

AVIATION INVESTIGATION REPORT

A01W0304

CONTROLLED FLIGHT INTO TERRAIN

10263 AVIATION LTD. (URSUS AVIATION)

CESSNA 172N C-GGFT

FORT GOOD HOPE, NORTHWEST TERRITORIES 30 nm S

31 DECEMBER 2001

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 Cessna 172N, C-GGFT, departed Tulita, Northwest Territories, for flights to Norman Wells, Fort Good Hope, and return to Tulita. At 1317 mountain standard time on 31 December 2001, the aircraft departed Fort Good Hope on the return flight to Tulita. The aircraft, with the pilot and three passengers on board, did not arrive at Norman Wells, and, at 1500, when the aircraft became overdue on its flight itinerary, a search was initiated. An overflying C-130 Hercules aircraft detected an emergency locator transmitter signal at around midnight on the 31st, but because of weather conditions, terrain, and short daylight hours, the wreckage was not found until the afternoon of 02 January 2002. The accident site is 30 nautical miles south of Fort Good Hope at the 1100-foot level of a 1400-foot mountain, on a rock face with about a 70-degree slope. All on board were deceased, and the aircraft was substantially damaged.

Ce rapport est également disponible en français.

Other Factual Information

The pilot checked the weather and, at approximately 1000 mountain standard time (MST)¹ on 31 December 2001, departed Tulita (CZFN) in C-GGFT for flights to Norman Wells (CYVQ), Fort Good Hope (CYGH), and return to Tulita via Norman Wells. When the flight arrived at Norman Wells, the weather was below visual flight rules (VFR) conditions and the pilot requested and was approved for a special visual flight rules (SVFR) arrival. He landed at approximately 1020 and had the aircraft refuelled. The pilot entered the Flight Service Station (FSS) for a weather update, but before the briefing was complete, he left to supervise the refuelling.

Meanwhile, another Cessna 172, C-GYYX, departed Norman Wells under SVFR for Fort Good Hope. C-GYYX returned after following the winter road for about 15 nautical miles (nm); the pilot reported (PIREP) that the visibility and ceiling were decreasing to treetop level, and that the airframe and windshield had picked up a layer of ice. The pilot of C-GGFT received the PIREP from C-GYYX as he was departing Norman Wells, but decided to proceed. A passenger boarded the aircraft at Norman Wells, and C-GGFT then departed under SVFR for Fort Good Hope. C-GGFT and C-GYYX passed each other a few miles west of Norman Wells on the north side of the winter road.

The pilot encountered marginal weather conditions en route and reportedly attempted different routes through the high ground along the winter road. His passenger suggested diverting to the river route, and the aircraft finally arrived in Fort Good Hope after a flight about 30 minutes longer than planned. The delay resulted in a query from the Norman Wells FSS to the Community Air Radio Station (CARS) operator in Fort Good Hope as to whether the aircraft should be reported as overdue. On landing, the aircraft was observed to have about $\frac{3}{4}$ to 1 inch of ice on the leading edges of the wings and tail surfaces, and about one quarter $\frac{1}{4}$ inch of ice on the windshield.

There are three main routes normally flown between Norman Wells and Fort Good Hope. The direct route is along the airway, with an instrument flight rules (IFR) minimum en route altitude (MEA) of 5300 feet above sea level (asl). Both the Mackenzie River route and winter road route are to the west of the direct route (see Appendix A). These alternate routes are longer than the direct route but are preferred when weather conditions are marginal because reference to the river and road simplifies navigation. The winter road crosses higher terrain than the river valley, but it has more emergency landing areas. The river valley route traverses the lowest terrain of all. However, pilots frequently have problems in winter with low visibility, when fog fills the valley around the open water at the Sans Sault Rapids.

The graphic area clouds and weather forecast issued at 1041, and valid from 1100 to 0000 (GFACN35), called for patchy broken stratocumulus cloud based at 1500 to 2500 feet asl, topped at 6000 feet, with broken layers from 8000 to 20 000 feet. It also called for local ceilings of 500 feet above ground level (agl), with intermittent visibilities of 2 to 6 statute miles (sm) in light snow showers and local visibilities of 1 sm in mist.

¹ All times are MST (Coordinated Universal Time minus seven hours) unless otherwise noted.

The icing, turbulence, and freezing level forecast, valid from 1100, predicted local moderate mixed icing in stratus, otherwise light rime icing in cloud. A cold front situated on an east-west line north of Fort Good Hope at 1100 was moving southward at 10 nm per hour. By 1700, clouds and weather in the area were predicted to be broken stratus/stratocumulus at 1500 feet asl with tops at 2500 feet, visibility more than 6 sm, and patchy broken stratocumulus at 3000 feet asl, with tops at 9000 feet. The forecast also called for patchy ceilings at 500 feet agl, with visibility 3 sm in light snow and local visibilities of 1 sm in ice crystals and mist. The icing, turbulence, and freezing level forecast valid for 1700 was unchanged from the 1100 forecast.

The 0900 Aviation Routine Weather Report (METAR) for Norman Wells was as follows: winds calm, visibility 10 sm, overcast ceiling at 400 feet agl, temperature minus 17°C, dew point minus 21°C, altimeter 30.46 inches of mercury, remarks stratus 8/10, sea level pressure 1032.4 millibars. The 0900 METAR (corrected) for Fort Good Hope was as follows: winds calm, visibility 15 sm, light snow showers, overcast ceiling at 1100 feet, temperature minus 15°C, dewpoint minus 17°C, altimeter 30.45 inches of mercury, remarks stratus 8/10, frost on the indicator, sea level pressure 1032.4 millibars.

On arrival at Fort Good Hope, the pilot entered the CARS at the airport, but did not consult the operator for a weather update or PIREPs of weather conditions in flight. He telephoned the company base at Tulita and filed a flight itinerary with another company pilot for the return trip from Fort Good Hope over Norman Wells to Tulita, remarking that the weather en route was marginal, and that his plan was to follow the river. The pilot was aware that another pilot had departed VFR from Fort Good Hope and returned because of adverse weather conditions. He also indicated that two additional passengers would be picked up for the return flight, and discussed the possibility of aborting or delaying the flight.

The pilot then removed ice from the aircraft, assisted by the outgoing passenger and a bystander. Three passengers boarded the aircraft, and the pilot started the engine and taxied out for departure. As he was taxiing, he received a call from the pilot of a Douglas DC4 freighter on approach to Fort Good Hope, advising him of IFR conditions in Norman Wells and icing conditions en route. The pilot of C-GGFT acknowledged the information and departed Fort Good Hope at approximately 1315.

Records indicate that the aircraft was certified and equipped in accordance with existing regulations and approved procedures. There was no indication of any airframe failure or system malfunction prior to or during the flight. The aircraft was not certified for flight in known icing conditions. Both the weight and centre of gravity were within limits. Examination of the wreckage showed that the aircraft struck the surface in straight and level flight, with the aircraft remaining intact as it fell about 50 feet down the slope to where it became entangled in a clump of trees. The engine was producing power at impact, and the flaps appeared to be retracted. The global positioning system (GPS) indicator was not recovered, and the automatic direction finder (ADF) was tuned to Tulita with the indicator pointing to the rear of the aircraft. A layer of rime ice was evident on the wing struts.

The pilot was certified and qualified for the flight and had a current instrument rating. He had a total of 650 hours flying time, with about 460 hours on type. Since he started work in Tulita in June 2001, the pilot had flown approximately 370 hours, with 11 flights to Fort Good Hope. The most recent trip was on 29 December 2001. His company training records showed that he had completed the contaminated surfaces examination, which acknowledged the requirement for an aircraft to be equipped and certified for flight into icing conditions.

Autopsy results revealed that the right front seat passenger was fatally injured by the impact, and that the pilot and rear seat passengers survived the impact with non-life-threatening injuries, but succumbed to hypothermia.

The company operates on the pilot self-dispatch system. It stated that there was no urgency for the flight or pressure on the pilot to undertake any portion of the flight. The passenger from Norman Wells to Fort Good Hope was going home for a few days, and the passenger from Fort Good Hope to Tulita was an entertainer who was to perform at a New Year's Eve party that evening. These passengers could have travelled on scheduled commuter flights that afternoon. The other two passengers out of Fort Good Hope had been booked on a scheduled flight, but accepted the available seats in C-GGFT.

Analysis

The location of the accident site suggests that the pilot had flown directly south from Fort Good Hope to intercept the river valley upstream of Sans Sault Rapids, bypassing the rapids. Based on information from weather observations, the pilot's own experience and discussion, and other pilots in the area, it is probable that the pilot encountered icing conditions and reduced visibility in snow showers or cloud. Since the wreckage remained intact and three of the occupants survived the direct impact with non-life-threatening injuries, the pilot was most likely flying at low airspeed. Perhaps he was intentionally flying slow and low in an attempt to maintain or regain visual reference with the terrain. The cruise flight configuration and the straight and level aircraft attitude at impact are consistent with a controlled flight into terrain accident.

The pilot's limited flying time, experience and instrument training were adequate to understand the associated risks and implications of operating the aircraft in these adverse weather conditions. He had flown numerous times in the area and was familiar with the terrain and the main and alternative air routes between Tulita and Fort Good Hope. It could not be determined, however, if any of his previous flights to these locations had been in similar marginal weather conditions.

Under the company's self-dispatch system, the pilot was responsible for determining whether the flight could be conducted safely. As there was no urgent requirement to complete the trip, it could not be determined why many of the decisions made by the pilot were not consistent with his training or accepted practices and airmanship, such as the following:

- he departed Norman Wells with a SVFR clearance when a current PIREP described en-route weather conditions as being below VFR limits, with known icing conditions;
- he persisted in attempting passage along the higher ground of the winter road instead of returning to Norman Wells;
- he entered the CARS but did not update weather information, despite adverse conditions;
- he disregarded information and advice from experienced pilots prior to departure from Fort Good Hope; and,
- he landed at Fort Good Hope with a considerable amount of airframe icing, removed the ice, then departed back into known icing conditions.

Findings as to Causes and Contributing Factors

1. The pilot flew into known weather and icing conditions for which the aircraft was neither equipped nor certified, when there was virtually no chance of completing the flight safely and in accordance with associated regulations.
2. The pilot flew into the side of a mountain for reasons related to ice accumulation and/or reduced

visibility in snow showers or cloud.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 04 December 2002.

Appendix A - Diagram of Occurrence Area