Transportation Safety Board of Canada
Bureau de la sécurité des transports du Canada

AIR TRANSPORTATION SAFETY INVESTIGATION REPORT A24W0086

MID-AIR COLLISION

L R Helicopters Inc.
Bell Helicopter Company, a Division of Textron Inc., 212 (helicopter), C-FTLR
and
Namao Flying Club
Cessna 172M, C-GJJL
Edmonton/Villeneuve Airport (CZVL), Alberta, 13 NM NW
09 July 2024

History of the flight

On 09 July 2024, the L R Helicopters Inc. Bell Helicopter Company, a Division of Textron Inc.[1] model 212 (Bell 212) helicopter (registration C-FTLR, serial number 30551) was being repositioned from Fort McMurray Airport (CYMM), Alberta, to Rocky Mountain House Aerodrome (CYRM), Alberta, with only the pilot on board. It departed CYMM under visual flight rules (VFR) at 0815[2] and landed at the Calling Lake Fire Base, located 7 nautical miles southeast of the Calling Lake Aerodrome (CFK4), Alberta, for fuel at 0922. It then resumed its flight at 0945, tracking south-

[1] At the time of report writing, the current type certificate holder for the Bell 212 is Bell Textron Inc.

[2] All times are Mountain Daylight Time (Coordinated Universal Time minus 6 hours).

southwest towards CYRM at an average altitude of 3000 feet above sea level (ASL). Sometime after 1000, the pilot of the Bell 212 made a position report on frequency 126.7 MHz;[3] no reply from other aircraft was heard. At 1031, the pilot climbed to 3300 feet ASL to maintain a height of about 1000 feet above ground level (AGL) and was 9 nautical miles north of Sandy Lake, Alberta, in Class G uncontrolled airspace (Figure 1).

At 1002, the Namao Flying Club Cessna 172 aircraft (registration C-GJJL, serial number 17264433) departed Edmonton/Villeneuve Airport (CZVL), Alberta, on a VFR proficiency training flight with a flight instructor and a licensed pilot on board. The flight proceeded north towards an area by Sandy Lake that is commonly used by the club for training and is located in uncontrolled Class G airspace (Figure 1). The Cessna 172 arrived in the training area at 1012 and began various air exercises at altitudes of 4400 feet ASL and below.[4] A position report and an announcement of their intentions was made by the flight instructor on frequency 126.7 MHz when they entered the training area; no reply was heard.

At 1033:34, the Cessna 172 levelled off at 3500 feet ASL[5] (1200 feet AGL) on a southeast track towards CZVL after climbing away from a simulated forced-landing exercise. At 1034:49, the Bell 212 was at 3500 feet ASL on a track of 188° magnetic (M) and at a ground speed of 114 knots when the 2 aircraft collided. At the time of the collision, the Cessna 172 was on a track of 131°M and at a ground speed of 80 knots (Figure 1, inset).

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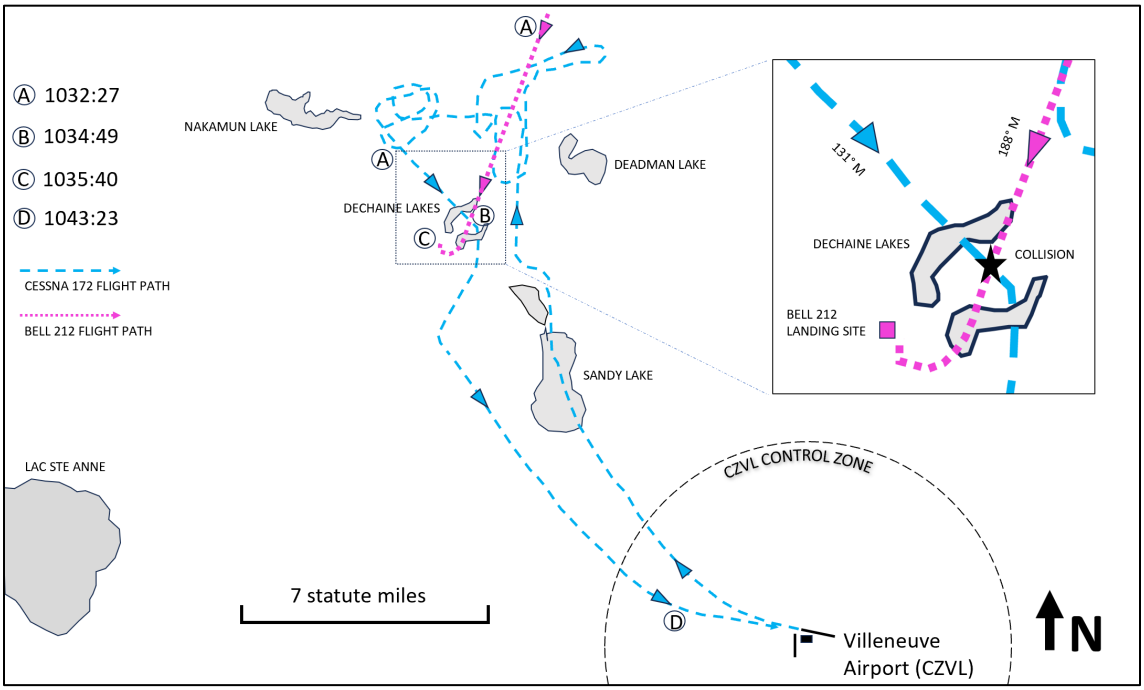
[3] Transport Canada, TP 14371E, *Transport Canada Aeronautical Information Manual* (TC AIM) (03 October 2024), RAC – Rules of the Air and Air Traffic Services, Section 5: Visual Flight Rules (VFR) En Route Procedures.

[4] Flight path data for the Cessna 172 was from radar information, and for the Bell 212 it was from radar data and an onboard GPS (global positioning system) receiver.

[5] Namao Flying Club flight training syllabus states that aircraft returning to CZVL from training areas should operate at 3500 feet ASL.

Figure 1. Map showing flight paths of the Cessna 172 (blue dashed line) and the Bell 212 (magenta dotted line), with a close-up view of the collision location in inset (Source of main and inset image: TSB)



The leading edge of the Cessna 172's right wing tip (Figure 2), and the tail skid of the Bell 212 (Figure 3) made contact. Both pilots in the Cessna 172 saw the Bell 212 passing from left to right moments before impact. The instructor reacted by pitching the aircraft's nose down. The pilot of the Bell 212 did not see the Cessna 172 at all.

Figure 2. Damage to right wing tip on the Cessna 172 (Source: TSB)

Figure 3. Damage to tail skid area on the Bell 212 (Source: TSB)

The pilot of the Bell 212 felt the impact and the resultant yaw. He did not know that he had collided with another aircraft, but he felt there was something mechanically wrong with the helicopter and immediately started a precautionary landing, made a Mayday call on frequency 126.7 Mhz, and landed in a field about 1 minute after the collision.

The flight instructor manoeuvred the aircraft to watch the Bell 212 land and broadcasted on frequency 126.7 MHz to inform the helicopter pilot that they had collided. The pilot of the Bell 212 responded after he was on the ground that he was okay. The Cessna 172 continued to fly

towards CZVL and landed at 1044. The instructor pilot did not report any difficulties in controlling the aircraft.

None of the occupants of either aircraft sustained any injury and neither emergency locator transmitter activated as a result of the collision. Both aircraft required extensive repairs due to the damage received in the collision.

Pilot information

The helicopter pilot held the appropriate licence for the flight in accordance with existing regulations: a commercial pilot licence – helicopter and a valid Category 1 medical certificate. At the time of the occurrence, the helicopter pilot had accumulated approximately 2435 hours total flight time, of which approximately 40 hours were as pilot-in-command of Bell 212 helicopters.

The flight instructor held the appropriate licence for the flight in accordance with existing regulations: a commercial pilot licence – aeroplane, issued in March 2024; a Class 4 instructor rating; and a valid Category 1 medical certificate. At the time of the occurrence, the flight instructor had accumulated approximately 315 hours total flight time, of which approximately 40 hours were as a flight instructor.

The other pilot in the Cessna 172 held a private pilot licence – aeroplane, issued in March 2016, and a valid Category 1 medical certificate. At the time of the occurrence, the pilot had accumulated approximately 200 hours total flight time.

Position reporting

The collision occurred in Class G uncontrolled airspace, " … within which ATC [air traffic control] has neither the authority nor the responsibility to exercise control over air traffic."[6] The *Transport Canada Aeronautical Information Manual* states,

> [p]ilots operating VFR en route in uncontrolled airspace when not communicating on an MF [mandatory frequency], or an ATF [aerodrome traffic frequency], or VFR on an airway should continuously monitor 126.7 MHz and whenever practicable, broadcast their identification, position, altitude and intentions on this frequency to alert other VFR or IFR [instrument flight rules] aircraft that may be in the vicinity. Although it is not mandatory to monitor 126.7 MHz and broadcast reports during VFR or VFR-OTT [over-the-top] flights, pilots are encouraged to do so for their own protection.[7]

Altitude for direction of flight

The *Canadian Aviation Regulations*[8] require aircraft to travel at specific altitudes depending on the direction of flight when operating VFR above 3000 feet AGL. In level cruising flight, pilots are required to operate at even altitudes plus 500 feet for westbound flights (between 180°M and 359°M) and at odd altitudes plus 500 feet for eastbound flights (between 000°M and 179°M).

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6 Transport Canada, TP 14371E, *Transport Canada Aeronautical Information Manual* (TC AIM) (03 October 2024), RAC – Rules of the Air and Air Traffic Services, section 2.8.7.

7 Ibid., section 5.1.

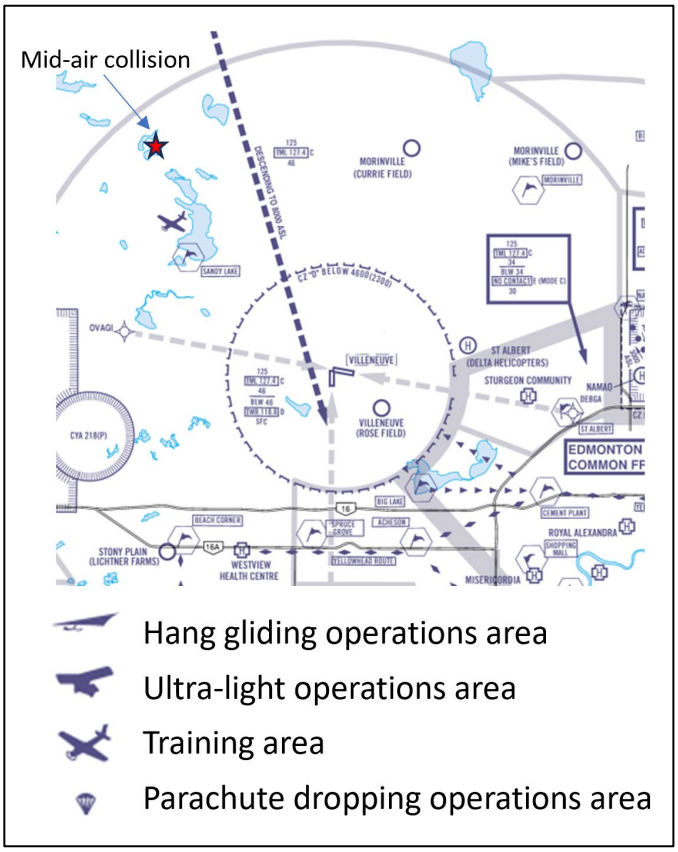
8 Transport Canada, SOR/96-433, *Canadian Aviation Regulations*, section 602.34.

Both the Bell 212 and the Cessna 172 were operating below 3000 feet AGL at the time of the collision.

Depiction of training areas on maps

Various symbols are used on maps to depict areas of interest to pilots. The training area near Sandy Lake was depicted on the back side of the Edmonton VFR Terminal Area Chart (VTA) (Figure 4). The back side of the VTA supplies pilots with additional information when operating within the Edmonton area.

Figure 4. Back side of Edmonton visual flight rules terminal area chart showing the training area symbol near the site of the mid-air collision (Source: NAV CANADA, with TSB annotations)



The training area near Sandy Lake was not depicted on the front/map side of the VTA, the Edmonton VFR Navigation Chart, or the *Canada Flight Supplement* Edmonton VFR Terminal Procedures Chart.

NAV CANADA's process for adding symbols is largely client-driven, either by external users or internal staff. In the case of the Sandy Lake training area symbol, this was requested by NAV CANADA operations personnel, and it was added to the back side of the Edmonton VTA only.

The *Canadian Aviation Regulations*[9] require that aeronautical information services be provided in accordance with the International Civil Aviation Organization's (ICAO's) standards set out in Annexes 4[10] and 15[11] to the *Convention on International Civil Aviation*. The standards require that processes be put in place to ensure that, when aeronautical data and information are provided in multiple formats, there is consistency between the formats.[12] However, there are no standards specific to the use of consistent symbology for special-use airspace across multiple formats.

[9] Ibid., section 803.01.

[10] International Civil Aviation Organization, Annex 4 to the *Convention on International Civil Aviation*: Aeronautical Charts, Eleventh Edition (July 2009).

[11] International Civil Aviation Organization, Annex 15 to the *Convention on International Civil Aviation*: Aeronautical Information Services, Sixteenth Edition (July 2018).

[12] Ibid., paragraph 5.1.2.

Previous TSB investigations on mid-air collisions

In addition to this investigation, over the past 15 years, the TSB has investigated 10 mid-air collision accidents.[13] In several of these reports, the TSB identified that the see-and-avoid concept for avoiding mid-air collisions is not effective and that until there is wide adoption of traffic awareness systems, the risk of mid-air collisions will not be substantially reduced.

Air traffic awareness systems

A more recent form of traffic awareness system is automatic dependent surveillance—broadcast (ADS-B).[14] The Bell 212 involved in this mid-air collision was equipped with ADS-B IN and ADS-B OUT, including cockpit displays that depict other ADS-B-equipped aircraft. The Cessna 172 was not equipped with ADS-B, nor was it required to be by regulation.

NAV CANADA has begun introducing requirements for aircraft to be equipped with ADS-B OUT technology as an additional tool for its provision of air traffic surveillance services. The requirement for ADS-B-capable transponders in Canada came into effect on 10 August 2023 in Class A airspace and on 16 May 2024 in Class B airspace. According to information from NAV CANADA, aircraft operating in the other types of airspace (C, D, and E) will be required to be equipped with ADS-B-capable transponders no sooner than 2028, pending consultation with the industry.

Transport Canada is considering an electronic conspicuity working group to evaluate different technologies (ADS-B is one of several technologies) with a view to reducing the risk of mid-air collisions in general aviation. The plan is for the working group to start in 2025.

Safety action taken

After the accident, the Namao Flying Club ceased flight training activities for approximately 2 weeks to assess risk mitigation options. After the 2-week assessment period, a decision was made to conduct flight training in the Class C airspace, where possible, to provide a layer of defence with ATC providing traffic alerts based on radar information.

TSB laboratory reports

The TSB completed the following laboratory report in support of this investigation:

- LP108/2024 – Aircraft Track Superimposed Over Terrain

[13] TSB aviation occurrence reports: A23Q0069, A20O0053, A19W0099, A18O0150, A17Q0030, A15W0087, A13P0127, A12H0001, A12C0053, and A11P0027.

[14] An advanced surveillance technology where aircraft equipped with ADS-B OUT share position, altitude, velocity, and other information with ATC and other appropriately equipped aircraft. ADS-B IN technology involves the receipt, processing, and display of other aircraft's ADS-B transmissions. ADS-B IN is necessary for airborne applications.

Safety messages

Given the limitations of the see-and-avoid principle, aircraft pilots and owners are encouraged to use an appropriate altitude for their direction of flight, where possible, even when flying below 3000 feet AGL, and to consider traffic awareness systems, such as ADS-B technology, as an aid to reduce the risk of mid-air collisions.

Pilots are reminded to maintain an active listening watch on frequency 126.7 MHz and to provide position updates on a regular basis, as well as to review all information related to their planned route to ensure they are aware of the types of operations taking place along the route.

This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 26 February 2025. It was officially released on 06 March 2025.

ABOUT THIS INVESTIGATION REPORT

This report is the result of an investigation into a class 4 occurrence. For more information, see the Policy on Occurrence Classification at www.tsb.gc.ca

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