

AVIATION INVESTIGATION REPORT

A02Q0130

COLLISION WITH TERRAIN

DERAPS AVIATION INC.

DE HAVILLAND DHC-3 OTTER C-FLGA

NATASHQUAN, QUEBEC 57 NM N

28 SEPTEMBER 2002

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.

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### *Summary*

A de Havilland DHC-3 Otter owned by Deraps Aviation Inc., registration C-FLGA, serial number 279, took off from Lake de l'Avion, Quebec, near Natashquan Airport at approximately 1050 eastern daylight time on a flight to a hunting camp 57 miles to the north along the Aguanish River. The pilot and three passengers were on board. Upon arriving at the destination at approximately 1135, the aircraft flew over part of the neighbouring forest before crashing upside down on rugged ground. The passengers were fatally injured on impact. The pilot survived and was evacuated to Sept-Îles by Canadian Forces Search and Rescue services at approximately 0400 on 29 September 2002.

*Ce rapport est également disponible en français.*

## *Other Factual Information*

The pilot received his commercial pilot licence in May 1990. He had logged about 7980 hours of flying time, with almost 7800 hours on aircraft equipped with floats or skis. During the last few years, he had flown mainly the de Havilland DHC-3 Otter. As the company chief pilot, he was responsible for professional standards for the flight crew under his authority.

Weather conditions during the first 40 nautical miles (nm) allowed for a direct course. However, for the rest of the distance, clouds frequently came down to the mountaintops, forcing the pilot to make a few detours. The winds were calm. The weather report from Environment Canada indicates that weather conditions at Natashquan Airport improved from 1018<sup>1</sup> to 1143, and the cloud base rose from 600 feet to 5500 feet above ground level. The winds were light, between 4 and 6 knots, and visibility did not drop below 8 statute miles. The report also mentions that, in mountainous terrain, it was possible for clouds to remain longer.

The mountain bordering the north side of the Aguanish River at the hunting camp is very steep. Since the pilot had not been to the location for a year, he flew over the camp to assess the landing area. He also noticed moose tracks on the bank and initiated a turn to the left to show the passengers. The turn was done at approximately 95 mph. It seemed to the pilot that, during the turn, close to the mountain, the aircraft drifted toward the mountain. After completing almost 360° of the turn, the pilot felt vibrations that he associated with wake turbulence. Because the aircraft seemed to want to sink, he applied full power. The left wing hit the tops of several trees, and the aircraft flipped before crashing upside down on the slope of the mountain.

The aircraft cut a 460-foot-long swath through the trees along a constant left curve. At first, only the treetops were involved, but then the aircraft quickly dropped, cutting the trees progressively closer to the ground. The aircraft's speed fell, and the left wing tore off, contributing to flipping the plane because of the dissymmetry of lift. There was little damage to the right wing. Pieces of the aircraft, including a pitot tube mounted on the end of the left wing, were found at the beginning of the impact trajectory.

The take-off weight was within prescribed limits. The records showed that the aircraft was equipped and maintained in accordance with existing regulations. A technical analysis of the aircraft was carried out at the accident site. The engine was producing high power; the propeller had cut several trees exceeding eight inches in diameter as it passed. However, upon final impact, the engine mount broke and the engine shifted to the back and right, pushing back the fire wall and the instrument panel to a point that compromised the space occupied by the pilot and the passenger. The passenger seat fasteners were broken by the forward movement of the plywood subfloor on impact. A net held the cargo, but because the aircraft was upside down for the end of its trajectory, the net was not effective in protecting the passengers, and most of the cargo shifted to the front. The right wing of the aircraft showed little damage; the left wing sustained many impact marks. Many parts and components came off before being torn from the fuselage. The continuity of the control cables could still be established—despite the separation of the left wing—because the cables did not break. The pilot had not noticed anything unusual about the aircraft's operation before the accident.

The aircraft crashed at approximately 1135. About 20 minutes later, Canadian Coast Guard vessel *Georges R. Pearkes*, which was 5 nm west of Havre-Saint-Pierre, was contacted by a member of the Canadian Forces Search and Rescue (SAR). The Coast Guard immediately sent a helicopter to the location. The Otter was found at approximately 1432, and information about the exact location of the wreckage and the status of the situation

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<sup>1</sup> All times are eastern daylight time (Coordinated Universal Time minus four hours).

was transmitted to SAR, which sent one of its helicopters to the location. The pilot was finally extracted from the aircraft by SAR technicians at approximately 0400 the next morning and was taken to Sept-Îles to be hospitalized.

The manufacturer was contacted to determine the consequences of wake turbulence on a flight trajectory if an aircraft of this type crossed its own wake turbulence after making a 360° turn, taking into account the flight parameters reported by the pilot, which were flaps retracted and an estimated speed of approximately 95 mph. According to the experts, even in still air, it is hard to cross one's own wake turbulence. Furthermore, even if this had occurred, the bumpiness felt would have been minimal and immaterial.

The aircraft was equipped with an Appollo global positioning system (GPS), model 360, made by II Morrow Inc. The GPS had the capacity to save the last five flights in memory. The exact position of the aircraft was recorded every 15 seconds. Analysis of the data from the last flight shows that for the first 32 nm, the aircraft followed a constant course. However, the aircraft followed the Aguanish River to its destination for the last 25 nm. A more detailed analysis of the last three points recorded by the GPS indicates that the aircraft's bank was between 18° and 35° for most of the 360° turn.

## *Analysis*

A review of the records showed that the aircraft was equipped and maintained in accordance with existing regulations and that the pilot had the skills and qualifications required for the proposed flight. Nothing indicates an airframe failure or a system malfunction before or during the flight.

As the pilot progressed to the final destination, the ceiling dropped. He chose to follow the course of the Aguanish River to reach the destination because clouds were touching the tops of the mountains. At the destination, he made a 360° turn. Because the mountain was sloped at 40° and clouds obscured the top, it seems that the pilot had trouble judging the horizontal and vertical distance between himself and the mountain. It was not until the last moment, when he noticed that he had drifted toward the mountain, that he was able to realize that he had come much too close to the obstacle. The aircraft then hit the trees.

As he was approaching the mountainside, the pilot felt vibrations. These vibrations were not likely caused by wake turbulence. The pilot probably felt the vibrations from the first impact with the treetops. Although he increased engine power, he could not get out of the predicament because of the low ceiling, the proximity of the mountain, and a bank angle that he could not increase.

## *Findings As To Causes and Contributing Factors*

1. Because of the geographic and weather conditions, the pilot probably had trouble judging his horizontal and vertical distance with respect to the mountain, and the aircraft crashed.

*This report concludes the TSB's investigation into this occurrence. Consequently, the Board authorized the release of this report on 08 October 2003.*

*Visit the TSB's Web site ([www.tsb.gc.ca](http://www.tsb.gc.ca)) for information about the TSB and its products and services. There you will also find links to other safety organizations and related sites.*