



Transportation
Safety Board
of Canada

Bureau de la sécurité
des transports
du Canada



AIR TRANSPORTATION SAFETY INVESTIGATION REPORT A24P0016

RUNWAY OVERRUN

Summit Air Ltd.
British Aerospace Avro 146 Series RJ100, C-FRJY
Prince Rupert Airport (CYPR), British Columbia
07 February 2024

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. **This report is not created for use in the context of legal, disciplinary or other proceedings.** See the Terms of use at the end of the report.

History of the flight

At 0631¹ on 07 February 2024, the British Aerospace Avro 146 Series RJ100 aircraft (registration C-FRJY, serial number E3274) operated by Summit Air Ltd. departed from Nanaimo Airport (CYCD), British Columbia (BC), on flight SUT8292 to Prince Rupert Airport (CYPR), BC. The instrument flight rules flight was the final leg of a scheduled passenger charter flight that originated at Vancouver International Airport (CYVR), BC, with a planned stop at CYCD before CYPR, its final destination. This multi-leg flight was conducted on a regular basis. For this particular leg from CYCD, there were 34 passengers and 4 crew members, including the captain and the first officer, on board.

After departure from CYCD, the aircraft climbed to a cruising altitude of flight level 300.² The flight up until the arrival at CYPR was uneventful.

¹ All times are Pacific Standard Time (Coordinated Universal Time minus 8 hours).

² Flight level 300 corresponds to 30 000 feet above sea level.

At CYPR, the occurrence aircraft conducted a straight-in approach using the area navigation global navigation satellite system Runway 31 approach via the initial approach waypoint. The aircraft touched down on Runway 31 at 0749, approximately 1600 feet from the runway threshold and at a ground speed of 112 knots.

The wing spoilers automatically deployed upon touchdown, and the flight crew members then applied the brakes; however, they did not feel any deceleration from the brakes. The flight crew had the ability to switch between 2 independent hydraulic systems for braking and subsequently switched to the 2nd hydraulic system, with no change in braking effectiveness. As the aircraft started to lose speed and neared the end of the runway with little appreciable deceleration from the application of brakes with either hydraulic system, the flight crew activated the emergency brake system in a final attempt to slow the aircraft. The flight crew also initiated the shutdown of engines No. 1 and No. 4 in an attempt to reduce thrust. As the aircraft was approaching the end of the runway, the captain tried to steer it using the nose wheel tiller. The aircraft started to slide sideways, and it subsequently contacted 2 runway end lights and slid beyond the end of the runway by approximately 30 m (Figure 1).

Figure 1. The occurrence aircraft's final position after the overrun, 30 m beyond the end of the runway (Source: Third party, with permission)



The aircraft came to a stop facing northeast. Engines No. 1 and No. 4 were completely shut down shortly after the aircraft had come to a stop, followed by engines No. 2 and No. 3 approximately 3 minutes later. The auxiliary power unit, which had been started before the landing, was still operating at this time to provide power to the on-board aircraft systems. The passengers remained on board the aircraft because it had been determined that there was no imminent danger.

One of the pilots exited the aircraft to assess the damage, visually noting scuffed tires and 2 damaged runway end lights. He also noted, while performing an aircraft walkaround, that the runway was glazed with a light coating of ice and was very slippery.

A bus was already at CYPR and had been waiting to transport the passengers from the airport to the city of Prince Rupert via the ferry service. This bus was escorted to the aircraft, where the passengers deplaned and luggage was unloaded so that both could be transported to the final destination. There were no reported injuries to anyone on board.

The aircraft eventually taxied to the main airport apron under its own power.

Flight crew information

The captain, who was the pilot not flying, had accumulated approximately 9719 hours total flight time, including 2131 hours on the British Aerospace Avro 146 Series RJ100.

The first officer, who was the pilot flying, had accumulated approximately 1947 hours total flight time and approximately 500 hours on type.

Both flight crew members held the appropriate licences for the flight in accordance with existing regulations and had valid medical certificates.

There was no indication that the flight crew's performance was degraded by fatigue.

Aircraft information

There were no recorded defects outstanding at the time of the occurrence, nor was there any indication that a component or system malfunction had played a role in this occurrence. The weight and centre of gravity were within the prescribed limits.

The aircraft was equipped with both a cockpit voice recorder (CVR) and a flight data recorder. The data from both recorders were downloaded. The flight data recorder data was reviewed and none of the parameters recorded indicated any anomalies, either mechanically or operationally. Given that the CVR remained powered after the occurrence, the CVR recording from the occurrence flight was overwritten.

Because the aircraft was manufactured in 1995, it was equipped with a CVR that had a recording capability of 30 minutes, which met the standard in place at that time. As of 29 May 2023, regulations for CVRs³ require a recording capability of at least the last 2 hours of operation.⁴ However, to allow time for operators to reach compliance with the new CVR requirements, Transport Canada had, by way of an exemption,⁵ authorized certain operators, including Summit Air Ltd, to operate with a CVR with a 30-minute recording capability.

³ Transport Canada, SOR/96-433, *Canadian Aviation Regulations*, sections 605.34 and 605.34.3.

⁴ Ibid., Standard 625, Subsection 625.34(2).

⁵ Transport Canada, Exemption no. NCR-014-2023: Exemption from sections 605.34 and 605.34.3 of the *Canadian Aviation Regulations* (issued 21 June 2023).

Airport information

CYPR is located on Digby Island. The island is accessible via a ferry service and water taxis, which operate from Prince Rupert. CYPR has 1 asphalt runway, Runway 13/31, which measures 6000 feet long by 150 feet wide. Airport staff are on site during normal operating hours, which are from 0845 to 1600 daily. Flight crews of aircraft that arrive outside of these hours can request services such as runway surface condition reporting. When these services are requested, there is an associated call-out charge.

Meteorological information

Weather conditions at CYPR are reported in the form of an automatic aerodrome routine meteorological report (METAR AUTO). The data for the METAR AUTO are gathered by an automated weather observation system.

The 0700 METAR AUTO, the most current report issued before landing, stated the following:

- Winds from 040° true at 3 knots
- Visibility of 9 statute miles (SM)
- Overcast ceiling at 3500 feet above ground level
- Temperature –1 °C, dew point –1 °C
- Altimeter setting of 29.88 inches of mercury

Aerodrome forecasts provide a description of the most likely weather conditions for aviation operations within a radius of 5 nautical miles of an aerodrome. The aerodrome forecast for CYPR, issued on 07 February at 0440 and valid from 0500 to 1700, a period that encompasses the arrival time of the occurrence flight, indicated light winds, a scattered and temporarily broken layer of cloud at 100 feet above ground level, and visibilities ranging from greater than 6 SM down to a 40% chance of ¼ SM in freezing fog.

Both the Clouds and Weather Chart (from the graphic area forecast) and the local graphic forecast indicated no forecasted icing for the occurrence flight's time of arrival.

Although it had not been forecasted in any of the aerodrome forecasts for CYPR, the METAR AUTO indicated that there was a 29-minute period of reported freezing precipitation in the form of light freezing rain at CYPR on the evening of 06 February, approximately 11 hours before the occurrence. This period of freezing precipitation occurred when airport staff were not on site.

Runway surface conditions

The last runway surface condition (RSC) assessment at CYPR before the occurrence was carried out during normal operating hours the previous day (06 February) and published at 1317 that afternoon.

RSC information is provided by thirds of a runway's length. The RSC report indicated that all 3 thirds of the surface of Runway 13/31 were 100% wet.

The occurrence aircraft landed the next morning, outside of normal airport operating hours, when the runway surface conditions had not yet been assessed. Summit Air Ltd. had not arranged for an RSC report before the aircraft's arrival.

Following the occurrence, an RSC assessment was conducted, and a report was issued at 0855, approximately 1 hour after the occurrence. The report indicated that the Canadian Runway Friction Index⁶ measurements for all 3 thirds of Runway 31 at a temperature of -1°C were 0.19, 0.23, and 0.21. These small numbers represent low braking coefficients of friction. In contrast, numbers from approximately 0.8 and above indicate the braking coefficients associated with dry runways.

TSB Watchlist

Runway overruns have been on the TSB Watchlist since 2010. From 01 January 2005 to 30 June 2022, there were on average 9.3 runway overrun occurrences per year at Canadian aerodromes. Of these occurrences, 6.7 occurred during landing. Although the number of runway overruns varies from year to year, there is no statistically significant trend.⁷

TSB laboratory reports

The TSB completed the following laboratory reports in support of this investigation:

- LP032/2024 – CVR Download and Analysis
- LP033/2024 – Runway End Excursion Analysis

Safety action taken

In March 2024, Summit Air Ltd. issued 3 amendments to its *Summit Air Standard Operating Procedures Avro-RJ* and 1 amendment to its *Summit Air Flight Dispatch Manual*. Two of these amendments pertain specifically to the coordination that is necessary between the pilot-in-command and dispatch when runway conditions are a concern, notably when runway reports⁸ are unavailable.

⁶ To measure the Canadian Runway Friction Index coefficient, according to the *Transport Canada Aeronautical Information Manual*, “[a] decelerometer is [...] mounted in a test vehicle [to measure] [...] the decelerating forces acting on the vehicle when the brakes are applied. The instrument is graduated in increments from 0 to 1, the highest number being equivalent to the theoretical maximum decelerating capability of the vehicle on a dry surface. These numbers are referred to as the CRFI [Canadian Runway Friction Index].” (Source: Transport Canada, TP 14371E, *Transport Canada Aeronautical Information Manual* [TC AIM], AIR—Airmanship [21 March 2024] Section 1.6.3, p. 389.)

⁷ TSB Watchlist 2022, Runway overruns, at <https://www.tsb.gc.ca/eng/surveillance-watchlist/aviation/2022/air-02.html> (last accessed on 18 September 2024).

⁸ According to Summit Air Ltd., the following are examples of an acceptable runway report: runway surface condition report, Canadian Runway Friction Index, Takeoff and Landing Performance Assessment, a report “passed through a radio, FSS [flight service station], or [t]ower operator from the airport maintainer,” another aircraft braking report, or historical weather (in the event that a runway report is available but expired). (Source: Summit Air Ltd., RJ SOP Bulletin No. 2401 [22 March 2024].)

According to 3 of the amendments, when the ambient temperature is colder than 5 °C, an aircraft can be dispatched, but it cannot initiate the approach and landing unless the flight crew has a runway report.^{9,10,11} These 3 amendments also explain that if the report is expired, the flight crew must check the historical weather for precipitation, high winds that could create large snow drifts, and temperatures falling from above to below 0 °C, which could allow ice or frost to form on the runway surface.^{12,13,14}

Safety messages

Runway conditions can change rapidly, and the most recent RSC report may not be an accurate representation of the current condition of the runway, especially outside of normal airport operating hours.

It is important for operators to take advantage of all options available to them to obtain current and/or relevant RSC reports, especially when aircraft operations take place outside of normal airport operating hours.

This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 25 September 2024. It was officially released on 07 October 2024.

Visit the Transportation Safety Board of Canada's website (www.tsb.gc.ca) for information about the TSB and its products and services. You will also find the Watchlist, which identifies the key safety issues that need to be addressed to make Canada's transportation system even safer. In each case, the TSB has found that actions taken to date are inadequate, and that industry and regulators need to take additional concrete measures to eliminate the risks.

⁹ Summit Air Ltd., RJ SOP Bulletin No. 2401 (22 March 2024).

¹⁰ Summit Air Ltd., RJ SOP Bulletin No. 2402 (22 March 2024).

¹¹ Summit Air Ltd., FDM Bulletin No. 2401 (19 March 2024).

¹² Summit Air Ltd., RJ SOP Bulletin No. 2401 (22 March 2024).

¹³ Summit Air Ltd., RJ SOP Bulletin No. 2402 (22 March 2024).

¹⁴ Summit Air Ltd., FDM Bulletin No. 2401 (19 March 2024).

ABOUT THIS INVESTIGATION REPORT

This report is the result of an investigation into a class 4 occurrence. For more information, see the Policy on Occurrence Classification at www.tsb.gc.ca

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Citation

Transportation Safety Board of Canada, *Air Transportation Safety Investigation Report A24P0016* (released 07 October 2024).

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Air transportation safety investigation report A24P0016

Cat. No. TU3-10/24-0016E-PDF

ISBN: 978-0-660-73694-5

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