

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ERA22LA150

COCKPIT VOICE RECORDER

Specialist's Factual Report

October 12, 2022

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. If taken out of context, the summary or parts thereof 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.....	3
B. COCKPIT VOICE RECORDER SPECIALIST	3
C. FEDERAL CARRIAGE REQUIREMENTS.....	3
D. DETAILS OF THE INVESTIGATION	3
1.0 RECORDER DESCRIPTION.....	3
1.1 Recorder Damage	4
1.2 Audio Recording Description.....	4
1.3 Timing and Correlation	5
1.4 Description of Audio Events.....	5
APPENDIX A. CVR QUALITY RATING SCALE.....	6
APPENDIX B. CVR SUMMARY	7

A. ACCIDENT

Location: Pittsburgh, Pennsylvania
Date: March 9, 2022
Time: 08:27 eastern standard time (EST)
Airplane: HondaJet HA-420, Jet It LLC, N903JT

B. COCKPIT VOICE RECORDER SPECIALIST

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C. FEDERAL CARRIAGE REQUIREMENTS

The accident aircraft, N903JT, was manufactured in 2021 and was operating as an air taxi flight under the provisions of Title 14 *Code of Federal Regulations* (CFR) Part 135. The aircraft was configured and operated such that it was required to be equipped with a cockpit voice recorder (CVR) that records a minimum of the last 2 hours of aircraft operation.

D. DETAILS OF THE INVESTIGATION

A CVR group was not convened. The NTSB Vehicle Recorder Division received the following combination cockpit voice and flight data recorder (CVFDR):

Recorder Manufacturer/Model: Universal Avionics CVFDR
Part Number: 1605-01-00
Recorder Serial Number: 2233

A CVFDR is a combined CVR and flight data recorder (FDR). For the remainder of this report, the CVFDR's cockpit voice functionality will be referred to as a CVR. For details about the FDR functionality of the CVFDR, refer to the *Flight Data Recorder - Specialist's Factual Report*, which is available in the public docket for this accident.

1.0 Recorder Description

The Universal Avionics CVR records a minimum of 120 minutes of digital audio stored on solid-state memory modules. Four channels are recorded: one channel for each required flight crew, one for a third crew member, and one 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.

A photograph of the CVR, as received by the lab, is shown in Figure 1.



Figure 1. CVR, as received.

1.2 Audio Recording Description

Each channel's audio quality is indicated in Table 1.¹

Table 1: Audio quality.

Channel Number	Content/Source	Quality	Duration
1	Pilot	Excellent	02:02:45
2	Co-pilot	Excellent	02:02:45
3	Spare ²	N/A	N/A
4	CAM	Good	02:02:45

¹ See the CVR Quality Rating Scale in Appendix A.

² In this recording, channel 3, which is typically used to record passenger announcements or audio from a third crew member, did not contain any audio data.

1.3 Timing and Correlation

Timing on the transcript was established by correlating the CVR events to common events on the flight data recorder (FDR). Specifically, the last five radio transmissions that the aircraft made were correlated to the radio transmit microphone key parameter from the FDR. Each of the five radio transmissions acted as an anchor point for linear interpolation between the remaining CVR events.

Once a correlation between the two recorders was established, a reference to local time was determined. The relationship between local time and CVR elapsed time is shown below:

$$\text{CVR Local time (EST)} = \text{CVR elapsed time} + 06:36:50 \text{ (hh:mm:ss)}$$

1.4 Description of Audio Events

In agreement with the Investigator-In-Charge, a CVR group did not convene. A summary of events from the CVR is provided in Appendix B, Table 2.

Submitted by:

Kyle Garner
Aerospace Engineer – Recorder Specialist

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

The first approximately 16 minutes of the recording contained audio from the flight before the accident flight, from Palm Beach International Airport (PBI) to Teterboro Airport (TEB), which was uneventful. The summary, in Table 2, begins with the airplane on the ground at TEB as the flight crew prepared for the accident flight leg, TEB to AGC.

On the accident flight leg, the pilot in the left seat was the pilot flying (PF) and the check pilot in the right seat was the pilot monitoring (PM).

Table 2. CVR summary.³

Time, EST	Observation
07:03:33	The flight crew donned their headsets and performed a takeoff briefing.
07:07:00	The flight crew received an instrument flight rules (IFR) clearance.
07:07:46	The flight crew performed a before-taxi checklist.
07:08:18	The flight crew radioed a TEB tower controller and reported they were ready to taxi. The controller cleared them to taxi to runway 6.
07:09:59	The flight crew performed a taxi checklist.
07:11:10	The flight crew performed a before-takeoff checklist.
07:18:15	The TEB tower controller cleared the airplane for takeoff on runway 6.
07:19:14	Sounds consistent with an increase in engine thrust were noted.

³ In the table, the use of [] denotes an editorial insertion.

Time, EST	Observation
07:19:35	The PM called, "rotate."
07:19:43	The PM called, "positive rate." The PF replied, "gear up." Sounds consistent with the retraction of the landing gear were noted thereafter.
07:20:31	The flight crew checked in with a New York departure controller. The departure controller cleared the airplane to climb to 4,000 feet.
07:21:23	The flight crew performed an after-takeoff checklist.
07:22:18	The departure controller cleared the airplane to climb to 10,000 feet.
07:22:50	The departure controller cleared the airplane to climb to 17,000 feet.
07:24:18	The flight crew stated they had received a Crew Alerting System (CAS) L ENG BLEED FAIL message. The flight crew then performed the L ENG BLEED FAIL checklist, which included turning off the left engine bleed. The checklist did not require an immediate landing; however, the checklist did include a provision to descend to flight level (FL) 250 or below. The flight crew discussed their fuel requirements if they continued the flight at a maximum altitude of FL 250. During this discussion, the crew noted that the airplane appeared to be operating normally and they performed the L ENG BLEED FAIL checklist in reverse to turn the left engine bleed back on.

Time, EST	Observation
07:26:23	The flight crew checked in with a New York center controller and reported they were at 15,000 feet and climbing to 17,000 feet. About two minutes later, the center controller cleared the airplane to FL 280. About one minute later, the center controller cleared the airplane to FL 400.
07:33:10	The flight crew discussed landing distance calculations for AGC: PM, "well that's always good. freezing rain ended at 11:54." PM, "what do you think...do uh- icing landing?" PF, "yup." PM, "call that wet." PM, "all right. 5,429 [feet] required. 6,501 [feet] available. speed's gonna be 118 [knots] and 123 [knots]."^{4,5}
07:35:17	The flight crew checked in with a second New York center controller and reported they were at FL223 and climbing to FL400.
07:41:34	The PF stated that the reported visibility at AGC was now four statute miles with light rain.

⁴ The published length of runway 10/28 at AGC is 6,501 feet.

⁵ The PM did not verbalize what specific V-speeds he was referring to with the calculated values.

Time, EST	Observation
07:42:33	The flight crew continued the discussion about landing distance calculations for AGC: PF, "what's the landing distance in APG there? with wet?"⁶ PM, "uh- 6,496 [feet], sixty percent."⁷ PF, "all right." PM, "wet. takeoff approach. icing. anti-icing on." PF, "so try- I just want to see something. try uh- you know on APG, try eighty percent. so what does it give you?"⁷ PM, "4,872 [feet]." PF, "you see the thing- yeah that's what I- fifty-five--" PM, "the winds are completely different though too." PF, "so fifty-five matches if you add the extra fifteen percent." PM, "yeah. yeah APG's not doing it. clearly." PF, "no." PM, "so yeah, adding to-- the APG number is accurate." PM, "see without these winds accurate--let's put it [unintelligible]. three sixty at five." PM, "yeah it's still-- there are some airplanes that you can actually input full data." PF, "the contamination." PM, "yeah."

⁶ APG = Aircraft Performance Group, a third-party provider of flight planning software.

⁷ Sixty percent and eighty percent likely refers to the landing factor required for on-demand operators as outlined in Title 14 CFR Part 135.385.

Time, EST	Observation
07:47:05	The flight crew performed an approach briefing.
07:50:23	The center controller cleared the airplane to descend to FL220.
07:50:23	The flight crew noted that their diversion airport would be Pittsburgh International Airport (PIT) if they could not land at AGC.
07:51:24	The flight crew performed a descent checklist, which included turning on engine anti-ice.
08:00:18	The flight crew checked in with a Cleveland center controller and reported they were at FL243 and descending to FL220.
08:00:57	The 0750 EST ATIS for AGC was audible and included the following information: • Wind variable at 4 knots • Visibility 1 statute mile • Light snow, mist • Ceiling overcast at 2,300 feet • Temperature 0°C, dew point -1°C • Altimeter 29.89 inHg • Instrument landing system (ILS) runway 28 approach in use • Braking action was reported 'good' at 0755 EST • Braking action advisory was in effect • Snow removal operations in progress • All aprons and taxiways, 1/8" slush • Runway 28, 10 percent, 1/8" slush While the ATIS was playing, the flight crew also discussed Youngstown-Warren Regional Airport (YNG) as a diversion airport.

Time, EST	Observation
08:03:27	The PM stated, "pressure's increasing rapidly. 5,419 [feet] is required, 6,501 [feet] available. speed of 118 [knots] and 123 [knots] still."
08:05:10	The center controller cleared the airplane to descend to 9,000 feet.
08:05:14	The flight crew radioed the fixed-based operator at AGC and reported they would be arriving in about 25 minutes.
08:07:01	The center controller reported light to moderate icing conditions through the descent, from FL190 to 10,000 feet.
08:07:47	The flight crew discussed the amount of fuel required for a diversion, if necessary.
08:09:00	The flight crew performed an approach checklist, which included setting the flaps to TO/APP.
08:11:11	The flight crew stated they received another CAS L ENG BLEED FAIL message. The flight crew then performed the L ENG BLEED FAIL checklist.
08:12:06	The flight crew reported to the center controller that they had picked up light icing when descending through 14,000 feet.
08:12:46	The flight crew checked in with Johnstown approach and reported they were at 10,000 feet descending to 9,000 feet. The approach controller then cleared the airplane to descend to 6,000 feet.
08:19:53	The approach controller cleared the airplane to descend to 5,000 feet.

Time, EST	Observation
08:21:02	The flight crew checked in with Pittsburgh approach and reported they were level at 5,000 feet. The approach controller reported that information Foxtrot was current and cleared the airplane to descend to 4,000 feet and direct GUGTE for the ILS approach to runway 28 at AGC.
08:21:36	The 0810 EST special observation Foxtrot ATIS for AGC was audible and included the following information: • Wind variable at 4 knots • Visibility 3/4 statute mile • Light snow/mist • Ceiling overcast at 400 feet • Temperature 0°C, dew point -1°C • Altimeter 29.89 inHg • ILS runway 28 approach in use • Braking action was reported 'good' at 0755 EST • Braking action advisory was in effect • Snow removal operations in progress • All aprons and taxiways, 1/8" slush • Runway 28, 10 percent, 1/8" slush
08:21:47	The PM remarked that there was 1/8" slush "everywhere. on the taxiways mostly but probably the runway."
08:23:13	The approach controller cleared the airplane for the ILS approach to runway 28, which included a descent to 3,000 feet.

Time, EST	Observation
08:23:48	The flight crew noted that they had captured the localizer. The flight crew checked in with AGC tower. The tower controller reported that they currently had a snowplow on the runway, but it would be clear of the runway shortly. The tower also reported that the last arrival, which was 40 minutes prior, reported braking action "good".
08:24:32	The flight crew remarked that they had set the flaps to TO/APPR.
08:24:42	The flight crew noted that they had captured the glide slope.
08:25:00	The flight crew noted that they had extended the landing gear.
08:25:11	The flight crew performed a before-landing checklist. While completing the checklist, the PM noted, "i'll probably give you maybe twenty- what is it twenty eight on top? i'll give you like twenty six. nothing to really worry about concerning that. i'd fly green dot as your ref anyway so...looks like our calcs [calculations] are a bit off...which is fine."
08:25:23	The AGC tower cleared the airplane to land on runway 28 and reported the wind was calm.
08:26:36	The PM noted he could see the approach lights.
08:26:41	An electronic voice stated, "five hundred." The PM remarked, "stable still."

Time, EST	Observation
08:27:04	The autopilot disconnect tone was audible.
08:27:05	An electronic voice stated, "minimums. minimums."
08:27:13	The PM reported the runway in sight. The PF stated, "landing."
08:27:33	Sounds consistent with the airplane touching down on the runway were noted. The PM stated, "speedbrakes. just stay on those brakes."
08:27:38	An electronic voice stated, "three thousand." ⁸
08:27:39	The PM remarked, "you on em [brakes]? hard." The PF replied, "yeah."
08:27:44	An electronic voice stated, "two thousand."
08:27:45	The PM stated, "brake hard."
08:27:50	The PM stated, "eighty knots."
08:27:52	An electronic voice stated, "one thousand."

⁸ Runway distance remaining annunciation.

Time, EST	Observation
08:27:53	The PF asked, "could you get on the brake?" The PM remarked, "uh oh."
08:27:57	Sounds similar to straining or grunting were noted.
08:28:07	The PM remarked, "off the end."
08:28:15	The PM remarked, "we're off the end." The tower controller replied, "roger we're callin'."
08:28:16 to 08:39:34	Sounds consistent with the pilot, copilot, and passenger evacuating the aircraft were noted.
08:39:35	The recording ended.