

AMENDED REPORT

AVIATION OCCURRENCE REPORT

COLLISION WITH TREES

**NAVAIR CHARTER INC.
PIPER PA-31 (NAVAJO) C-GKNB
KAMLOOPS, BRITISH COLUMBIA 7 NM ESE
22 NOVEMBER 1995**

REPORT NUMBER A95P0268

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

The Navair Charter Piper PA-31, flight FCV705, a mail courier with a crew of two, was on a night, instrument flight rules (IFR) flight plan from Williams Lake, British Columbia, to Kamloops. While the crew was conducting an instrument procedure to the Kamloops airport, they flew into an area that was clear of cloud. The captain cancelled his IFR flight plan and descended for a visual flight rules (VFR) approach to the airport. At 1902 PST, the aircraft collided with trees at an elevation of 2,400 feet above sea level (asl), seven nautical miles (nm) east-southeast of the Kamloops airport. The captain was fatally injured on impact, and the first officer was seriously injured; the aircraft was destroyed during the crash and post-crash fire.

Ce rapport est également disponible en français.

¹ All times are PST (Coordinated Universal Time minus 8 hours) unless otherwise noted.

Other Factual Information

The flight had originated as Navair flight FCV704, which departed Vancouver at 0633 PST for a courier flight to Williams Lake. It arrived at Williams Lake at 0838; after securing the aircraft, the crew retired to their lodgings to rest until the late afternoon departure. The crew returned to the airport at 1730, and, while the first officer prepared the aircraft for departure, the captain obtained a weather briefing for the return flight.

The mail delivery vehicle arrived at the Williams Lake airport 10 minutes later than scheduled, and 210 pounds of freight was loaded onto the aircraft. The flight, now designated FCV705, departed Williams Lake at 1815 for the return trip to Kamloops, and then Vancouver. As they approached Kamloops at 11,000 feet asl, the crew made radio contact with company flight FCV719, an MU-2 aircraft which had arrived in Kamloops at 1846. Its crew reported finding a break in the cloud cover on the instrument approach localizer, about 8 nm from the airport, and they had cancelled their IFR flight plan and had flown a visual approach to the airport. The crew of FCV705 then discussed the conditions under which they too might cancel IFR. The first officer, who was flying the aircraft from the left seat, expressed concern about the prospect of a visual descent over dark terrain and briefed the captain on the full IFR procedure approach.

At 1852, the crew commenced an instrument approach procedure to the Kamloops airport. The Navajo is a category B aircraft, and the lowest minimum descent altitude (MDA) for a category B aircraft at Kamloops is 3,200 feet asl. The Kamloops airport elevation is 1,133 feet asl, which means that the lowest the aircraft could descend during an IFR approach, without the crew seeing the runway environment, would be 2,067 feet above ground level (agl).

The 0200Z Kamloops weather was reported as 800 feet agl scattered, measured ceiling of 1,900 feet agl overcast, with a light wind, and a visibility of 10 miles. This weather sequence, although more than one hour old, was the last one the crew had requested and the one they were using. At the time of the accident, the Kamloops weather was reported as 800 feet agl scattered, measured ceiling of 1,600 feet agl overcast, with a light wind, and a visibility of 10 miles. It was a dark night, and the sky condition consisted of a 1/10 opacity of stratus fractus and 9/10 opacity of stratus type clouds. Both the forecast and the reported ceiling indicated that the weather was below the minimum required to successfully complete the approach.

As the aircraft began its approach, the captain contacted Kamloops Flight Service Station (FSS) and advised the FSS specialist that he anticipated cancelling the IFR flight plan as soon as possible. The FSS specialist acknowledged the call and provided the airport advisory information, including information that a DHC-8 and a company aircraft were awaiting departure from runway 08 on IFR flight plans. To minimize conflict between arriving and departing IFR traffic, regulations require that aircraft departing on an IFR flight plan not be allowed to take off until the arriving aircraft has either landed, or has cancelled IFR. Some flight crews cancel their IFR flight plans during an approach to facilitate or expedite the departure of other IFR traffic.

During the outbound leg of the approach procedure, the crew established visual contact with lights and other ground references through a break in the cloud layer. The break in the clouds was centred on the localizer, was about 10 nm wide, and extended from the Kamloops non-directional beacon eastward for about 15 nm. The captain cancelled his IFR flight plan at 1855, took over control of the aircraft, and began a circling descent, perpendicular to the localizer, in what appears to have been a figure-eight pattern. At 1858, the crew advised the FSS specialist that they were in descent at 10 nm; 40 seconds later they reported through 5,000 feet and still in the descent.

At 1901, ATS released a DHC-8 for take-off and departure from runway 08. The published IFR departure from that runway placed the DHC-8 on an opposing track with FCV705. The crew of FCV705 was well aware of the departing DHC-8 and of the potential traffic conflict with it. At 1901:26, the FSS specialist called the Navajo for an updated position report, to which the pilot replied that they were 8nm DME out and descending through 2,500 feet. There was no further communication from the aircraft. At 1905, the Kamloops RCMP informed the FSS specialist that an aircraft accident might have occurred in the Juniper Ridge area.

Although risks are always present during night visual flight operations, the risks are even higher in mountainous regions because of the high terrain that surrounds many airports. The published night circuit procedure for the Kamloops airport recommends that only pilots familiar with the local area use the airport during darkness, that all six hazard beacons which identify the circuit area be operational, and that all turns be completed within the perimeter of the hazard beacons. The hazard beacons were operating normally at the time of the accident.

The instrument approach procedure to runway 26 at Kamloops uses a non-directional beacon and a localizer that is aligned, in part, with the valley of the South Thompson River. Although the valley floor is at an elevation of about 1,200 feet asl, the terrain on both sides of the valley rises to at least 3,000 feet. The accident occurred on high ground, outside the area that is normally used for night VFR circuits.

VFR flight relies on the availability of adequate visual cues to allow a pilot to navigate using ground references, and to maintain safe clearance between the aircraft and any local obstacles. Air Navigation Order (ANO) Series VII, No. 3, details specific minimum weather requirements for VFR flight. However, in addition to adverse weather conditions, darkness and sparsely lit terrain often combine to reduce available visual cues, thus degrading a pilot's ability to judge his position and altitude by visual means. This accident occurred in a sparsely lit mountain valley.

The crew was appropriately licensed and qualified for the flight. The captain, employed by Navair for the previous three years, was familiar with the area surrounding the Kamloops airport since he had flown the same flights two to four times per week. The first officer, employed by Navair for the previous three and a half months, was not

so familiar with the Kamloops airport, since he had flown this route about 14 times, and only once in IFR conditions at night.

The Piper PA-31 aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures. Because of the destruction of the aircraft by the impact and post-crash fire, investigators could not determine if any pre-impact failure or system malfunction contributed to this accident; however, none was identified.

The first officer was wearing a shoulder harness at the time of the accident, and he believes it saved his life. The captain was not wearing a shoulder harness, although one was available.

A Transport Canada audit, conducted on 21 November 1995 in accordance with standard Transport Canada audit procedures, reported that the company was maintaining a satisfactory standard in accordance with appropriate sections of the Air Regulations.

Analysis

The crew began a full instrument approach procedure to runway 26 at Kamloops. The reported weather at the time of the approach was below the minima required to complete an approach to category B limits. Therefore, there was a possibility that the crew might miss the approach and divert to their alternate.

During the approach, the captain established visual contact with lights and other ground references, then cancelled his IFR flight plan. His decision to cancel was likely influenced by his knowledge of the weather, and by the fact that a previous company flight had successfully carried out a visual approach to Kamloops about 15 minutes earlier. It is also possible that the captain's action was intended to help expedite the departure of other aircraft waiting to take off from Kamloops on IFR flight plans. In practical terms, however, this delay would probably have been insignificant to the departing aircraft.

After the captain cancelled his IFR flight plan, ATS released a DHC-8 for take-off on runway 08. The published instrument departure procedure for that runway placed the DHC-8 on a conflicting track with the accident aircraft. It is possible that this traffic conflict influenced the pilot to descend lower than normal in order to ensure separation with the approaching aircraft.

A VFR descent procedure does not provide the benefit of guaranteed terrain clearance and, in the absence of adequate visual references, may place the aircraft at a dangerously low altitude without the knowledge of the crew. Although the prevailing weather conditions were suitable for VFR flight, as detailed by the ANOs, the dark, overcast night, coupled with the sparsely lit, featureless terrain below, would have reduced available visual cues for the pilots to judge their actual height above the ground, or their position relative to local obstacles. As a result, the overall conditions would have impeded the ability of the pilots to continue the flight with visual reference to the ground.

Findings

1. The crew was licensed and qualified for the flight.
2. The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures.
3. A Transport Canada audit reported that the company had maintained a satisfactory standard in accordance with appropriate sections of the regulations.
4. The Kamloops airport is surrounded by mountainous terrain on all sides, and cautions have been published about use of the airport for VFR flight at night.
5. All instrument radio approach aids and all hazard beacons for the visual night circuit procedure were operating normally.
6. The weather conditions at Kamloops were suitable for VFR flight, as detailed by the ANOs; however, the overall conditions, brought on by darkness and sparsely lit terrain, would have reduced the available visual cues, and would have impeded the pilots' ability to navigate and maintain separation from the ground by visual means.
7. The captain cancelled his IFR flight plan while conducting an instrument procedure to the Kamloops airport and descended through a break in the cloud layer.
8. During the descent, the crew had insufficient visual cues to continue the flight safely with visual reference to the ground.
9. The aircraft collided with trees, in mountainous terrain, approximately seven nautical miles east-southeast of the airport and slightly south of the localizer track.

Causes and Contributing Factors

The aircraft collided with trees during a night, VFR descent over mountainous terrain because the crew had inadequate visual cues to accurately determine their height above the ground. Contributing to this accident were the captain's decision to cancel his IFR flight plan and attempt a visual approach from well outside the published VFR circuit area, the inherent risks of VFR flight in mountainous regions, and a requirement by the crew to remain clear of departing IFR traffic from the Kamloops airport.

Safety Action

Action Taken

Since the accident, Navair Charter has hired an outside agency to provide all company flight crew members with cockpit/crew resource management (CRM) training. All crews have received this CRM training, except for the recently hired pilots, who should receive it within a few months of their hiring.

At a company flight safety meeting held shortly after the accident, Navair reviewed company policy on cancelling IFR flight plans at night, and the night circuit procedures. Navair emphasized that cancelling IFR flight plans to accommodate other aircraft is not recommended.

Navair is presently developing a company Standard Operating Procedure manual which will comply with the new Canadian Aviation Regulations and will address the night IFR and night circuit procedures.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 23 October 1997.

KAMLOOPS AIRPORT AREA AND CRASH SITE

NIGHT CIRCUIT PROCEDURES

1. Recommend that only pilots familiar with the local area use this airport during hours of darkness.
2. Night operations not recommended unless all 6 hazard beacons are operating.
3. All turns to be completed within the perimeter of the hazard beacons.

