National Transportation Safety Board

Office of Research and Engineering

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COCKPIT VOICE RECORDER

Specialist's Factual Report

July 18, 2024

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.

TABLE OF CONTENTS

A. ACCIDENT

Location: Boston, Massachusetts
Date: February 8, 2024
Time: 06:40 eastern standard time (EST)
Airplane 1: Airbus A321-231, JetBlue Airways, N956JT
Airplane 2: Airbus A321-271NX, JetBlue Airways, N2157J

B. COCKPIT VOICE RECORDER SPECIALIST

Specialist: Kyle Garner
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National Transportation Safety Board (NTSB)

C. FEDERAL CARRIAGE REQUIREMENTS

The airplanes involved in the accident were both operating under the provisions of Title 14 *Code of Federal Regulations* (CFR) Part 121. Both airplanes were required to be equipped with a cockpit voice recorder (CVR) that records a minimum of the last 2 hours of operation.

D. DETAILS OF THE INVESTIGATION

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

Airplane 1 – N956JT
Recorder Manufacturer/Model: Honeywell HFR5-V
Part Number: 980-6032-023
Recorder Serial Number: CVR-08472

Airplane 2 – N2157J
Recorder Manufacturer/Model: L3Harris SRVIVR25 CVDR
Part Number: 7100-0200-00
Recorder Serial Number: 002095008

1.0 Recorder Descriptions

The Honeywell HFR5-V records a minimum of 120 minutes of digital audio and the L3Harris SRVIVR25 CVDR records a minimum of 25 hours of digital audio. On each CVR, four channels of audio 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 Condition

The CVRs arrived undamaged, and the audio information was extracted from the recorders without difficulty.

1.2 Audio Recording Description

The quality of each channel of audio recovered from the CVRs installed on Airplane 1 and Airplane 2 is indicated in Table 1 and Table 2, respectively.[1]

Table 1. Audio quality – CVR from Airplane 1 – Honeywell HFR5-V.

Channel Number	Content/Source	Quality	Duration
1	Captain	Good	02:10:31
2	First Officer	Good	02:10:31
3	PA or Observer	Good	02:10:31
4	CAM	Good	03:07:17

Table 2. Audio quality – CVR from Airplane 2 – L3Harris SRVIVR25 CVDR.

Channel Number	Content/Source	Quality	Duration
1	Captain	Excellent	52:24:06
2	First Officer	Excellent	52:24:06
3	PA or Observer	Excellent	52:24:06
4	CAM	Excellent	52:24:06

1.3 Timing and Correlation

Timing of the summary was established by correlating CVR events to common events on the flight data downloaded from Airplane 2's CVDR. Specifically, radio transmissions that Airplane 2 made were correlated to the radio transmit microphone key parameter from the CVDR. Each of the radio transmissions acted as an anchor point for a linear interpolation between the remaining CVR events. Once a correlation was established, a reference to local time, EST, was determined for both recordings.

1.4 Description of Audio Events

A summary of events from each airplane's CVR is provided in Appendix B, Table 3. Only items relevant to the accident are included in the summary. Throughout the recordings, both flight crews verbalized "clear left" and "clear right" before any airplane movement.

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[1] See Appendix A for 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.

APPENDIX B. CVR SUMMARY

Table 3. CVR summary.[2]

Time (EST)	Airplane 1 - N956JT	Airplane 2 - N2157J
04:57:06.0		*[start of accident flight recording for all channels]*
05:01:16.6	*[start of accident flight recording for CAM channel]*	
05:17:00.4	The flight crew radioed company operations and indicated they would need to be de-iced before departure.	
05:19:51.0		The flight crew radioed company operations and indicated they would need to be de-iced before departure.
05:23:08.6	The first officer remarked that this was the first time he had to de-ice in "probably two years."	
05:37:11.6	The flight crew performed a departure briefing.	
05:56:40.9	The flight crew radioed the clearance delivery controller and indicated they were ready to push from the gate for the de-icing pad.	
05:57:12.1		The flight crew performed a departure briefing.
05:58:02.7	*[start of HOT channels]*	
05:59:00.6		The flight crew radioed the clearance delivery controller and indicated they were ready to push from the gate for the de-icing pad.
06:02:07.7	The flight crew started both engines.	
06:02:10.9		The flight crew started both engines.
06:04:44.2	The flight crew performed an after-start checklist.	

[2] Items bracketed in the table are editorial insertions.

Time (EST)	Airplane 1 - N956JT	Airplane 2 - N2157J
06:04:53.2	The flight crew radioed a ground controller to request a taxi clearance. The ground controller cleared the airplane to taxi to the de-icing pad.	
06:05:55.1		The flight crew performed an after-start checklist.
06:07:12.7		The flight crew radioed a ground controller to request a taxi clearance.
06:08:35.5		The ground controller cleared the airplane to taxi to the de-icing pad.
06:14:54.9		The flight crew radioed the de-ice contractor and indicated they were in the queue for de-icing.
06:15:49.0	The flight crew radioed the de-ice contractor and indicated they were in the queue for de-icing.	
06:20:06.0	The de-ice contractor instructed the airplane to taxi into the de-icing pad to holding point OD4.	
06:20:38.4	The ground controller cleared the airplane to taxi to the de-icing pad.	
06:22:36.9	The flight crew radioed the de-ice contractor and indicated they were at holding point OD4. The de-ice contractor instructed the airplane to taxi to the D2 parking spot for de-icing.	
06:24:21.8	The de-ice contractor gave the airplane a five-second countdown and then a stop command at the D2 parking spot. The contractor then told the flight crew to set the parking brake and contact the iceman[3].	
06:24:35.7	The flight crew radioed the iceman. The iceman asked the flight crew to inform him when they were properly	

[3] *Iceman* is a typical radio call sign for the personnel performing the de-icing process for an airplane.

Time (EST)	Airplane 1 - N956JT	Airplane 2 - N2157J
	configured for de-icing. The flight crew then performed a de-icing checklist.	
06:26:33.6	The flight crew reported they were properly configured for de-icing and de-icing began.	
06:30:48.8		The de-ice contractor instructed the airplane to taxi into the de-icing pad.
06:31:14.3		The ground controller cleared the airplane to taxi to the de-icing pad.
06:33:13.3		The de-ice contractor instructed the airplane to taxi into the de-icing pad to holding point OD4.
06:33:36.2	The iceman reported that de-icing process was complete. The iceman instructed the flight crew to contact a ground controller for a taxi clearance to their departure runway.	
06:34:09.5		The de-ice contractor gave the airplane a three-second countdown and then a stop command at holding point OD4.
06:36:23.0	The flight crew radioed a ground controller and reported they were ready to taxi for departure.	
06:36:31.5	The ground controller cleared the airplane to taxi to runway 9. The flight crew performed final checks in preparation to taxi.	
06:36:48.6		The de-ice contractor instructed the airplane to follow the follow-me truck to the D1 parking spot for de-icing.
06:36:57.3		The first officer verbalized “clear right”.
06:37:00.2		The captain stated, “Jesus. I think I'm clear left. I’m supposed to be. I’m on the line so-”
06:37:28.0	***[sound similar to impact was noted on both recordings]***	

Time (EST)	Airplane 1 - N956JT	Airplane 2 - N2157J
06:37:28.6	The flight crew remarked that there had been an impact.	
06:37:30.2		The flight crew remarked that there had been an impact.
06:39:02.7		The iceman radioed the flight crew and noted that there was impact damage on their left winglet. The flight crew acknowledged and stated they would maintain their position.
06:41:47.3		The captain remarked, “I don't know what else I could be doing. I'm on a line. I'm following a follow-me truck.”
06:46:46.8	The first officer noted, "if we are where we are supposed to be how could he have hit us?"	
06:47:09.9	The captain noted that the de-ice contractor had given them a five-second countdown and stop command at the D2 parking spot.	
06:47:47.8		The captain noted, “is it not like fair to assume that these lines are measured out properly for spacing? that everything looks tight in here and that the lines you know- if everybody is where they're supposed to be that we shouldn't have had a problem?”
06:50:11.7		The flight crew radioed company maintenance to assess the damage. Company maintenance stated they would be able to taxi back to a gate to offload passengers.
06:52:08.7	The captain noted that they were not at the proper stopping point location in the D2 parking spot. The flight crew commented that following the countdown and stop command from the de-ice contractor, they assumed they were stopped in the correct location.	
06:56:41.1	The flight crew noted that they could see that Airplane 2's nose landing gear was on the yellow centerline.	

Time (EST)	Airplane 1 - N956JT	Airplane 2 - N2157J
07:06:46.8	The captain opened the side window and looked outside toward the stopping point location in the D2 parking spot. He noted that the de-ice contractor had stopped them too early, and they were not in the proper stopping point location.	
07:06:59.4		The airplane arrived at a gate and started to offload passengers.
07:16:59.6		*[end of accident flight recording]*
07:17:36.7	Operations personnel who responded to the accident radioed the flight crew and noted that the preliminary assessment was that the airplane was stopped about 35 feet short of the stopping point location for parking spot D2.	
07:21:26.3	The flight crew radioed company maintenance to assess the damage. Company maintenance stated they would be able to taxi back to a gate to offload passengers.	
07:51:00.6	The airplane arrived at a gate and started to offload passengers.	
07:57:12.8	*[end of accident flight recording]*	