

# National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



DCA23LA096

## COCKPIT VOICE RECORDER

Specialist's Factual Report

January 9, 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 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: Kahului, Hawaii  
Date: December 18, 2022  
Time: 1007 Hawaii standard time (HST)  
2007 coordinated universal time (UTC)  
Airplane: Airbus A330-243, Hawaiian Airlines, Flight HA35, N393HA

## **B. COCKPIT VOICE RECORDER SPECIALIST**

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## **C. FEDERAL CARRIAGE REQUIREMENTS**

Per federal regulation, turbine engine powered aircraft operating under Title 14 *Code of Federal Regulations* (CFR) Part 121 must be equipped with a cockpit voice recorder (CVR) that records a minimum of the last 2 hours of aircraft operation; this is accomplished by recording over the oldest audio data. When the CVR is deactivated or removed from the airplane, it retains only the most recent at least 2 hours of CVR operation.

## **D. DETAILS OF THE INVESTIGATION**

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

Recorder Manufacturer/Model: Honeywell HFR5-V  
Part Number: 980-6032-020  
Recorder Serial Number: CVR-01852

### **1.0 Recorder Description**

This model CVR, the Honeywell HFR5-V, records a minimum of 120 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.<sup>1</sup>

**Table 1:** Audio Quality.

Channel Number	Content/Source	Quality	Duration (hh:mm:ss)
1	Captain	Excellent	02:10:51
2	First Officer	Excellent	02:10:51
3	Observer/PA	Excellent	02:10:51
4	CAM	Good	03:12:06

## 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 ten radio transmissions that the aircraft made were correlated to the radio transmit microphone key parameter from the FDR. Each of the ten radio transmissions acted as an anchor point for a linear interpolation between the remaining CVR events. Once a correlation between the two recorders was established, a reference to local time was determined. The CVR and FDR times were offset to reflect the local Hawaii standard time (HST) of the accident. Therefore, for the rest of this report, times are listed in HST.

## 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 follows in table 2. The recording began at 07:51:44 with the aircraft in cruise. The turbulence encounter occurred at 10:07:43. The aircraft landed at 10:46:26, and the recording ended at 11:03:50.

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<sup>1</sup> Appendix A comprises the CVR Quality Rating Scale.

**Table 2:** CVR Summary.

<b>Time HST (hh:mm:ss)</b>	<b>Observation</b>
07:51:43.8	The recording began with the flight in cruise.
09:13:06.2	A clicking sound was noted, then an automated seatbelt sign announcement was heard.
09:41:49.1	The crew checked in with a Center controller at Flight Level 400.
09:43:32.6	The crew conducted a standard arrival briefing.
09:55:56.9	A nearby aircraft, SWA1256 on the Echo track, was advised by ATC that it was best to go around some weather ahead with moderate turbulence reported. Another nearby aircraft, HA45, reported continuous moderate chop.
09:58:22.4	A flight attendant gave a passenger announcement that there was 45 minutes until landing, and advised passengers to use the bathroom now, if needed.
10:00:43.0	ATC reported to the flight that there was moderate to extreme precipitation and turbulence, as well as light to moderate chop for the next 40 miles.
10:01:13.8	ATC reported to a nearby aircraft, HAL11, that cloud tops were at Flight Level 410, with light chop and moderate turbulence.
10:07:07.3	A crew member noted that "it's moving fast," but that they expected to "clear most of it."
10:07:22.5	The flight crew called the cabin to inform them to expect a somewhat "bumpy" ride shortly.
10:07:31.0	A crew member noted that "it's building fast."

<b>Time HST (hh:mm:ss)</b>	<b>Observation</b>
10:07:43.2	The turbulence encounter occurred. Sounds of rattling were noted, while the crew reacted verbally. The cavalry charge, dual input, and several EICAS chimes were noted. The crew confirmed who had control of the aircraft, confirmed "thrust lock," and re-engaged the autopilot.
10:07:43.2	An altitude alert was noted, lasting approximately 1.5 seconds.
10:07:58.6	An altitude alert was noted, lasting approximately 15 seconds. <sup>2</sup>
10:08:12.4	The flight attendants made an announcement for passengers to return to their seats and fasten their seatbelts.
10:08:14.4	An EICAS chime was noted.
10:08:28.1	An altitude alert was noted, lasting approximately 16 seconds. <sup>2</sup>
10:08:45.8	A cavalry charge was noted.
10:08:50.3	An EICAS chime was noted.
10:08:54.4	The crew conversed with flight attendants, who requested medical attention on the ground.
10:08:56.1	An EICAS chime was noted.
10:09:00.5	An EICAS chime was noted.
10:09:05.7	An EICAS chime was noted.
10:09:11.1	An EICAS chime was noted.

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<sup>2</sup> As noted in the Airbus A330 Flight Crew Operations Manual (FCOM), the Flight Warning Computer (FWC) generates a continuous C-chord altitude warning when the aircraft deviates more than 200 feet from its selected altitude or flight level. The warning is cancelled by returning to within 200 feet of the selected altitude, selecting a new altitude, or by pushing either the ECAM control panel's EMER CANC pushbutton or either MASTER WARN pushbutton.

<b>Time HST (hh:mm:ss)</b>	<b>Observation</b>
10:09:13.0	The crew ran an undetermined checklist.
10:10:05.8	The crew discussed the incident, including that they should have "gone around it." The crew additionally conversed further with a flight attendant, who confirmed injuries and the need for medical attention.
10:10:13.9	The crew further conversed with a flight attendant, who reiterated the need for medical attention, adding that the cabin "doesn't look good."
10:10:40.8	The crew further discussed the event, including that they thought they would clear the formation but that it "came up real fast," questioning, "did it just pop up?"
10:10:57.3	The crew received and read back standard arrival navigation instructions from ATC.
10:11:21.2	The crew conversed with a flight attendant about the state of the cabin, passengers, and injuries.
10:13:42.9	A pilot made an announcement briefing the passengers on the turbulence encounter.
10:14:35.4	The crew contacted dispatch and briefed them on the turbulence encounter, including that they "hit 40 degrees of bank," that passengers were injured, and requested medical assistance, with an estimated arrival time of 2045 UTC.
10:15:12.1	The crew called Center informing them they had started their descent.
10:17:04.3	The crew performed the descent checks.
10:18:14.4	The crew informed ATC they encountered severe turbulence about 15 miles back at Flight Level 400, confirmed they had at least one injury and requested expedited handling into Honolulu. Center declared an emergency for them.

<b>Time HST (hh:mm:ss)</b>	<b>Observation</b>
10:19:07.8	The crew conversed with a flight attendant, who detailed injuries to several passengers and crew as well as ceiling damage and oxygen masks falling out in the back half of the cabin. The flight attendant mentioned the front half of the cabin looked better. The pilot and flight attendant agreed the onboard medical personnel should be seated.
10:20:17.2	The crew contacted Approach at Flight Level 322 descending to 10,000 feet.
10:20:52.2	The crew contacted dispatch, informing them of three confirmed injuries and that they were "coming in as fast as they can." Dispatch confirmed that emergency medical personnel were alerted and ready.
10:23:35.2	The crew again checked in with Approach out of Flight Level 250 for 10,000 feet, this time informing ATC they were an emergency aircraft.
10:24:16.5	The captain made an announcement to passengers that they'd be landing in Honolulu shortly, to be met by emergency personnel, and that he would keep the seatbelt sign on to let emergency personnel get to those injured.
10:24:44.8	The crew discussed with ATC the number and nature of injuries.
10:25:43.7	The crew discussed what else they could have done. This conversation was largely unintelligible due to an overlapping unrelated radio transmission.
10:26:34.5	The crew discussed that the formation didn't show up as red on the radar and caught them completely off guard.
10:28:29.8	The pilots received a call from the cabin informing them of minor structural damage, some dropped masks, that they had to take some ceiling panels down, and it was reiterated that there were approximately ten injuries.
10:30:39.9	The crew called dispatch again for medical attention.



<b>Time HST (hh:mm:ss)</b>	<b>Observation</b>
10:31:11.4	The crew checked in with the next Approach controller at 11,700 feet descending to 10,000 feet and were told to expect the ILS-Y runway 4R approach.
10:31:47.0	The crew conducted the in-range checklist.
10:33:55.3	The crew discussed the attitude response of the aircraft, including that "we went at least 40 degrees," "maybe more," and, "I saw a lot of brown," and that the aircraft "kicked off everything." At the same time, the flight was cleared down to 8,000 feet.
10:35:25.3	The crew discussed having just practiced a similar upset event in the simulator.
10:35:30.9	The flight was instructed to turn left heading 220.
10:36:52.4	The flight was cleared down to 6,000 feet.
10:37:49.6	The crew selected flaps 1.
10:39:14.8	The flight was cleared down to 1,500 feet. Another discussion ensued about what could have been done differently, that the plume came out of nowhere, and that nothing was on the screens.
10:40:31.2	The flight was instructed to turn right heading 260.
10:41:14.6	The flight was instructed to turn right heading 310, and a 2500-foot EGPWS callout was noted.
10:42:04.5	The crew selected flaps 2.
10:42:14.9	The flight was instructed to turn right heading 010 and to maintain 1,500 feet until established on the ILS. The flight was cleared for the ILS-Y 4R approach, and, if able, instructed to maintain 170 knots or greater until 6 DME.
10:43:11.0	The flight was handed to Honolulu Tower.

<b>Time HST (hh:mm:ss)</b>	<b>Observation</b>
10:43:21.2	The flight checked in with Tower.
10:43:30.2	The flight was cleared to land on runway 4R.
10:43:37.9	The crew selected gear down and flaps 3.
10:44:04.7	The crew selected flaps full.
10:44:15.3	The crew ran the before landing checklist.
10:45:05.5	A 1000-foot EGPWS callout was noted, and the crew confirmed 1000 feet, stable.
10:45:34.3	The crew turned on the windshield wipers.
10:45:40.7	The crew made a 500-foot stable callout.
10:45:42.8	A 500-foot EGPWS callout was noted.
10:45:50.5	An unintelligible crew comment was noted.
10:45:53.3	A hundred above EGPWS callout was noted.
10:45:55.1	A cavalry charge was noted.
10:46:01.5	A minimums EGPWS callout was noted, and the crew confirmed they were landing.
10:46:17.7	A 70-foot EGPWS callout was noted.
10:46:18.9	A 60-foot EGPWS callout was noted.
10:46:19.8	A 50-foot EGPWS callout was noted.

<b>Time HST (hh:mm:ss)</b>	<b>Observation</b>
10:46:20.8	A 40-foot EGPWS callout was noted.
10:46:21.6	A 30-foot EGPWS callout was noted.
10:46:22.5	A 20-foot EGPWS callout was noted.
10:46:23.1	A retard EGPWS callout was noted.
10:46:24.1	A 7-foot EGPWS callout was noted.
10:46:26.3	Sounds consistent with touchdown were noted.
10:46:29.1	The crew confirmed spoilers were up.
10:46:33.2	The crew confirmed reversers were green as an increase in ambient noise consistent with thrust reverser deployment was noted.
10:46:44.7	An unintelligible brakes comment was noted.
10:46:46.3	Tower issued runway vacaton instructions and instructed the flight to contact Ground.
10:46:58.9	The flight attendants made an announcement for the passengers to remain seated at the gate to allow medical personnel onboard.
10:47:42.8	The crew contacted Ground and were issued taxi instructions to the gate.
10:48:03.6	The crew conducted the after-landing checklist.
10:48:44.3	The crew discussed the event, including that it reminded a crew member of a "volcanic explosion," that the upset was "the most unusual attitude I've seen," and that it was a "good thing seatbelt sign was on."
10:50:07.4	A pilot commented that they were scared to open the door to look back into the cabin.

<b>Time HST (hh:mm:ss)</b>	<b>Observation</b>
10:51:32.6	The ramp controller advised the aircraft to hold short to wait for a company aircraft to move out of the way before parking.
10:51:49.8	A flight attendant made an announcement to the passengers to remain seated at the gate to allow medical personnel onboard.
10:52:34.0	The ramp controller instructed the crew to give way to an outbound aircraft, then proceed into the ramp.
10:52:48.6	The ramp controller confirmed medical personnel were at the gate.
10:53:18.0	The flight attendants reminded the passengers to stay seated.
10:54:16.7	A crew member stated they could see the wing walkers and the marshaller.
10:54:41.5	The crew observed that there was a cart in the way of the aircraft.
10:54:56.5	The crew contacted the ramp to have them move the cart.
10:55:57.0	The captain commented that the crew might have to make a statement, and that they should have a quick chat to make sure they "all interpret things the same way." A discussion ensued including that they saw no red on the radar, it was smooth, it looked like they would clear above it, when they got super close, they saw the cloud building, and by that point it was too late.
10:57:29.7	The crew continued their discussion, noting that the clouds looked flat with a little lump, no red on their screens, when the clouds suddenly came up, and that by the time they saw it and told the flight attendants, it was too late to maneuver. They also commented that they didn't think it would be that bad.
10:57:58.1	Increased engine noise consistent with continuing taxi.
10:58:17.2	The captain commented that the only thing he could have done was to make a blanket PA, but that it was too late. Another crew member commented that he did call the flight attendant.

<b>Time HST (hh:mm:ss)</b>	<b>Observation</b>
10:58:57.0	The captain advised the passengers to remain seated.
10:59:16.1	A largely unintelligible comment was noted about having "a lot of error messages."
11:00:03.3	The crew ran the parking checklist.
11:00:19.9	The crew confirmed there was structural damage in the cabin.
11:00:58.8	The crew described the clouds, noting that they were "kinda flat," but that "once we got close, it built super fast."
11:01:21.6	The crew noted that the aircraft "dumped everything," including the autopilot and autothrottle. A crew member noted that it looked like a mode reversion or unusual attitude mode, but that all electrical systems stayed on.
11:02:39.3	The crew discussed injuries, estimating about a dozen people with gashes, noting that they were trying to stop bleeding, but didn't have enough equipment, using blankets instead.
11:03:07.6	The crew discussed having lost the autopilot, entering into unusual attitudes, and noted that the pilots "ended up dual inputting," clarifying that it was "instinct."
1103:50.0	The recording ended.

Submitted by:

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## 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.