

AVIATION INVESTIGATION REPORT
A00Q0116

RISK OF COLLISION

BETWEEN

AIR CANADA

AIRBUS INDUSTRIE A319-114 C-FYJB

AND

CESSNA 152 C-GFBJ

MONTRÉAL INTERNATIONAL AIRPORT (DORVAL), QUEBEC

1 NM WEST

29 AUGUST 2000

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

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Summary

The pilot of the Cessna 152, C-GFBJ, departed the airport at Les Cèdres, Quebec, with one passenger, for a sightseeing flight over Sainte-Anne-de-Bellevue, to the west of Montréal International Airport (Dorval). The aircraft entered the Dorval control zone at approximately 0903 eastern daylight time without contacting the Dorval control tower and without activating the aircraft transponder. The crew of Air Canada flight 671, an Airbus A319, on initial climb-out from runway 24 right (24R) at Dorval en route to San Francisco, California, saw the Cessna passing from right to left across their flight path as the Airbus climbed through 900 feet above sea level approximately 0.75 nautical mile from the runway. The pilot-flying turned right to avoid the Cessna. The closest point of approach was estimated to have been between 100 and 200 feet horizontally as the Airbus passed through the altitude of the Cessna.

Ce rapport est également disponible en français.

Other Factual Information

The Cessna pilot was a licensed private pilot with 74 hours of flight experience. This was her third flight since acquiring her licence in early August. The previous two flights had been a half-hour checkout flight at Les Cèdres and a one-hour sightseeing flight on August 21, eight days before the occurrence. The occurrence flight was planned as a practice flight in an area west of Les Cèdres. Just before take-off, the pilot decided to carry out an informal sightseeing flight over Sainte-Anne-de-Bellevue on the western tip of the island of Montréal. She planned to remain within 25 miles of the departure airport, so no flight plan was required or filed.

The airspace within 7 miles to the west of Dorval airport, from ground level to 3000 feet above sea level (asl), is designated as the Dorval control zone and is Class C airspace. The airspace within 12 miles of Dorval, from 1300 feet asl to 12 500 feet asl, is also designated as Class C airspace (see Appendix A). Aircraft intending to fly under visual flight rules (VFR) within Class C airspace are required to receive a clearance from air traffic control before entry and must be equipped with a functioning transponder incorporating an automatic pressure reporting device.

Most of the aircraft the Cessna pilot had flown during flight training were not equipped with transponders, and most of the flights had been made in areas not requiring their use. Although the “Before Take-off” checklist on these training aircraft had the item “Transponder ALT” (the transponder function with altitude reporting) as the last item before take-off, it had been the practice during flight training to skip that item. On take-off from Les Cèdres, the pilot did not turn the transponder on, and the transponder was not operating while the Cessna was in the Dorval control zone.

The Cessna pilot had some previous experience flying in the vicinity of Les Cèdres during the earlier portion of flight training, but most of her training had taken place elsewhere. None of the earlier flights was towards Montréal. Though the Cessna pilot carried a Montréal VFR terminal area (VTA) chart, it was not used during the flight.

The Cessna pilot was aware of the airspace classification in the vicinity of Dorval. After take-off, the pilot established the aircraft altitude at 1100 feet asl to remain below the Class C airspace, which is based at 1300 feet asl and which overlies Île Perrôt and the western tip of the island of Montréal. The pilot planned to follow Highway 20 eastbound only as far as Sainte-Anne-de-Bellevue, 10 nm west southwest of Dorval and outside the Dorval control zone. She thought that the aircraft had not yet passed Pincourt on Île Perrôt when she saw Dorval airport directly ahead. She immediately recognized the navigation error, performed a general lookout, and then began an immediate right turn with the intention of returning to Les Cèdres. During the right turn, the Cessna passed in front of the Airbus. The occupants of the Cessna did not see the Airbus.

The briefing room in the aviation rental offices at Les Cèdres, from which the pilot rented the Cessna, contains a VTA chart fixed to the wall as an airspace visual aid to pilots renting aircraft. There is no requirement that rental agencies provide any other briefings or airspace information to pilots, who may be new or unfamiliar with the local geography or airspace, nor is it a practice at this rental agency to do so.

The first officer of the Airbus was the pilot-flying at the time of the occurrence. The aircraft captain was monitoring flight and aircraft performance and was preparing to change radio frequencies from Dorval tower frequency to Montréal departure frequency. The take-off and initial climb from runway 24R had been uneventful until the first officer saw the Cessna directly ahead, crossing from right to left. The aircraft, visible

to the first officer for one or two seconds, was estimated to be just above the Airbus and approximately 100 feet away. He immediately turned right to avoid the Cessna. The Airbus's altitude was approximately 900 feet asl at the time, with a climb rate of approximately 1500 feet per minute. The aircraft was still on runway heading with landing lights, navigation lights, and strobe lights illuminated. Reported ground visibility at the time was 15 nm; however, there was some haze present, which reduced flight visibility to approximately 10 nm. The crew of the Airbus received no traffic alert and collision-avoidance system (TCAS) advisory of the presence of the Cessna because the Cessna transponder was not on.

According to the Nav Canada *Air Traffic Control Manual of Operations*, article 301.2, an airport controller is responsible for providing VFR control services to airport traffic operating in the manoeuvring area of the airport, to VFR aircraft operating within the control zone or tower radar area, and to instrument flight rules (IFR) aircraft for which the tower has responsibility.

The Dorval control tower is at the west end of Dorval airport. In order to monitor activity on runways 24L and 24R, the airport controller in the tower is generally oriented facing northeast. When runway 24 is in use, such positioning permits the airport controller to provide a thorough scan of the approach, the runway, and the overrun area just to the west of the runway end. The position at which the Airbus and the Cessna crossed is at an angular displacement of approximately 150 to 160 degrees from the normal visual orientation of the airport controller. The airport controller did not see the Cessna until after the pilot of the Airbus advised of the evasive manoeuvre.

Dorval tower includes a radar coordinator position. Among other duties, the radar coordinator monitors the radar display in the tower in accordance with the Dorval tower radar plan and identifies and points out to the airport controller potential aircraft conflicts. After being advised of the evasive manoeuvre by the Airbus, the radar coordinator noted that the radar target for the Cessna was displayed on the tower radar indicator as a primary radar target without an identifying data block. During replay of the recorded radar information, the target was visible as it approached the airport. The radar coordinator did not notice the radar target of the Cessna.

Montréal departure control is part of the Montréal Area Control Centre terminal specialty. The departure controller is responsible for providing air traffic control service to IFR aircraft on departure from Dorval after control transfer from Dorval control tower. The departure controller did not notice the radar target of the Cessna before the occurrence. Two earlier departures from runways 24L and 28 occurred at approximately the time that the Cessna entered the control zone. The departure from runway 28 came within approximately 1.2 nm of the Cessna, and the departure from 24L was approximately 2.4 nm from the Cessna. Because the Cessna radar target was not detected by the departure controller, he was not in a position to determine whether it constituted conflicting traffic to either of these departures and to issue traffic information if warranted. The departing Airbus had not yet been identified by the departure controller, and they were not in communication with each other.

Within Class C airspace, air traffic control is required to provide separation between all IFR flights and, as necessary, to resolve possible conflicts between VFR and IFR aircraft. Although the Cessna presented a less evident radar target than it would have had the aircraft transponder been activated, the requirement to provide the defined air traffic control service was not diminished. The Cessna was not detected by air traffic control; therefore, no traffic information was issued to the Airbus.

Analysis

The Cessna pilot had undergone training on aircraft that were not equipped with transponders, thus the checklist item requiring activation of the transponder had often been skipped. It did not occur to the Cessna pilot that there was a need to activate the transponder, especially since there was no intention to enter airspace in which a transponder was required. There was no consideration of the safety benefits that activating the transponder during all phases of the flight would create.

Checkout flights required by aircraft rental agencies are designed to ensure that pilots are capable of safely handling the aircraft to be rented. There is no onus on the rental agency to ensure that new renters are aware of the categories of airspace near the rental base or of major landmarks. There is no onus to mark especially important boundaries. A short briefing by dispatchers to new renters or the mandatory review of suitably marked local area charts would provide a level of defence against the positional confusion exhibited by the Cessna pilot in this occurrence.

The pilot had originally intended to proceed to a training area to the west of Les Cèdres airport. Because the change to a sightseeing flight over Sainte-Anne-de-Bellevue was made just before take-off, the pilot did not review significant landmarks, navigation charts, communication requirements, or airspace boundaries for the new route of flight. The pilot did not expect to pass the intended sightseeing destination so quickly. The lack of preparation contributed directly to the airspace incursion and resulting conflict with the Airbus.

It could not be determined why the controllers responsible for providing air traffic control services did not see the radar target of the Cessna as it approached the airport and conflicted with the departing Airbus. Without the benefit of a TCAS warning or air traffic control traffic information, the crew of the Airbus had to rely solely on the see-and-avoid principle to ensure the safety of the aircraft.

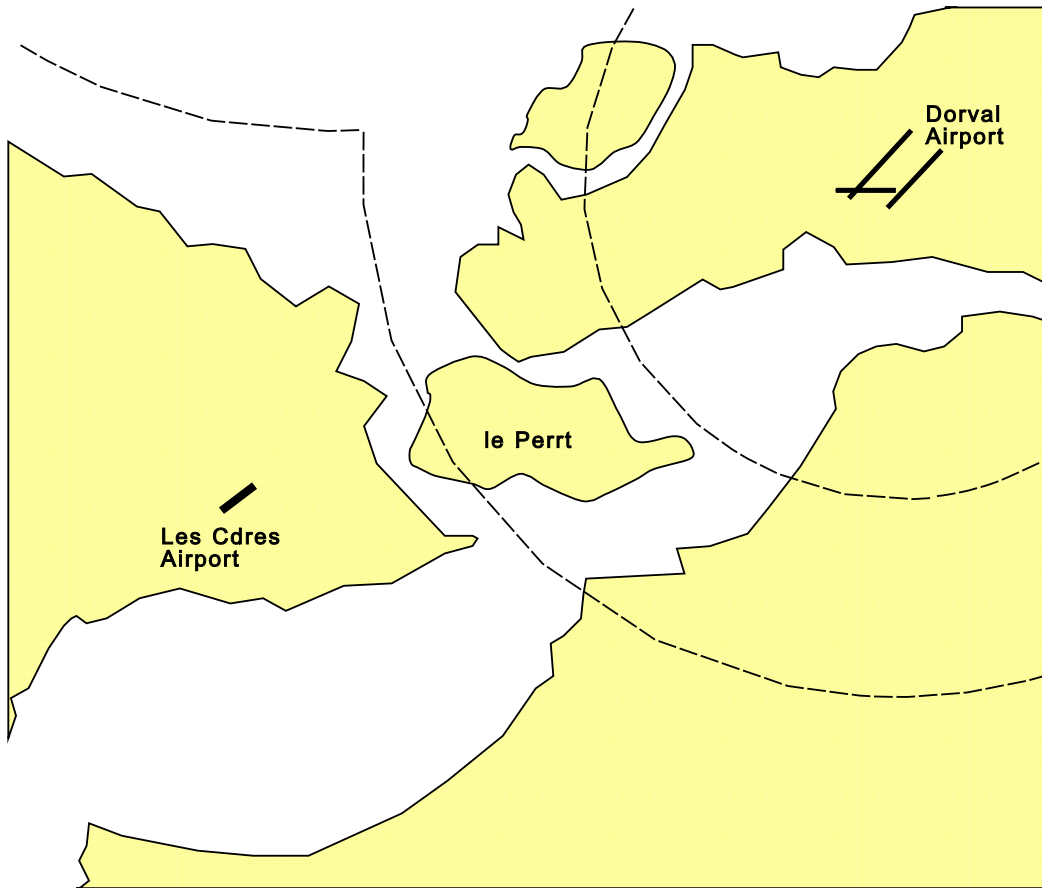
Findings as to Causes and Contributing Factors

1. The pilot of the Cessna inadvertently flew the aircraft within one mile of the Dorval airport, directly into the departure path of the Airbus.
2. The pilot of the Cessna entered the Dorval control zone without receiving air traffic control (ATC) clearance and without activating the aircraft transponder. She thus reduced the chance of being detected by ATC and eliminated the chance of being detected by the traffic alert and collision-avoidance system on the Airbus.
3. Air traffic controllers did not detect the Cessna and, therefore, did not provide traffic information to the Airbus to avert the near collision.

Findings as to Risk

1. The training and the habits of the Cessna pilot resulted in the transponder not being turned on for the flight.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 24 May 2001.



Appendix A—Cessna 152 Route of Flight