

National Transportation Safety Board

Office of Research and Engineering

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ERA21LA350

COCKPIT VOICE RECORDER

Specialist's Factual Report

July 27, 2023

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 National Transportation 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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A. ACCIDENT

Location: Naples, Florida
Date: September 3, 2021
Time: 1244 eastern daylight time
Airplane: Beechcraft Premier, N351CW

B. COCKPIT VOICE RECORDER SPECIALIST

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C. FEDERAL CARRIAGE REQUIREMENTS

The event aircraft, N351CW, was operating as Title 14 *Code of Federal Regulations* (CFR) Part 135. The event aircraft was manufactured in 2002 and was operating such that it was required to be equipped with a cockpit voice recorder (CVR) that records a minimum of the last 30 minutes of aircraft operation.

D. DETAILS OF THE INVESTIGATION

A CVR group was not convened. The NTSB Vehicle Recorder Division received the following CVR:

Recorder Manufacturer/Model: L3 Communications FA2100
Part Number: FA2100-1010
Recorder Serial Number: 000147270

1.0 Recorder Description

This model CVR, the FA2100-1010, 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).

1.1 Recorder Damage

Upon arrival at the laboratory, it was evident that the CVR had not sustained any heat or structural damage and the audio information was extracted from the recorder normally, without difficulty.

1.2 Audio Recording Description

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

Table 1: Audio Quality

Channel Number	Content/Source	Quality	Duration
1	Blank	N/A	30 minutes
2	Right Seat Audio Panel	Excellent	30 minutes
3	Left Seat Audio Panel	Excellent	30 minutes
4	Cockpit Area Microphone	Excellent	30 minutes

1.3 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 recording began with the aircraft in a descent from cruise altitude. The pilot had a passenger in the cockpit area with him and discussed some of the features of the aircraft and its systems. Systems discussed included avionics, FMS, automation, and landing systems.

About three and a half minutes prior to the end of the recording, shortly after putting the landing gear down, the pilot said that there was a flap fail message and it was only their second trip out of maintenance. The pilot then explained that the braking would be "a lot more aggressive" because they would be at a "faster approach speed that what we normally would be".

About 40 seconds prior to the end of the recording the CAM recorded a sound similar to the aircraft touching down on the runway. Shortly after touching down, a mechanical toggling noise similar to the activation of the anti-skid system was intermittently audible in the recording. Eight seconds later the pilot stated, "those new brakes are pretty wile". The mechanical toggling noise grew more frequent for the next 40 seconds until there were sounds consistent with the aircraft departing the runway. The recording ended one second later.

Submitted by:

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Mechanical Engineer/Recorder Specialist

¹ Appendix A comprises the CVR Quality Rating Scale.

APPENDIX A. 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.