

**NATIONAL TRANSPORTATION SAFETY BOARD
Office of Research and Engineering
Vehicle Recorder Division
Washington, D.C. 20594**



SPECIALIST'S FACTUAL REPORT OF INVESTIGATION

ANC20LA015

**By
Michael Portman**

WARNING

The reader of this report is cautioned that the summary of a cockpit voice recorder audio recording is not a precise science but is the best product possible from a Safety Board group investigative effort. The summary or parts thereof, if taken out of context, could be misleading. The summary should be viewed as an accident investigation tool to be used in conjunction with other evidence gathered during the investigation. Conclusions or interpretations should not be made using the summary as the sole source of information.

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March 22, 2022

Cockpit Voice Recorder

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1. EVENT SUMMARY

Location: Dutch Harbor, Alaska
Date: January 16, 2020
Aircraft: Beechcraft 200, Registration N547LM
Operator: Aero Air, LLC
NTSB Number: ANC20LA015

On January 16, 2020, about 0806 Alaska standard time, a Beechcraft 200 airplane, Lifeguard N547LM, sustained substantial damage when it impacted the waters of the Bering Sea while departing from the Thomas Madsen Airport (PADU), Unalaska, Alaska (Port of Dutch Harbor). The airplane was being operated by Aero Air, as a Title 14 *Code of Federal Regulations (CFR)* Part 135 instrument flight rules (IFR) air ambulance flight when the accident occurred. Visual meteorological conditions prevailed at the departure airport, and company flight following procedures were in effect. The flight departed Thomas Madsen Airport (PADU), Unalaska, Alaska (Port of Dutch Harbor), about 0756 destined for Adak, Alaska. A solid-state cockpit voice recorder (CVR) was sent to the National Transportation Safety Board (NTSB) Vehicle Recorder Division for evaluation.

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division received the following CVR:

Recorder Manufacturer/Model: **Fairchild A-100S**
Recorder Serial Number: **02324**

3.1 CVR Carriage Requirements

Per federal regulation, multiengine aircraft with more than six passenger seats and requiring two pilots manufactured prior to April 7, 2010, and operated under 14 CFR 135, must be equipped with a CVR that records a minimum of the last 30 minutes of aircraft operation; this is accomplished by recording over the oldest audio data. The accident aircraft was manufactured in 1998. When the CVR is deactivated or removed from the airplane, it retains only the most recent 30 minutes of CVR operation.

3.2 Recorder Description

This model CVR, the Fairchild A-100S, records a minimum of 30 minutes of digital audio stored on solid state memory modules. Four channels are recorded: one channel for each flight crew, one channel for a cockpit observer, and one channel for the cockpit area microphone (CAM).

3.3 Recorder Damage

The recorder arrived at the Vehicle Recorder laboratory partially submerged in water. The outer case, which appeared undamaged, was removed, and opening the interior crash-protected case revealed minor water intrusion around the memory chips, as seen in figure 1. This corresponded to minor corrosion noted around some memory chip connections. The corrosion was cleaned using laboratory methods, and the digital audio was successfully downloaded from the crash-survivable memory unit (CSMU).



Figure 1. CSMU interior showing minor water intrusion.

3.4 Audio Recording Description

Each channel's audio quality is indicated in table 1.¹ Channel number four did not contain any audio information (nor was it required by federal regulations).

¹ See attached CVR Quality Rating Scale.

Table 1. Audio Quality.

Channel Number	Content/Source	Quality	Duration (MM:SS)
1	Flight Crew Audio Panel	Excellent	30:38
2	Flight Crew Audio Panel	Excellent	30:38
3	CAM	Good	30:38
4	N/A	N/A	N/A

3.5 Timing and Correlation

The timing on this summary is in recorder elapsed time. No flight data recorder was installed nor were any air traffic control records available to establish a correlation to Alaska standard time.

3.6 Description of Audio Events

In agreement with the Investigator-In-Charge, a CVR group did not convene. A summary of events from the CVR follows.

The first approximately 20 minutes of the CVR recording captured the flight inbound to Dutch Harbor. The approach and landing occurred uneventfully.

The incident flight began at 00:19:49.

At 00:20:06, sounds consistent with engine startup were heard.

At 00:23:38, the Dutch Harbor Automated Weather Observation System (AWOS) report was heard: 1654 Zulu, winds from 100 degrees at 15 knots with gusts to 22 knots, visibility 6 statute miles with light rain and mist; ceiling of 1,400 feet overcast; temperature four degrees Celsius, dewpoint 2 degrees Celsius; altimeter 29.48 inches of mercury.

At 00:24:22, the pilot and onboard crew member discussed which Anchorage area airport they were destined for.

At 00:26:24, the pilot mentioned closing doors, turning on lights, and confirming those onboard were ready to go.

At 00:26:59, the pilot contacted Anchorage Center and received their clearance; cleared to the Adak airport as filed, climb and maintain flight level 260, squawk 4176. The pilot acknowledged and reported departure would be within the next five minutes.

At 00:28:18, the pilot made a radio call to Dutch traffic, taking the active runway 31 for a southwest departure.

At 00:29:38, a power increase was heard, consistent with the beginning of the takeoff roll.

At 00:30:31, an approximately 1,000 Hz tone was heard, consistent with a stall warning, which sounded nearly continuously throughout the rest of the recording.

The recording ended shortly thereafter at 00:30:38.

Attachment I

CVR Quality Rating Scale

The levels of recording quality are characterized by the following traits of the cockpit voice recorder information:

Excellent Quality	Virtually all of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate only one or two words that were not intelligible. Any loss in the transcript is usually attributed to simultaneous cockpit/radio transmissions that obscure each other.
Good Quality	Most of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate several words or phrases that were not intelligible. Any loss in the transcript can be attributed to minor technical deficiencies or momentary dropouts in the recording system or to a large number of simultaneous cockpit/radio transmissions that obscure each other.
Fair Quality	The majority of the crew conversations were intelligible. The transcript that was developed may indicate passages where conversations were unintelligible or fragmented. This type of recording is usually caused by cockpit noise that obscures portions of the voice signals or by a minor electrical or mechanical failure of the CVR system that distorts or obscures the audio information.
Poor Quality	Extraordinary means had to be used to make some of the crew conversations intelligible. The transcript that was developed may indicate fragmented phrases and conversations and may indicate extensive passages where conversations were missing or unintelligible. This type of recording is usually caused by a combination of a high cockpit noise level with a low voice signal (poor signal-to-noise ratio) or by a mechanical or electrical failure of the CVR system that severely distorts or obscures the audio information.
Unusable	Crew conversations may be discerned, but neither ordinary nor extraordinary means made it possible to develop a meaningful transcript of the conversations. This type of recording is usually caused by an almost total mechanical or electrical failure of the CVR system.