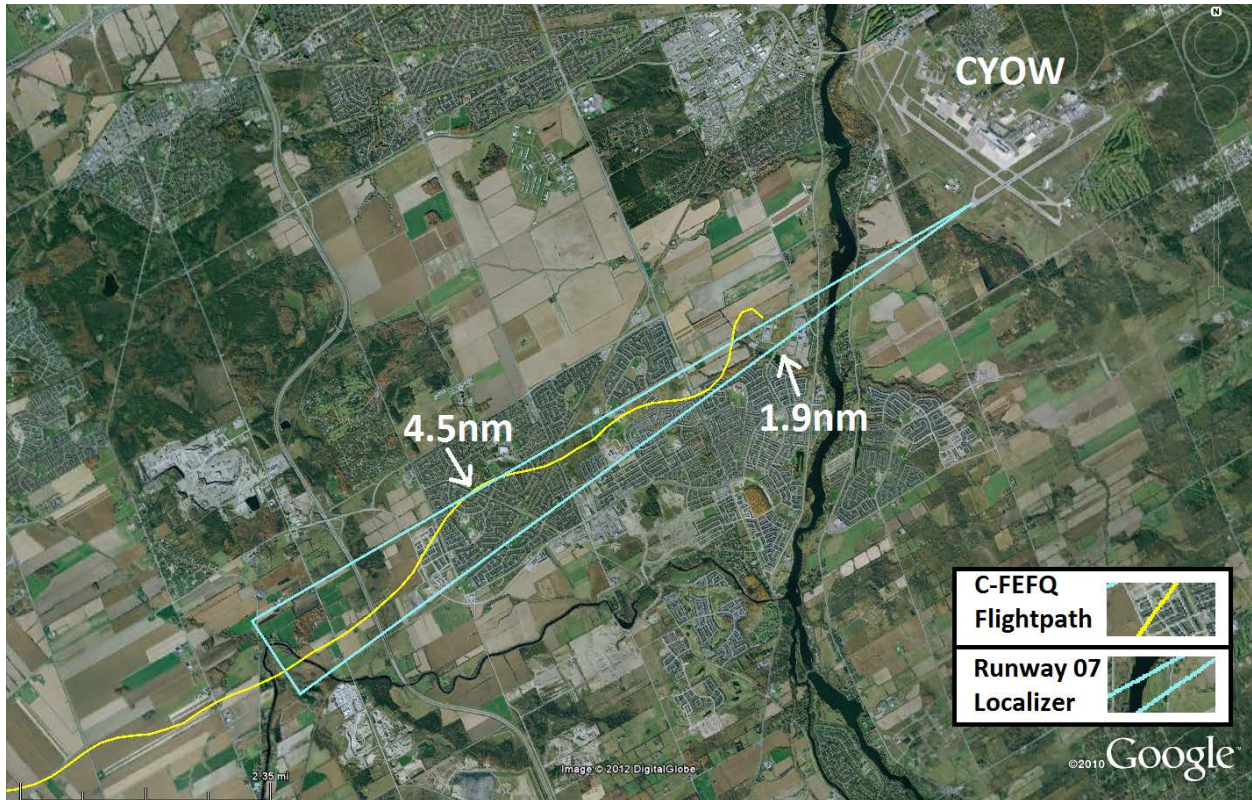


Figure 1. Final aircraft flight path

Weather and Flight Planning

At 1621, while on the ground at KWBW, the PIC filed an IFR flight plan with Williamsport flight service station (FSS). The flight was planned to depart at 1700 and cruise at 5000 feet, and was estimated to take 2 hours and 10 minutes to CYRP. The alternate airport for the flight was CYOW; the forecast weather was within alternate limits at the time of filing.

When the pilot called the FSS to file the flight plan, a weather briefing was not requested. It could not be determined if the pilot accessed the latest weather reports on the Internet prior to the flight-plan phone call. The flight service specialist asked if the pilot wanted information relating to icing, and proceeded to inform the pilot of an AIRMET³ that forecast moderate icing

³ An AIRMET is a short-term weather advisory, intended primarily for aircraft in flight, to notify pilots of potentially hazardous weather conditions not described in the current graphic area forecast (GFA) and not requiring a SIGMET (significant meteorological information). Its purposes

between 3000 and 14 000 feet on the route of flight. The pilot asked about the area around Watertown, which was on the route of flight, and the flight service specialist indicated that there were no pilot reports, but that they might encounter some showers as indicated by the AIRMET.

The latest forecast weather available for CYOW at the time that the flight plan was filed was issued at 1538; it forecast conditions at 1800 as visibility greater than 6 statute miles (sm), scattered cloud at 1500 feet, and broken ceiling at 4000 feet. Between 1800 and 2000, the conditions were forecast to deteriorate temporarily to visibility of 2 sm in mist and ceiling at 900 feet overcast. At 2000, conditions were forecast to improve to visibility greater than 6 sm in light snow and rain showers, and overcast ceilings at 3000 feet.

The latest actual weather at CYOW at the time that the flight plan was filed was issued at 1600, and described conditions as wind 090 at 8 knots, visibility 3 sm in mist, and ceiling overcast at 700 feet.

At 1812, while cruising at 5000 feet, 29 nm south of Watertown International Airport (KART), the pilot requested a weather update for KART and CYOW from Boston Flight Watch (BFW). The BFW specialist reported conditions at KART to be visibility 10 sm and overcast ceilings at 9500 feet, and conditions at CYOW to be visibility 3 sm in mist and overcast ceiling at 200 feet. The specialist repeated the AIRMET previously described, and the PIC indicated that the crew would check for updates once the aircraft was across the border.

At 1834, while crossing the Canada–United States border near Gananoque, Ontario, the pilot requested a weather update for CYOW from Montréal ATC. The weather relayed was the same as previously reported by BFW. Six minutes later, the pilot asked to change the destination to CYOW.

At 1906, before clearing C-FEFQ for the ILS approach, Ottawa Terminal ATC issued the latest weather to the pilot: ceiling at 200 feet above ground level (agl), visibility 3 sm in mist, and wind 100° at 10 gusting to 15 knots.

The Aircraft

C-FEFQ was jointly owned by a group of 5 pilots, which included the PIC and the passenger.

Records indicate that the aircraft was certified, equipped, and maintained in accordance with existing regulations. Examination of the aircraft wreckage determined that there were no signs of pre-impact damage or defects that would have precluded safe flight.

The aircraft was not certified for flight into known icing conditions, and did not have any anti-ice equipment other than a heated pitot tube.

are to ensure dissemination of significant meteorological changes to pilots after briefing or departure, and to automatically amend the GFA.

The aircraft collided with the ground with the flaps selected up. In this configuration, the Cessna 177A stall speed is listed in the owner's manual as 57 knots.

The Pilot and Passenger

The PIC held a private pilot licence, a valid Category 3 medical certificate, and a valid Group 3 instrument rating. The pilot's personal logbook, last completed prior to the return trip, contained the following totals (hours):

Total flying time	429.1
Night flying as PIC	30.3
PIC on C-FEFQ	28.7
Actual instrument	44.1
Simulated instrument (hood)	40.9
Simulator	41.8

While the logbook showed a total of 44.1 hours of actual instrument time, it was determined that this column was being used to record time spent flying on IFR flight plans, rather than time spent in actual instrument meteorological conditions (IMC).⁴ Analysis of the departure, arrival, and en route weather of these recorded flights suggest the pilot had experienced very little, if any, actual flight in IMC conditions.

Canadian Aviation Regulations (CARs) 401.05(2)(b)(i)(B) require a pilot who is carrying passengers at night to have completed 5 night take-offs and 5 night landings in the preceding 6 months. Records indicate that the PIC of C-FEFQ had completed only 1 take-off and 2 landings at night in the prescribed time period.

The passenger held a private pilot licence and a valid Category 3 medical certificate. Records indicate that the passenger had approximately 330 hours of experience, including 58 hours at night as PIC, and 5.9 hours under simulated instrument conditions. The passenger did not possess an instrument rating.

⁴ Meteorological conditions less than the minima specified in Subpart 602 of the *Canadian Aviation Regulations* (CARs) for visual meteorological conditions (VMC), expressed in terms of visibility and distance from cloud

Flight Tests

Flight tests in Canada are evaluated using a 4-point marking scale. The detailed explanation of the marking scale is outlined in the *Flight Test Guide – Instrument Rating* published by Transport Canada (TC),⁵ but the following applies in general:

- 4 – Performance is well executed considering existing conditions.
- 3 – Performance is observed to include minor errors.
- 2 – Performance is observed to include major errors.
- 1 – Performance is observed to include critical errors, or the aim of the test sequence/item is not achieved.

The PIC had attempted 5 flight tests since beginning flight training in 2003.

On 05 May 2005, the PIC completed a private pilot flight test, which was assessed as a pass. On Exercise 24A: Instrument Flying – Full Panel, the PIC received a mark of 2. The pilot examiner noted that the candidate was “chasing the needle.”⁶

On 26 October 2007, the PIC completed an instrument rating flight test, which was assessed as a pass. On Exercise 8: ILS Approach, the PIC received a mark of 2. The pilot examiner noted that the candidate let the glideslope deviate to ½-scale deflection inside the outer marker, which was caused by trying to read the pre-landing checklist. The PIC was granted an instrument rating valid to 01 November 2009.

On 11 December 2009, the PIC attempted an instrument rating renewal flight test, which was assessed as a fail. On Exercise 2: IFR Operational Knowledge, the PIC received a mark of 1. The pilot examiner noted that the candidate was unable to explain the approach ban, and showed an unacceptable depth of knowledge. The flight test was stopped on the ground after this exercise was failed.

On 07 October 2011, the PIC attempted an instrument rating renewal flight test, which was assessed as a fail. On Exercise 8: ILS Approach, and Exercise 9: Missed Approach, the PIC received a mark of 1. The pilot examiner noted that the candidate let the glideslope deviate to full-scale deflection and let the course deviation indicator deflect fully en route to the missed-approach waypoint.

TC's *Flight Test Guide – Instrument rating* describes the aim, description, and performance criteria for each exercise to be completed on the flight test. For Exercise 8 (ILS or LPV⁷ Instrument Approach [Precision Approach]), the Performance Criteria section, (i), states that

⁵ TC, TP 9939E, *Flight Test Guide – Instrument rating: Groups 1, 2 and 3: Aeroplane* (8th edition, March 2011)

⁶ The term “chasing the needle” refers to a series of over-corrections in an effort to regain the desired track.

⁷ Localizer performance with vertical guidance

assessment will be based on the candidate's ability to, "on final approach course, allow no more than ½-scale deflection of the localizer or glideslope indications." ^{8,9}

CARs Standard 421.49(4)(b) requires applicants for renewal of an instrument rating that expired more than 24 months before the date of application to rewrite the instrument-rating written examination (INRAT). The original instrument rating held by the PIC would have been expired for 24 months on 01 November 2011.

On 31 October 2011, the PIC completed an instrument-rating renewal flight test, which was assessed as a pass. The PIC received a mark of 2 on 4 exercises, including Arrival, Holding, RNAV Approach, and ILS Approach. The pilot examiner noted on the flight test report that the candidate let the localizer deviate to ½-scale deflection upon interception. Notes written on a separate piece of paper during the flight test described the localizer deviation as ¾-scale. Had the most recent instrument-rating renewal flight test not been completed, the PIC would have had to rewrite the INRAT written exam.

Factors Affecting Pilot Decision Making

The PIC had several work appointments that were scheduled for the day following the accident. In addition, the pilot also had personal commitments to attend to later that week.

In the *Operators Guide to Human Factors in Aviation* (OGHFA), ¹⁰ the Flight Safety Foundation (FSF) describes the phenomenon of making a decision to continue to the planned destination or toward the planned goal even when significantly less risky alternatives exist. This phenomenon has been variously referred to as "press-on-itis," "get-home-itis," "hurry syndrome," "plan continuation," and "goal fixation." ¹¹

The FSF states that the following are some of the reasons that aircrews may be susceptible to "press-on-itis:"

- They have a personal commitment/appointment at the completion of the flight, or they may simply want to get to the destination.

⁸ TC, TP 9939E, *Flight Test Guide - Instrument rating: Groups 1, 2 and 3: Aeroplane* (8th edition, March 2011), page 23

⁹ The final approach segment begins when the aircraft is established on the final approach course and intercepts the glide path (*TP2076E Instrument Procedures Manual*, 4th Edition, 1997, pages 4-44).

¹⁰ European Advisory Committee, *Operators Guide to Human Factors in Aviation*. Flight Safety Foundation (2009), available at <http://www.skybrary.aero/index.php/Portal:OGHFA> (last accessed 25 October 2013)

¹¹ European Advisory Committee, "Press-on-itis" (OGHFA Briefing note), *Operators Guide to Human Factors in Aviation*, Flight Safety Foundation (2009), available at [http://www.skybrary.aero/index.php/Press-on-itis_\(OGHFA_BN\)](http://www.skybrary.aero/index.php/Press-on-itis_(OGHFA_BN)) (last accessed on 25 October 2013)

- They want to “just get the job done” (excessive commitment to task accomplishment), and are influenced by organizational goals such as on-time arrival, fuel savings and passenger convenience.
- They focus solely on aircraft flight-path control, due to turbulence and other distractions.
- “We are almost there, let’s just do it and get it over with.”
- They become task-saturated.
- They are fatigued.
- They lose situational awareness and are not fully aware of the potentially perilous situation.
- They have not set performance limits and trigger gates that require a go-around.
- They are not fully aware of their own limitations and/or the aircraft’s limitations.

Transportation Safety Board of Canada Laboratory Reports

The following TSB Laboratory reports were completed:

LP041/2012 – Radar Data Analysis

LP106/2012 – Model of Aircraft Wire Strike

LP001/2012 – Engine, Propeller and Airframe Examination

Analysis

The investigation determined that the aircraft was certified, equipped, and maintained in accordance with existing regulations. Because there were no signs of pre-existing damage or defects that would have precluded safe flight, the analysis will focus on the underlying human factors that contributed to the accident.

The pilot-in-command (PIC) was appropriately licensed and instrument-rated. However, the most recent, and other, flight test reports showed signs that the PIC had continued difficulty conducting instrument landing system (ILS) approaches. In addition, the PIC was not current in night-flying operations, and had very little, if any, experience in actual instrument meteorological conditions (IMC). Most of the PIC's instrument-flying experience was acquired during training in simulated IMC and in the simulator. This experience may not have presented the PIC with an accurate representation of the conditions and pressures faced in actual conditions.

The PIC chose to depart Wilkes-Barre Wyoming Valley Airport (KWBW) into forecast icing conditions despite the fact the aircraft was not certified for such operations. While en route, the pilot was informed of deteriorating conditions in the Ottawa area, but chose to continue. This decision and the previous day's long flying schedule, combined with work and personal commitments, suggest the PIC may have been susceptible to the phenomenon known as "press-on-itis."

While on the ILS approach into Ottawa in unfamiliar night IMC conditions, the pilot had significant difficulty maintaining the localizer. During the approach, the tower controller twice advised the pilot that the aircraft was deviating from the approach course. During the second attempt to regain the localizer, the pilot most likely made a steep right turn, which quickly developed into a rapid descent and loss of control.

Airframe icing could not be completely ruled out as a possible contributor to the loss of control, but the high airspeed (> 40 knots above the stall speed) that was maintained until the loss of control suggests that it was unlikely. Icing likely did not contribute to the aircraft's repeated deviation from the localizer and over-correction.

Findings

Findings as to Causes and Contributing Factors

1. During an attempt to fly the precision approach at night in weather conditions unfamiliar to the pilot, control of the aircraft was lost, and the aircraft collided with the ground.

Findings as to Risk

1. If pilots possess limited currency and experience at night or in instrument flight conditions, the risk of a loss of control is increased when operating an aircraft in marginal weather conditions.
2. Non-recognition of the effects of the phenomenon known as “press-on-itis” can lead to increased risk that a decision will be made to depart or continue a flight when significantly less risky alternatives exist.

Other Findings

1. The pilot did not meet the recency requirements for night flying with passengers.

This report concludes the Transportation Safety Board’s investigation into this occurrence. Consequently, the Board authorized the release of this report on 19 September 2013. It was officially released on 31 October 2013.

Visit the Transportation Safety Board’s website (www.bst-tsb.gc.ca) for information about the Transportation Safety Board and its products and services. You will also find the Watchlist, which identifies the transportation safety issues that pose the greatest risk to Canadians. In each case, the TSB has found that actions taken to date are inadequate, and that industry and regulators need to take additional concrete measures to eliminate the risks.