

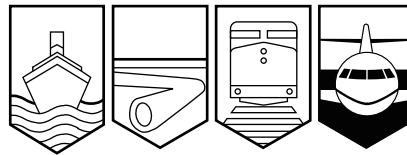
Transportation Safety Board  
of Canada



Bureau de la sécurité des transports  
du Canada

## AVIATION INVESTIGATION REPORT

A04P0057



### IN-FLIGHT COLLISION BETWEEN

CANADIAN FISHING COMPANY

CESSNA 185, C-GGBT AND

CORILAIR CHARTERS LTD CESSNA 185, C-GTNE

NANAIMO, BRITISH COLUMBIA 20 NM N (NANOOSE BAY)

12 MARCH 2004

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

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### *Summary*

Two float-equipped Cessna 185 aircraft were conducting independent herring patrols on the north-east side of Vancouver Island, British Columbia. The pilot of C-GGBT (serial number 18504026) was on a private business flight in support of his company's fishing vessels, located in the vicinity of Nanoose Bay; he was monitoring radio frequencies 126.7 MHz and 122.9 MHz. The pilot of the second Cessna 185, C-GTNE (serial number 18501889), was on a charter flight in support of Fisheries and Oceans Canada (DFO). The crew of this flight was to observe herring spawn size and location, and to conduct gear counts. This flight had originated at Comox and had proceeded southeast along the shoreline toward Nanoose Bay where the pilot was to land and pick up a second DFO officer from a boat that was regulating the fishing activity. The pilot of C-GTNE was monitoring frequency 123.2 MHz.

C-GTNE concluded the spawn count adjacent to the government wharf in Nanoose Bay, and the pilot began a left turn to land near the DFO boat. At the same time, C-GGBT was exiting Nanoose Bay, in level flight, at about 400 ft above ground level (agl). The two aircraft collided in flight at approximately 0948 Pacific standard time. The pilot of C-GTNE had not seen the other aircraft. The pilot of C-GGBT did see the opposing aircraft, but he had insufficient response time to avoid the collision. After the collision, both pilots were able to maintain control. They established radio contact between them and then inspected and assessed each other's damage. C-GGBT returned to and landed at Vancouver. C-GTNE flew back to Campbell River and landed without further incident. There were no injuries.

*Ce rapport est également disponible en français.*

## *Other Factual Information*

C-GGBT received damage to the vertical fin and rudder while C-GTNE received damage to the forward compartment of the left float.

The pilots of both aircraft were certified and qualified, and there was no indication that any physiological factors affected their ability to conduct the flights safely. There were no mechanical discrepancies found with either aircraft that would have contributed to the occurrence.

Both aircraft were operating under visual flight rules (VFR) in the vicinity of Nanoose Bay. Safe VFR flight is predicated on the see-and-avoid concept. The effectiveness of the see-and-avoid concept for collision avoidance is dependent on flight crew detecting other aircraft on collision courses in time to take evasive action. A pilot's ability to visually detect another aircraft is affected by many factors, including physiological limitations of the human visual and motor-response systems, the pilot's awareness of the presence of another aircraft, the pilot's available field of view, obstructions to that field of view, aircraft conspicuity, pilot scanning techniques, and pilot workload. In this instance, the conspicuity of both aircraft was increased in that C-GGBT was operating with strobe lights illuminated on each wing tip and on the rear stabilizer, and C-GTNE was operating with pulsed landing lights and strobes.

It is generally recognized that traffic advisories will improve a pilot's ability to visually acquire another aircraft. Firstly, the advisory provides advance warning of a potential conflict and will tend to increase the time that the crew will devote to the visual search for the traffic. Secondly, the advisory will aid the pilot in concentrating the visual search in the proper direction.

Research conducted by the Lincoln Laboratory<sup>1</sup> during traffic alert and collision avoidance system (TCAS) flight testing showed that a pilot alerted to the presence of other aircraft visually acquired the other aircraft in 57 of 66 cases; the median range of visual acquisition was 1.4 nautical miles (nm). In cases where the pilot was not alerted to the presence of the other aircraft, visual acquisition of the other aircraft was achieved in only 36 of 64 encounters; in the successful encounters, the median acquisition range dropped to 0.99 nm. These studies showed that verbal guidance as to where to look increased the acquisition probability for the pilots and found that a pilot who had been alerted to the presence of another aircraft was eight times more likely to see the aircraft than was a pilot who had not been alerted.

In Canada, certain frequencies are mandatory for VFR operation in the vicinity of aerodromes. When operating outside of these areas, the appropriateness for selection of a specific frequency is, in part, related to aircraft location, but it is also related to the pilot's intentions. In the area where this collision occurred, the following frequency selections would have been appropriate:

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<sup>1</sup> J.W. Andrews, *Modeling of Air-to-Air Visual Acquisition*. The Lincoln Laboratory Journal, Volume 2, Number 3 (1989) p 478.

For an aircraft proceeding to Qualicum aerodrome – 122.8 MHz  
For an aircraft proceeding to Nanaimo Harbour – 122.9 MHz (GGBT)  
For an aircraft proceeding to Nanaimo airport – 122.1 MHz  
For an aircraft en route to a distant location – 126.7 MHz (GGBT)  
For a seaplane intending to land in Nanoose Bay – 123.2 MHz (GTNE)

## *Analysis*

Neither pilot saw the other aircraft in time to avoid the collision. Risks associated with visual flight are well documented. These risks are known to be mitigated by radio position reporting; such reporting requires aircraft to be on a common frequency.

Although both pilots were monitoring an appropriate frequency for the area they were in and for the type of operation they were conducting, neither pilot was on the same frequency. Independent flight operations in the same area, but operating on different frequencies, increases the risks associated with visual flight.

## *Findings as to Causes and Contributing Factors*

1. Both pilots were monitoring one or more radio frequencies that they considered appropriate for their location and intentions; however, neither pilot was on the same frequency, so any calls made were not heard by the other pilot.
2. Neither pilot saw the other aircraft in time to avoid the collision and the two planes collided in flight.

*This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 22 December 2004.*