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

AIR TRANSPORTATION SAFETY INVESTIGATION REPORT A24Q0104

COLLISION WITH WATER

Privately registered
Airbus AS350 B2 (helicopter), C-GGLM
Lac d'Elvert, La Vérendrye Wildlife Reserve, Quebec
18 August 2024

History of the flight

At 0957[1] on 18 August 2024, the privately registered Airbus AS350 B2 helicopter (registration C-GGLM, serial number 3443) took off from a private property in Mirabel[2] to conduct a visual flight rules flight to Launey, with 1 pilot and 2 passengers on board.

The helicopter landed at Mont-Laurier Aerodrome (CSD4) at approximately 1050. The pilot and passengers were then driven to a residence in Saint-Aimé-du-Lac-des-Îles.

The helicopter was refuelled at around noon by the refueller at CSD4. Another helicopter owned by a helicopter company was parked at CSD4 because its pilot had cancelled the flight planned for the afternoon owing to the poor weather conditions forecasted.

[1] All times are Eastern Daylight Time (Coordinated Universal Time minus 4 hours).

[2] All locations mentioned in this report are in Quebec, unless otherwise noted.

Canada

After returning to CSD4, the occurrence pilot decided to wait for the weather to improve before proceeding with the flight. According to information gathered, a vehicle was made available to the pilot so that he and the passengers could reach their destination in time for meetings scheduled the next day. The offer was declined, and the helicopter took off northbound at approximately 1530.

Drivers on Route 117 in the La Vérendrye Wildlife Reserve reported seeing the helicopter, which appeared to be following the highway north at very low altitude. According to them, road conditions were unsafe because of heavy rain and strong winds.

At approximately 1600, given the poor weather conditions, the pilot landed at Le Domaine, a rest area and lodging site for hunting and fishing enthusiasts owned by the Société des établissements de plein air du Québec. One of the passengers took a photo with their cellphone while in flight before landing at Le Domaine, which showed that forward visibility was very low due to heavy rain (Figure 1). Text messages exchanged between an individual on the ground and this passenger confirmed that weather conditions were poor during the flight.

After landing, a Le Domaine staff member offered the pilot a place to rest. The pilot declined the offer, indicating that he was used to this type of weather. The helicopter took off again around 15 minutes later.

Figure 1. Photo taken during the occurrence flight before landing at Le Domaine (Source: Third party, with permission)

At approximately 1650, the helicopter flew northbound over the Lac-Rapide campground, next to Route 117, at very low altitude. Witnesses at the campground reported heavy rain.

At 2035, the Québec Flight Information Centre contacted the Joint Rescue Coordination Centre in Trenton, Ontario, to report that the helicopter was missing. Friends of the pilot had made the initial notification to the Québec Flight Information Centre, which had not received a flight plan for the occurrence flight. Air and ground searches began with the assistance of the Sûreté du Québec.

The helicopter was found the next morning at around 0930, submerged in Lac d'Elvert, which is next to Route 117 and 2 km from the Lac-Rapide campground. The occupants did not survive.

Pilot information

The pilot held a private pilot licence – helicopter and a valid Category 3 medical certificate. He had accumulated approximately 3175 hours total flying time, including approximately 2900 hours on type.

He had taken 1.5 hours of flight training with a qualified instructor on 20 August 2023 to meet the recency requirements under paragraph 401.05(2)(a) of the *Canadian Aviation Regulations*.

The pilot was being monitored by a cardiologist for atherosclerotic coronary artery disease that had been diagnosed several years earlier. His last medical exam by a Transport Canada civil aviation medical examiner took place on 04 June 2024, at which point his medical certificate was renewed. He still had to undergo an annual heart stress test. The investigation was unable to determine whether the pilot experienced sudden incapacitation in flight.

The pilot had been flying by helicopter between Launey and CSD4 on a regular basis for several years, and he would usually follow Route 117. The pilot held the appropriate licences and ratings for the occurrence flight in accordance with existing regulations.

Aircraft information

The occurrence AS350 B2 helicopter (Figure 2) was manufactured by Eurocopter (now Airbus Helicopters) in France in 2001 and imported into Canada in 2007. The helicopter was not equipped with a flight data recorder or a cockpit voice recorder, nor was either required by regulations.

Figure 2. Occurrence helicopter (Source: JetPhotos)

It was maintained by an approved maintenance organization, which had performed an annual inspection on 10 May 2024. After the helicopter had flown 7.2 to 15.2 flight hours following the inspection, the tail rotor pitch link attachment bolts were required to be retightened, and the main drive shaft play was required to be checked. According to the last entry in the aircraft's journey log, dated 30 July, more than 32 hours had been flown since the annual inspection, and there had been no maintenance-related entries since then.

The helicopter was equipped with a Kannad 406 AF-Compact emergency locator transmitter (serial number C055AB) capable of transmitting on 406 MHz and 121.5 MHz. It was activated by impact forces, but no 406 MHz signal was received by the Cospas-Sarsat system, most likely because the transmitter was submerged in water. However, a weak distress signal was heard on frequency 121.5 MHz by people on a helicopter flying over the area of Lac d'Elvert while searching for the occurrence helicopter the next day.

Wreckage and impact information

The helicopter was found submerged and inverted, with part of a skid sticking out of the water. The tail boom had separated from the fuselage and was lying approximately 300 feet from the wreckage. The cabin sustained major damage: its roof, doors, windscreen, instrument panel, and central console had been torn off. This damage suggests significant pressure from water entering through the windscreen as a result of the collision with the water while the helicopter was moving forward. The fuel tank dislodged and was protruding out of the fuselage, and the cargo doors were missing.

The main rotor blades were still attached to the main rotor head, and the damage to the blades indicates that they were rotating at the time of the collision. The symmetry of the damage is consistent with a nose-down, no-roll attitude at the time of the collision, after which the helicopter toppled forward.

Damage to the tail boom was limited to the point of separation. The separation of the tail boom and the fuel tank is consistent with rapid rotation around the pitch axis at the time of the collision.

The wreckage was transported to the TSB Engineering Laboratory in Ottawa, Ontario, for further examination. During this examination, the tail rotor pitch link attachment bolts and main drive shaft play were checked given that no entries had been made in the aircraft's journey log as required by the inspection on 10 May 2024. The TSB examination did not find any anomalies.

The damage observed at the point where the drive shaft separated from the main gearbox input confirmed that the engine was running at the time of the collision. There were no other indications of mechanical anomalies or system malfunctions.

A portable GPS (global positioning system) removed from the wreckage was examined, but the only non-volatile data recorded on the memory card were GPS points.

Weather information

The only weather station providing aviation weather information on the occurrence flight path is located at Val-d'Or Airport (CYVO). The following aerodrome forecasts[3] were issued at 0740 and available to the pilot on 18 August 2024:

- Surface winds from 050° true (T) at 5 knots, visibility of 1½ statute miles (SM) in rain showers and mist, overcast ceiling at 300 feet above ground level (AGL)
    - Temporarily, between 0800 and 1100, visibility greater than 6 SM in light rain showers, with scattered clouds at 300 feet AGL and a ceiling at 1000 feet AGL
- Starting at 1100, surface winds from 350°T at 12 knots, visibility of 4 SM in light rain showers and mist, with an overcast ceiling at 700 feet AGL

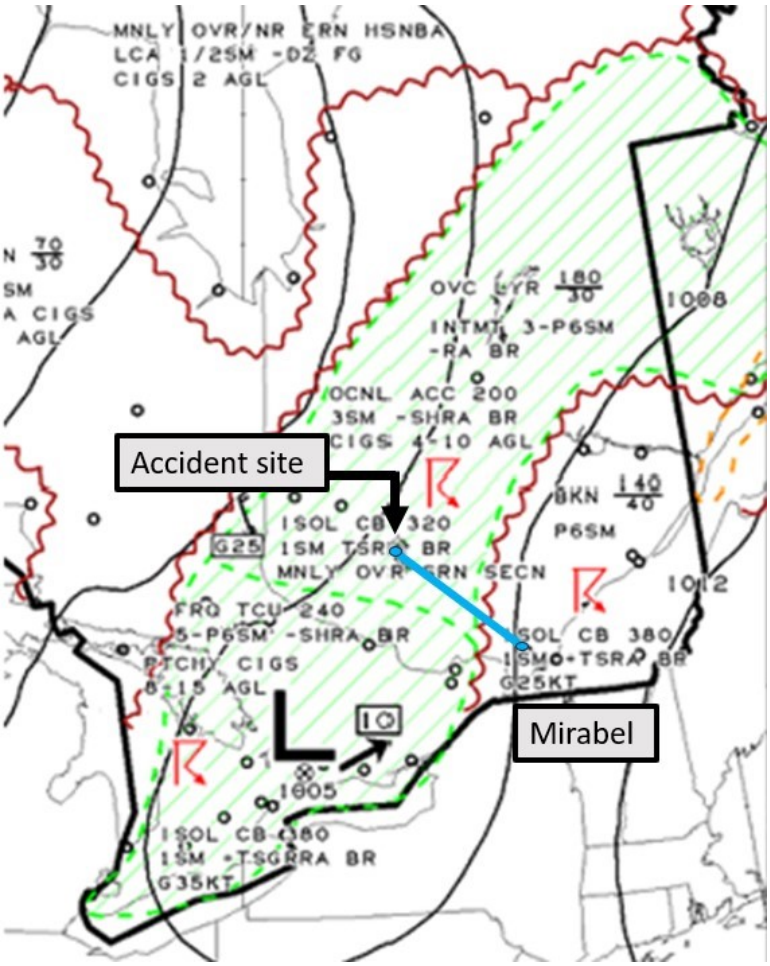
[3] "TAFs [aerodrome forecasts] are intended to relate to weather conditions for flight operations within 5 NM [nautical miles] of the centre of the runway complex, depending on local terrain." (Source: Transport Canada, TP 14371E, *Transport Canada Aeronautical Information Manual* [TC AIM] [03 October 2024], MET – Meteorology, section 7.2, p. 154, at https://tc.canada.ca/sites/default/files/2024-09/aim-2024-2_access_e.pdf [last accessed on 13 March 2025].)

    - Temporarily, between 1100 and 1700, visibility greater than 6 SM in light rain showers, with an overcast ceiling at 1500 feet AGL
    - Between 1200 and 1400, winds from 360°T at 15 knots, gusting to 25 knots
- Starting at 1700, winds from 360°T at 15 knots, gusting to 25 knots, visibility greater than 6 SM in light rain showers, with a broken ceiling at 800 feet AGL and an overcast cloud layer at 1200 feet AGL

Forecasts for the area along the flight route, available on the graphic area forecast Clouds and Weather Chart (Figure 3) and Icing, Turbulence and Freezing Level Chart, indicated the following conditions starting at 1400 for the planned route:

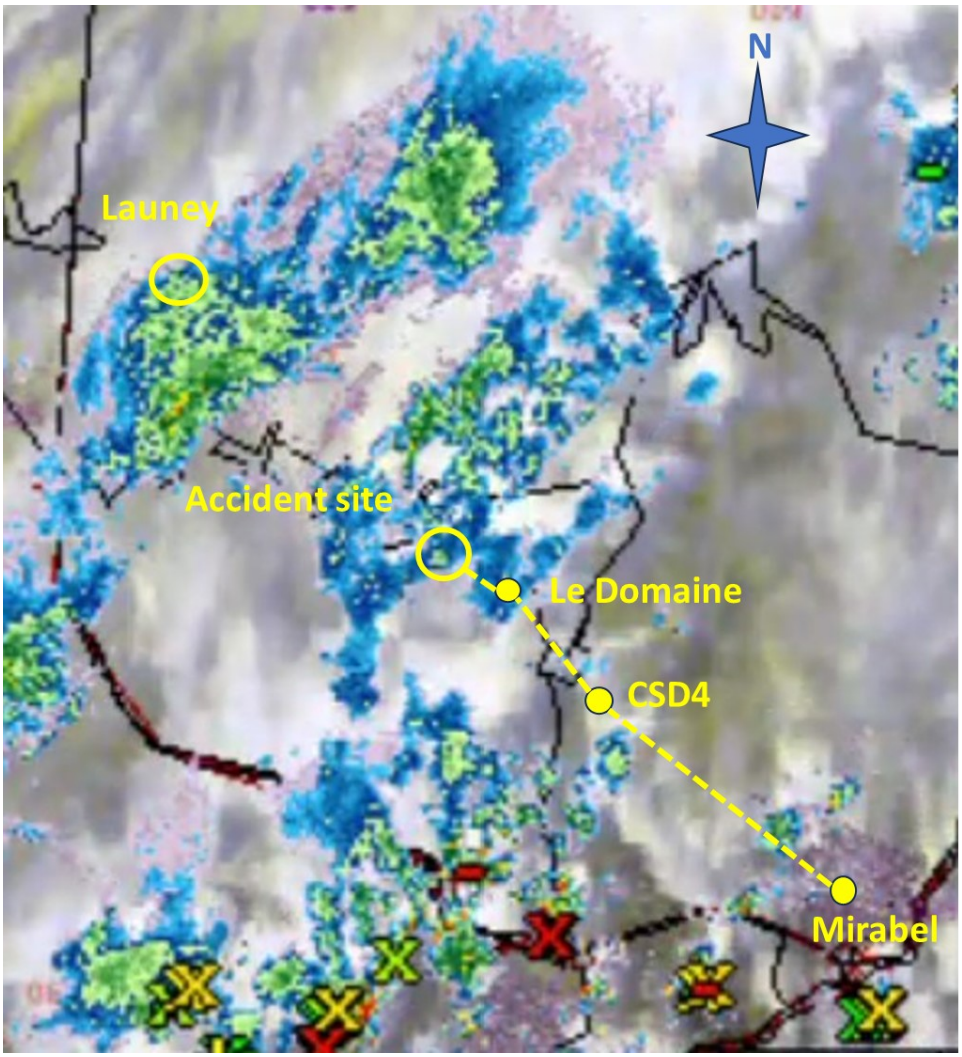
- Overcast ceiling at 3000 feet above sea level (ASL) with tops at 18 000 feet ASL, visibility varying between 3 SM and greater than 6 SM in light rain and mist
- Occasionally, due to altocumulus castellanus clouds, visibility of 3 SM in light rain showers and mist, reducing the ceiling to between 400 and 1000 feet AGL
- Isolated cumulonimbus clouds, reducing visibility to 1 SM in thunderstorms, rain, and mist, primarily in the southern portion
- Moderate mechanical turbulence from the surface to 3000 feet AGL due to low-level wind shear

Figure 3. Graphic area forecast Clouds and Weather Chart, valid at 1400 on 18 August 2024, with depiction of the occurrence flight (Source: NAV CANADA, with TSB annotations)



According to the radar image at 1700, there were rain showers in the area where the helicopter was flying at the time of the occurrence (Figure 4).

Figure 4. Radar image of lightning and precipitation at 1655 on 18 August 2024, with depiction of the occurrence flight. According to the image, rainfall intensity was between 0.7 and 2.7 mm/h at the accident site (Source: Environment and Climate Change Canada, with TSB annotations)



Decision to continue the flight

The investigation was unable to determine what weather information the pilot checked, or the time of day he did so. No call was made to the Québec Flight Information Centre to obtain a weather briefing for the occurrence flight. The pilot did wait for the weather to improve before taking off from CSD4; however, he landed at Le Domaine because conditions were poor.

Proper flight planning before takeoff and, if necessary, establishing an alternate plan in case of uncertainty saves the pilot from having to make a decision in flight, at a time when the workload is much higher. Proper situational awareness is important for choosing appropriate actions.

According to information gathered, weather conditions at the time of the occurrence were not suitable for a visual flight rules flight. Choosing to take off and continue a flight in such conditions can be influenced by cognitive biases such as plan continuation bias. This is a deep-rooted tendency to want to continue the plan even when changing circumstances require a new plan.

Individual factors such as experience, knowledge of the flight route, and the degree of confidence in one's abilities can also influence the decision whether or not to continue a flight in unfavourable weather conditions.

TSB laboratory reports

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

- LP130/2024 – Instruments Analysis
- LP131/2024 – Light Bulb Analysis
- LP127/2024 – NVM Data Recovery – GPS

Conclusion

The hazards associated with continuing a visual flight rules flight in instrument meteorological conditions are well known. According to data collected by the TSB from 2014 to the end of July 2024, there were 50 accidents resulting in 37 fatalities for flights that began in visual meteorological conditions and continued in instrument meteorological conditions. Of these 50 accidents, 19 involved helicopters.

This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 12 March 2025. It was officially released on 27 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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