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

GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

DCA22MA009

By
Sean Payne

WARNING

The reader of this report is cautioned that the transcript 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 transcript or parts thereof, if taken out of context, could be misleading. The transcript 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 transcript as the sole source of information.

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division

February 21, 2023

Cockpit Voice Recorder

Group Chairman's Factual Report
By Sean Payne

1. EVENT SUMMARY

Location:	Brookshire, TX
Date:	October 19, 2021
Aircraft:	McDonnell Douglass DC-9-87, N987AK
Operator:	987 Investments, LLC.
NTSB Number:	DCA22MA009

2. GROUP

A group was convened on November 16, 2021, at the NTSB's Vehicle Recorder Division laboratory in Washington, D.C. The group consisted of the following individuals:

Chairman:	Sean Payne Sr. Mechanical Engineer National Transportation Safety Board
Member:	Dusan Vukotic FAA Aviation Safety Inspector (ASI) - Operations (OPS) - Aircraft Evaluation Group (AEG) Federal Aviation Administration (FAA)
Member:	Michael L. Belisle Flight Operations Pratt & Whitney
Member:	Capt. H.K. "Chip" Sieglinger Chief Technical Pilot MD Airplanes Boeing
Member:	Paul Quirion Director of Operations Everts Air Cargo

3. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division received the following CVR:

Recorder Manufacturer/Model: **Honeywell 6022**
Recorder Serial Number: **Unknown**

3.1 CVR Carriage Requirements

Per federal regulation, turbine engine powered aircraft that require two pilots and are operating under 14 *CFR* Part 91, must be equipped with a CVR. For aircraft with an initial certificate of airworthiness issued prior to April 6, 2021, the minimum CVR record length is 30 minutes.

3.2 Recorder Description

This model CVR, the Honeywell 6022, records a minimum of 30 minutes of analog audio on a continuous loop tape in a four-channel format: 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 had experience thermal damage but did not show obvious signs of deformation damage. The recorder's internal crash survivable memory unit (CSMU) appeared undamaged and was still affixed to the recorder's chassis. Figure 1 shows the condition of the recorder upon arrival to the NTSB laboratory.

Figure 1. The arrival condition of the FDR (rear) and the CVR (front) from N560AR.

Figure 2 shows the internal condition of the CSMU when removed from the chassis and opened. The CSMU had signs of external heat exposure but the internal components appeared undamaged.

Figure 2. The condition of the CSMU.

3.4 Audio Recording Description

The data downloaded normally from the CVR and produced files consistent with the logic of a 30-minute CVR. The primary channel that detected the flight crew's voices was the cockpit area mic (CAM) channel and was characterized as "Poor." The recording did not indicate that the flight crew was using an intercom system and as such the crew channels were largely un-used. Attachment 1 to this report, which follows the CVR transcript and summary, describes the NTSB's CVR rating scale.

For the 30-minute portion of the recording, each channel's audio quality is indicated in Table 1.

Table 1. Audio Quality for 30 minute portion.

Channel Number	Content/Source	Quality	Duration
1	Cockpit Observer (un-used)	Unknown	31m14s
2	First Officer (un-used)	Unknown	31m14s
3	Captain	Fair	31m14s
4	Cockpit Area Microphone (CAM)	Poor	31m14s

3.5 Timing and Correlation

A time correlation with the flight data recorder (FDR) was not possible. In the absence of FDR timing information, air traffic control tapes were used to create a time correlation. Specially, the transmission from the accident flight crew when they read back their takeoff clearance was used to create a time correlation.

All other times are referenced in CDT.

3.6 Description of Audio Events

In agreement with the Investigator-In-Charge, a CVR group was convened. A full transcript of the 30-minute recording was produced. The transcript generated as a result of the group activity continues below.

3.7 Surviving Flight Crew Review

In accordance with the NTSB CVR Handbook, surviving flight crew members are offered the opportunity to review the accident recording at the NTSB headquarters in Washington, D.C. The director of operations at Everts was notified of this opportunity on December 3, 2021. No response related to this correspondence was received from the director of operations, or the flight crew.

Transcript of a Honeywell 6022 solid-state cockpit voice recorder, installed on a McDonnel Douglas MD-87 (N987AK), which crashed in Brookshire, Texas on October 19, 2021.

LEGEND

ACM	Voice identified as Aircraft Manager
CAM	Sound/Voice Detected from Cockpit Area Microphone
GND	Ground Controller
MX	Mechanic
O	Voice identified as the owner of the aircraft
PAX	Passenger's Voice
RDO	Transmission over VHF radio
TWR	Tower Controller
-1	Voice identified as the captain
-2	Voice identified as the first officer
-?	Voice unidentified
*****	Unintelligible word
#	Expletive
@	Non-pertinent word
( )	Questionable insertion
[ ]	Editorial insertion

Note 1: Times are expressed in Eastern Daylight Time.
Note 2: Generally, only radio transmissions to and from the incident aircraft were transcribed.
Note 3: Words shown with excess vowels, letters, or drawn out syllables are a phonetic representation of the words as spoken.
Note 4: A non-pertinent word, where noted, refers to a word not directly related to the operation, control or condition of the aircraft

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
0928:50.3	**START OF RECORDING**		
	START OF TRANSCRIPT		
09:28:52.2			
CAM-?	twenty-eight and I got two hundred for now.		
09:29:01.8			
CAM-?	* * *.		
09:29:04.2			
CAM-2	alright uhh speed bug's set. assume temp selector.		
09:29:07.9			
CAM-1	ahhh fifty.		
09:29:09.0			
CAM-2	flap takeoff selector?		
09:29:10.3			
CAM-1	stowed.		
09:29:10.9			
CAM-2	stabilizer trim computer?		
09:29:12.1			
CAM-1	eleven's (fine).		
09:29:14.8			
CAM-2	we have uhhh--		
09:29:17.2			
CAM-1	'kay.		
09:29:17.8			
CAM-1	so we got twenty two percent flaps eleven.		

09:29:20.2
CAM-2 uhh twenty two point eight?

09:29:21.6
CAM-1 ya

09:29:23.7
CAM-1 here we go.

09:29:25.3
CAM-1 there we go.

09:29:26.9
CAM [stabilizer trim motion aural tone.]

09:29:28.7
CAM [stabilizer trim motion aural tone.]

09:29:29.4
CAM-2 aaand stabilizer.

09:29:30.7
CAM [stabilizer trim motion aural tone.]

09:29:31.9
CAM-1 looks like four units (there/in/isss).

09:29:32.7
CAM [stabilizer trim motion aural tone.]

09:29:34.6
CAM [stabilizer trim motion aural tone.]

09:29:34.8
CAM-1 set.

09:29:37.0
CAM-1 hola.

09:29:37.9
CAM-ACM hola. [sounds as if a passenger.]

09:29:38.8
CAM-2 crew brief.

09:29:39.7
CAM-1 okay uhhh it's gunna be my leg. uhh normal uh Everts procedures.

09:29:45.2
CAM-1 anything below eighty we'll abort. throttles idle max brakes spoilers and reversers.

09:29:48.5
CAM-1 I think we got auto spoilers--

09:29:49.3
CAM-2 we do have uhhh autobrakes auto spoilers for this one.

09:29:51.0
CAM-1 okay.

09:29:51.9
CAM-1 alright. uhh after eighty knots only for fire- failure- airplane wont fly- or red light warnings- after that- uhhh- after vee one only if the airplane won't fly.

09:30:00.9
CAM [A conversation is detected in the background that involved the aircraft manager. The details of the conversation could not be determined.]

09:30:02.5
CAM-1 and uhhh this'll be uhh vector.

09:30:06.3
CAM-2 and this STRYA8 sayyys- gunna fly a heading of one seven five- and vector is- one seventy five- six hundred and eighty feet for radar vectors to KNTKY.

09:30:23.8
CAM-1 I assume we're goin' off the south runway?

09:30:26.8
CAM-1 uhh?

09:30:27.6
CAM-2 uhhh they said three-sixxx?

09:30:29.4
CAM-1 they just landed. that guy just landed there.

09:30:32.8
CAM-1 okay well it's three six.

09:30:41.9
CAM-1 three six will be three five five.

09:30:48.2
CAM-2 three five five and six eighty is radar vectors to KNTKY- - alright so now- * * let's see-

09:30:57.2
CAM-PAX morning.

09:30:58.2
CAM-1 good morning.

09:31:00.7
CAM-PAX how are you this morning? [passenger to other individual, not pilots.]

09:31:04.0
CAM-1 hold on gotta get the position in here.

09:31:06.4
CAM-2 yeah its already in there.

09:31:07.4
CAM-1 okay-- [cut off by background voice.]

09:31:08.5
CAM-2 * arrival depart. uhh INIT. [“INIT” – Initialize Position button on FMS.]

09:31:15.0
CAM-2 uhhh where is the--

09:31:16.9
CAM-1 PERF-INIT [Performance initialization.]

09:31:19.9
CAM-2 yeah where? * *-- there it is.

09:31:23.9
CAM [background conversation of passenger's boarding regarding the baseball game. The captain's voice was detected playing to the conversation briefly.]

09:31:29.4
CAM-1 execute.

09:31:34.7
CAM-1 * * and we're going to DPATY.

09:31:39.8
CAM-2 ahhh DDDPATY.

09:31:44.5
CAM-2 and DPATY.

09:31:45.7
CAM-1 there ya go.

09:31:47.5
CAM-2 aaand * * *.

09:31:50.4
CAM-2 uhhh

09:31:53.9
CAM [Background conversation by boarding passengers regarding ground transportation at destination. Flight crew voices were heard interacting at times.]

09:32:27.0
CAM [Boarding passengers interacted with the captain regarding how to access tickets for the baseball game at the destination electronically. In the background, the first officer was detected inserting portions of the flight's route into the FMS. The first office was heard stating "J42."]

09:33:01.8
CAM-2 aaand then- arrival.

09:33:06.5
CAM-2 arrival.

09:33:08.7
CAM-2 the uhh GRAYM6 *.

09:33:12.8
CAM-1 * GRAYM6 * and usually - looks like two three will be the runway

09:33:15.6
CAM-1 winds outta the west. that's the long one right?

09:33:19.5
CAM-2 sooo weather is do you have that.

09:33:24.3
CAM-2 uhh winds two eighty at twelve.

09:33:26.6
CAM-1 yeah but look at the length of the runway I think two nine runway's real short- well maybe not.

09:33:31.9
CAM-2 seven thousand * (we don't know what we're gunna)--

09:33:32.2
CAM-1 okay. two nine two nine's the one we want dude.

09:33:34.2
CAM-2 I-L-S two nine.

09:33:35.3
CAM-1 there ya go.

09:33:36.3
CAM-2 you happy with that?

09:33:37.1
CAM-1 yeah I like it.

09:33:37.7
CAM-1 let's take a look at the legs here. i'll read em to you and you cna verify.

09:33:42.6
CAM-2 oookay.

09:33:45.1
CAM-2 uhh CLAVN.

09:33:47.3
CAM-1 'kay hang on - first one i got KNTKY

09:33:49.8
CAM-1 then PEETY.

09:33:51.5
CAM-2 okay.

09:33:51.9
CAM-1 then DARTR. you don't have any of those?

09:33:53.2
CAM-2 okay there's STRYA. DPATY uhhh-

09:33:55.7
CAM-1 then I got MUSIQ.

09:33:58.5
CAM-2 let's look at that SID again.uhh it says uhhh- let me go to the right airport.

09:34:10.9
CAM-2 there’s two pages for it,

09:34:12.3
CAM-1 let's get vectors to KNTKY.

09:34:24.9
CAM-2 KNTKY. PEETY.

09:34:32.4
CAM-2 okay yup yeah see they-they just have CLAVN on here

09:34:35.8
CAM-1 yeah.

09:34:36.3
CAM-2 which you have on there. but umm- let's see you have KNTKY PEETY DARTR-

09:34:44.0
CAM-2 go to the first page.

09:34:44.7
CAM-1 DARTR. yeah.

09:34:45.4
CAM-2 uhh DARTR then uhhh MUSIQ.

09:34:47.5
CAM-1 got MUSIQ - then CLAVN.

09:34:49.7
CAM-1 okay. CLAVN.

09:34:50.8
CAM-2 and then STRYA.

09:34:52.1
CAM-1 and make sure that's ont he flight plan.

09:34:53.7
CAM-1 STRYA- STRYA [Spoken in a tone to emphasize pronunciation.]

09:34:55.0
CAM-2 and then uhh DPATY.

09:34:56.3
CAM-1 DPATY. M-H-Z--

09:34:58.4
CAM-2 I-G-B?

09:34:58.9
CAM-1 yup.

09:34:59.7
CAM-1 uh (we have) G-Q-O

09:35:01.4
CAM-2 yup.

09:35:02.0
CAM-? yup.

09:35:02.7
CAM-1 P-S-K

09:35:02.9
CAM-2 yup

09:35:03.0
CAM-1 E-M-I

09:35:06.2
CAM-2 yup.

09:35:06.9
CAM-1 Robbinsville's R-B-V

09:35:08.1
CAM-2 yup.

09:35:09.6
CAM-1 aaand LAURN.

09:35:10.9
CAM-2 yup.

09:35:11.4
CAM-1 LLUND.

09:35:12.1
CAM-2 yup.

09:35:12.6
CAM-1 SANTT.

09:35:13.3
CAM-2 yup.

09:35:13.5
CAM-1 PACER.

09:35:14.6
CAM-2 yup.

09:35:14.8
CAM-1 Hartford.

09:35:15.5
CAM-2 yup.

09:35:16.2
CAM-1 and then uhhh GRAYMs.

09:35:20.1
CAM-2 uhhh they dont have that on here they just have Bedford but-- that's gunna be the arrival.

09:35:24.5
CAM-1 roger.

09:35:25.8
CAM-1 cool man.

09:35:27.1
CAM-2 wanna go ahead and activate that?

09:35:28.2
CAM-1 yeah go ahead.

09:35:30.2
CAM-2 activate.

09:35:32.0
CAM-2 PERF INIT [Performance Initialization].

09:35:33.8
CAM-2 oh boy let's see. zero fuel weight.

09:35:36.7
CAM-1 put in uhh thirteen-point zero slant alpha.

09:35:42.4
CAM-ACM hi there. [conversation between aircraft manager and passengers.]

09:35:45.8
CAM-1 go ahead.

09:35:46.1
CAM-2 slant alpha to the fuel (schedule).

09:35:48.8
CAM-1 yup.

09:35:54.4
CAM-1 okay gross weight-- thirty three - thirty three point eight for the Z weight.

09:36:03.7
CAM-1 that's not the Z weight.

09:36:05.7
CAM-2 uhh there it is.

09:36:07.9
CAM-2 okay.

09:36:08.3
CAM-1 okay. and the reserves will be whatever the reserves *.

09:36:11.7
CAM-2 says four point five--

09:36:12.8
CAM-1 four point two.

09:36:15.8
CAM-1 I'd use forty-five for the cost index.

09:36:19.9
CAM-2 (maybe/probably) you better explain what the hell that is.

09:36:22.0
CAM-1 it's just- it tells the computer how fast you want to go basically. it's -- it's uh algorithm between fuel burn and speed.

09:36:33.9
CAM [sound of two deep clicks.]

09:36:36.0
CAM-2 so let's put your cruise altitude in there.

09:36:38.4
CAM-1 uhh don't worry about it.

09:36:40.5
CAM-2 okay.

09:36:41.3
CAM-1 and then just put the cruise winds in there.

09:36:45.8
CAM-2 let's see- and then we're gunna have to go back in here to find that out.

09:37:01.1
CAM-2 two ninety at fifty-three.

09:37:24.2
CAM-1 I just watched somebody else taking off going north. so.

09:37:28.0
CAM-1 yeah that's the way it's gunna be huh?

09:37:29.3
CAM-2 uh huh.

09:37:32.8
CAM-2 uh the wind's three fifty at six.

09:37:34.0
CAM-ACM uh we're all ready.

09:37:35.6
CAM-1 okay. well we can go whenever you want we got a clearance.

09:37:38.3
CAM-ACM uh we need fuel?

09:37:39.2
CAM-2 nope. we got fuel.

09:37:40.4
CAM [sound of clacking switch.]

09:37:41.6
CAM-2 alright so uhhh.

09:37:47.1
CAM-2 [mumbling, possibly turned away from CAM.]

09:37:55.9
CAM [sound similar to swtich activation.]

09:38:11.4
CAM-2 got air?

09:38:18.2
CAM-2 alright I think we've got everything in there.

09:38:28.9
CAM-1 I like it.

09:38:36.9
CAM-2 you happy with that?

09:38:37.2
CAM [sound of click.]

09:38:38.2
CAM-1 I am how 'bout you?

09:38:39.6
CAM-2 yeah let's uhh --

09:38:40.5
CAM-1 finish the checklist.

09:38:42.9
CAM-2 well we got- the crew brief done so we're down to the start check.

09:38:49.4
CAM-1 okay well.

09:38:49.8
CAM-2 we got the before start checklist first flight of the day checklist complete.

09:38:51.1
CAM [sound of click.]

09:38:52.3
CAM-1 perfect.

09:38:53.5
CAM-2 so we gotta close the uhh--

09:38:55.1
CAM-1 yeah we'll let the mechanic do that.

09:38:57.3
CAM-2 okay.

09:38:59.9
CAM-2 with uhh- I saw him pull up the umm railing

09:39:04.5
CAM-1 yup.

09:39:04.9
CAM-2 they slide out where's the button to slide 'em back in?

09:39:07.4
CAM-1 underneath.

09:39:08.1
CAM-2 underneath okay.

09:39:08.8
CAM-1 I - I'll show ya.

09:39:09.7
CAM-2 I've never uh--

09:39:10.8
CAM-1 never done the railing?

09:39:12.2
CAM-2 nooo. we're cargo people we don't need to extend them.

09:39:15.2
CAM-1 yeah I know.

09:39:17.4
CAM-1 you'd rather just fall off the ladder and what the #.

09:39:20.9
CAM-2 now we still use the stairs every once in a while.

09:39:22.5
CAM-1 ohhh I know.

09:39:23.1
CAM-2 yeah or the aft stairs.

09:39:30.7
CAM-1 all the lights are- be on?

09:39:35.2
CAM-2 'kay.

09:39:37.1
CAM-2 alright. uhhhmmm.

09:39:44.8
CAM-2 well we're just waitin' on that.

09:39:46.7
CAM-1 yuuup.

09:39:49.0
CAM-2 three fifty-five two hundred for the speed. two thousand.

09:39:59.8
CAM-O the only thing I don't see is our mechanic.

09:40:02.9
CAM-O the only thing I don't see is our mechanic. [Line repeated the second time more clearly.]

09:40:04.5
CAM-1 yeah I don't see him either.

09:40:05.8
CAM-O @OWNER'SNAME haven't met I don't think.

09:40:07.3
CAM-2 I'm @FIRSTOFFICER. (nice to meet you.)

09:40:08.7
CAM-O nice to meet ya.

09:40:09.0
CAM-O thanks for goin'.

09:40:10.2
CAM-2 yeah no problem.

09:40:11.6
CAM-O 'kay they're supposed to be givin' y'all tickets.

09:40:13.6
CAM [short non-pertinent conversation about eating at a restaurant and the baseball game.]

09:40:23.7
CAM-2 should I run down and see if he's?

09:40:24.9
CAM-1 yeah- let's see if he can figure it out what's goin' on.

09:40:25.9
CAM [sound of clicking.]

09:40:29.8
CAM-1 oh heere they are they're coming.

09:40:31.3
CAM-2 uppp they're comin?

09:40:32.4
CAM-1 yeah I see 'em walkin' this way.

09:41:04.3
CAM [sound of switch.]

09:41:07.9
CAM [sound similar to moving rudder pedal adjustment knob.]

09:41:28.6
CAM [sound of switch.]

09:41:43.5
CAM-O did he find him?

09:41:44.6
CAM-1 yeah they're just walking back this way.

09:42:04.1
CAM-2 ohhh he's coming.

09:42:07.9
CAM-1 did he just go in the-- F-B-O?

09:42:09.3
CAM-2 yeah maybe but I told @ACM. so. the owner goin' down the stairs to give @ACM #.

09:42:17.7
CAM-1 here he comes.

09:42:18.1
CAM-2 here he goes.

09:42:23.8
CAM-2 stateroom door.

09:42:24.9
CAM [sound of click.]

09:42:26.7
CAM-2 not one you see very often.

09:42:33.6
CAM [sound of clunk, similar to internal aircraft door.]

09:42:33.9
CAM-2 what is the room door for?

09:42:36.2
CAM-1 uh the uh-- the bedroom.

09:42:39.4
CAM [sound of clunk.]

09:42:40.2
CAM-2 (look out there).

09:42:41.7
CAM-1 now he's goin' the other way.

09:42:43.5
CAM [sound of clunk.]

09:42:47.8
CAM-O can 'ya check and make sure ya have my number?

09:42:50.5
CAM-1 uhhh I just wrote it down but I will--

09:42:55.4
CAM-O when you're in the ball game you can send me an email.

09:42:57.6
CAM-1 okay.

09:43:01.7
CAM-O you got it right there somehow.

09:43:03.1
CAM-1 yeah I did I wrote it down.

09:43:03.1
CAM-1 oh is this it?

09:43:04.3
CAM-O okay.

09:43:05.0
CAM-O yeah. okay.

09:43:07.6
CAM-O #[PARTIAL PHONE NUMBER REDACTED] I sent it to ya that's why.

09:43:10.1
CAM-1 ahhh good.

09:43:10.8
CAM-O just store that here.

09:43:11.9
CAM-1 okay.

09:43:15.2
CAM [non-pertinent continuation of conversation between captain and the owner regarding contact information input to cell phone.]

09:43:35.2
CAM-2 system two inop- system *.

09:43:40.1
CAM-1 what's that?

09:43:41.4
CAM-2 oh I'm just readin' the little (light) up there.

09:43:49.5
CAM-2 okay (there she is).

09:44:05.4
CAM [quick non-pertinent conversation between captain, first officer and aircraft manager about locating the aircraft manager's sunglasses.]

09:44:28.4
CAM-ACM so. to open the door when you get there make sure before anyone goes out you put the hand rails up.

09:44:37.2
MX * * *.

09:44:43.3
CAM-ACM so so when you retract- when it gets all the way up just slam that down and close the door.

09:44:47.7
MX ahh okay.

09:44:49.9
CAM-ACM * * * just close the door.

09:44:51.6
MX * *.

09:44:52.6
CAM-ACM in the back?

09:44:53.4
CAM-2 the supervisor's here.

09:44:56.1
CAM-ACM if you find my sunglasses grab them for me. I know they were--

09:45:05.4
CAM-ACM (that's it).

09:45:11.8
CAM [sound of click.]

09:45:12.1
CAM [change in ambient sound associate with pack turning off.]

09:45:15.7
CAM-1 okay.

09:45:16.5
CAM-1 start check (sir).

09:45:20.2
CAM-2 over wing heater.

09:45:22.0
CAM-1 uhh it's on.

09:45:23.2
CAM-2 tail stand.

09:45:23.6
CAM-2 I saw (one).

09:45:24.7
MX i have app.

09:45:25.8
CAM-1 okay.

09:45:26.5
MX then what?

09:45:28.1
MX it's view my M-L-B account.

09:45:30.6
CAM-1 yeah yeah you gotta sing into it--we gotta get goin' here @OWNER wants to go.

09:45:34.3
CAM-ACM yep. let's go.

09:45:35.6
MX that it?

09:45:35.7
CAM-2 alright uhhh-- tailstand?

09:45:37.7
CAM-1 removed secured.

09:45:38.5
CAM-2 cargo.

09:45:39.1
CAM-1 verified secured.

09:45:39.9
CAM-2 cell P-E-Ds off stowed.

09:45:40.7
CAM-1 off and stowed.

09:45:42.0
CAM-2 doors and windows.

09:45:44.0
CAM-2 closed.

09:45:44.8
CAM-2 lights are off.

09:45:46.3
CAM-1 except for those.

09:45:46.6
CAM-2 yeah except for those two.

09:45:48.5
CAM-2 uhhh the slides--

09:45:51.5
CAM-1 he’s gunna get 'em.

09:45:52.2
CAM-2 uhkay.

09:45:54.8
CAM-2 parking brake.

09:45:57.0
CAM-1 set.

09:45:57.4
CAM-2 pneumatic crossfeed levers.

09:45:59.5
CAM [sound of deep thunk, similar to pneumatic crossfeed levers being moved.]

09:46:01.2
CAM-1 ahh off-- I'm sorry they're on.

09:46:03.5
CAM-2 open.

09:46:04.0
CAM-1 open.

09:46:04.9
CAM-2 hydraulic pumps.

09:46:06.2
CAM-1 high- high off.

09:46:07.9
CAM-2 anti-collision light.

09:46:08.9
CAM-1 on.

09:46:10.1
CAM-2 air condition switches.

09:46:11.7
CAM-1 off.

09:46:12.6
CAM-2 galley power.

09:46:13.7
CAM-1 off.

09:46:14.5
CAM-2 seatbelts.

09:46:15.5
CAM-1 on.

09:46:16.0
CAM-2 they're on. pneumatic pressure.

09:46:17.6
CAM-1 checked.

09:46:18.1
CAM-2 ignition.

09:46:19.4
CAM-1 what's that?

09:46:20.4
CAM-2 ignition.

09:46:22.3
CAM-1 alpha.

09:46:23.5
CAM-2 aaand uh start checklist complete.

09:46:24.6
CAM [sound of thunk.]

09:46:25.7
MX good to go.

09:46:26.5
CAM [sound similar to hinge bearing operation.]

09:46:27.3
? * * *.

09:46:27.9
CAM-1 hold on we gotta keep this off the middle because there's a camera.

09:46:30.6
CAM-2 yeah yeah he said don't put your hand up there otherwise it will * * *.

09:46:32.4
CAM-1 yeah right can't see the camera there.

09:46:34.0
CAM-ACM [sound of laughter.]

09:46:46.2
CAM-1 pretty exciting.

09:46:47.1
CAM-2 mhmm.

09:46:56.7
CAM [Another short non-pertinent conversation about the aircraft manager's lost sunglasses.]

09:47:19.6
CAM-ACM alright you (got this).

09:47:21.2
CAM-2 alright.

09:47:26.0
CAM-O [Owner’s voice was discussing seat positioning. The word forward was detected. The cadence of the conversation sounded similar to a passenger briefing.]

09:47:37.8
CAM-1 @OWNER likes to be the flight attendant.

09:47:40.9
CAM-2 that'll work.

09:47:46.5
CAM [sound similar to stowing of airstairs.]

09:47:57.2
CAM [sound of clunk.]

09:47:57.5
MX door closed.

09:47:59.1
CAM-2 alright door's closed light's out.

09:48:04.8
CAM-1 checklist complete?

09:48:05.8
CAM-2 start check is complete sir.

09:48:09.7
CAM-1 turning two.

09:48:13.2
CAM-1 start valves open.

09:48:15.0
CAM-1 pressure.

09:48:21.3
CAM-1 N two hydraulics.

09:48:24.5
CAM-1 well- come on baby there it is.

09:48:29.0
CAM-1 there's my N one it's right there.

09:48:33.7
CAM [sound similar to fuel lever operation.]

09:48:35.3
CAM-1 fuel flow.

09:48:36.7
CAM-1 light off.

09:48:44.8
CAM-1 thirty-five.

09:48:47.4
CAM-1 forty percent.

09:48:50.8
CAM-1 start valve's closed.

09:48:52.4
CAM-1 pressure recovered.

09:48:54.9
CAM-1 turning one.

09:48:56.5
CAM-2 guarding number two.

09:48:59.9
CAM-1 start valve open.

09:49:01.7
CAM-1 Pressure.

09:49:05.1
CAM-1 N two.

09:49:07.1
CAM-1 hydraulics.

09:49:07.8
CAM-1 oil's rising.

09:49:10.3
CAM-1 N one's moving.

09:49:17.0
CAM-1 there's max motoring.

09:49:19.9
CAM-1 fuel flow.

09:49:22.0
CAM-1 light off.

09:49:28.8
CAM-1 thirty-five.

09:49:32.7
CAM-1 forty percent.

09:49:35.9
CAM [change in pitch tone associated with aircraft's generator coming online.]

09:49:38.9
CAM-1 start valve's closed pressure's recovered.

09:49:43.1
CAM-1 it looks hunky doorey.

09:49:45.4
CAM-2 (mmmkay).

09:49:53.5
CAM-1 I guess I forgot to check the uhh cross tie I'm not gunna worry about it.

09:50:00.8
CAM [change in pitch tone associated with aircraft's generator coming offline.]

09:50:02.9
CAM-1 after start.

09:50:04.4
CAM-2 fuel levers.

09:50:05.8
CAM-1 uhh detent.

09:50:06.8
CAM-2 ignition.

09:50:07.9
CAM-1 off.

09:50:08.7
CAM-2 electrical system.

09:50:09.8
CAM-1 uhh check set.

09:50:11.2
CAM-2 air conditioning supply switches.

09:50:13.1
CAM-1 uhh they are - auto.

09:50:18.5
CAM-2 engine anti-ice.

09:50:20.2
CAM-1 off.

09:50:21.0
CAM-2 annunciator panel.

09:50:22.1
CAM-1 checked.

09:50:22.7
CAM-2 hydraulic systems.

09:50:24.1
CAM-1 high on checked.

09:50:27.1
CAM-2 uhhh pneumatic crossfeeds.

09:50:29.6
CAM-1 closed.

09:50:30.7
CAM-2 ground equipment.

09:50:31.7
CAM-1 removed.

09:50:32.5
CAM-2 A-P-U master switch.

09:50:33.6
CAM-1 off.

09:50:34.8
CAM-2 transponder A-D-S-B.

09:50:36.8
CAM-2 we're on.

09:50:38.1
CAM-2 V-T-S check.

09:50:40.0
CAM-2 uhh that's a different one that I'm not used to.

09:50:42.6
CAM-1 uhh (just a) that might be a position deal.

09:50:48.4
CAM-2 (in it you want it)?

09:50:56.6
CAM-2 (there it is).

09:50:59.1
CAM-2 (same old door closed.)

09:51:01.4
CAM-1 set the position try setting the position.

09:51:04.7
CAM-1 put it in the boxes.

09:51:06.5
CAM-2 uhh just copy this down?

09:51:08.1
CAM-1 yup.

09:51:10.5
CAM-1 execute.

09:51:12.4
CAM-1 * * *. uhh it'll figure it out.

09:51:18.8
CAM-1 got a route going there- try your PERF INIT again. [Performance Initialization.]

09:51:23.3
CAM-1 uhh now you got your altitude.

09:51:35.4
CAM-1 and if you wanna put those speeds in there you can do that. you don't have to.

09:51:40.1
CAM-2 okay.

09:51:41.5
CAM-2 uhhh.

09:51:42.8
CAM-1 * * if it says preflight complete you're okay.

09:51:44.6
CAM-2 yeah.

09:51:44.9
CAM-2 okay.

09:51:45.5
CAM-1 alright.

09:51:46.1
CAM-2 uht it still says that but it's uhh--

09:51:47.5
CAM-1 uhhh let it think about it for a minute.

09:51:54.7
CAM-2 one twenty nineee.

09:52:01.7
CAM-2 (there's)

09:52:16.1
CAM [sound of light thunks.]

09:52:25.3
CAM-2 and then.

09:52:26.0
CAM-1 sure about that?

09:52:26.7
CAM-2 (yup/nope).

09:52:27.3
CAM-1 we got one twenty-nine - one thirty-four and one forty or something.

09:52:30.8
CAM-1 one twenty-nine - one thirty four - one forty.

09:52:32.6
GND nine eight seven alpha kilo three six taxi charlie alpha.

09:52:33.2
CAM-2 one thirty-nine--

09:52:34.5
CAM-1 yeah--

09:52:34.5
CAM-2 two nine [First Officer's quickly corrected his previous remark of one thirty-nine.]

09:52:35.0
CAM-1 vee one. vee R. vee two. [spoken simultaneously with the First Officer's corrected remarks.]

09:52:36.9
CAM-2 okay. I'm just asking for a * *.

09:52:41.0
CAM-2 * *.

09:52:43.5
CAM-2 * (could you get that)?

09:52:45.7
CAM-2 thirty (two).

09:52:45.7
CAM-1 okay yeah uhh--

09:52:46.9
CAM-1 thirty-four

09:52:49.8
CAM-1 and then one thirty whatever it is.

09:52:51.5
CAM-2 one * *.

09:52:52.3
CAM-1 one forty there ya go.

09:52:54.5
CAM-2 I'm not used to that one forty two that's low.

09:52:58.0
CAM-1 yeah okay.

09:52:59.6
CAM-2 okay and--

09:53:00.5
CAM-1 alright.

09:53:04.6
CAM-2 uhhh alright there it is.

09:53:07.9
CAM-1 alright let's uhhh--

09:53:09.1
CAM-2 is he asking us to go direct to something? or something like.

09:53:12.7
CAM-1 well- we can get radar vectors.

09:53:15.1
CAM-1 don't worry about it.

09:53:15.5
CAM-2 alright you ready to uhhh taxi?

09:53:17.7
CAM-1 yappp.

09:53:19.0
CAM [sound similar to parking brake being released.]

09:53:19.0
RDO-2 ground november nine eight seven alpha kilo taxiing.

09:53:27.2
CAM [Automated Voice.] slats. [sound of aural warning.]

09:53:29.5
CAM [Automated Voice.] fa-laps. [sound of aural warning.]

09:53:29.9
CAM-1 flaps alarm.

09:53:31.8
CAM [Automated Voice.] slats. [sound of aural warning.]

09:53:33.9
CAM [Automated Voice.] slats. [sound of aural warning.]

09:53:35.2
RDO-CAM-2 going to three six right charlie and alpha nine eight seven alpha kilo.

09:53:45.4
CAM-2 alright so three six alpha (then kilo)

09:53:50.0
CAM-1 watch your toes.

09:53:51.0
CAM-2 yep.

09:53:55.7
CAM-2 blue.

09:54:02.1
CAM-2 alright taxi checks.

09:54:03.1
CAM [sound similar to lever actuation.]

09:54:03.5
CAM-1 okay go for it.

09:54:04.1
CAM-2 flaps slats are eleven eleven takeoff.

09:54:08.4
CAM-1 eleven eleven takeoff.

09:54:10.3
CAM-2 flight controls check.

09:54:11.8
CAM-1 check.

09:54:12.9
CAM-2 takeoff data uhhh let's see autobrakes spoilers do you em uhhh armed?

09:54:16.2
CAM-1 yep let's do it.

09:54:17.9
CAM [sound similar to mechanism for arming autospoilers.]

09:54:20.1
CAM-1 takeoff- armed- armed.

09:54:21.4
CAM-2 alright.

09:54:21.6
CAM-1 did you arm em?

09:54:22.4
CAM-2 yeppp.

09:54:24.0
CAM-1 nooo we didn't.

09:54:24.8
CAM-2 yeahhh you gotta turn the selector on here (alright).

09:54:29.0
CAM-2 okay uhhh let's see- takeoff data T-R-I airspeed bugs.

09:54:33.3
CAM-1 check set.

09:54:33.4
CAM-2 check set.

09:54:34.9
CAM-2 uhh flight guidance radios. set.

09:54:36.1
CAM-1 set.

09:54:37.3
CAM-2 A-P-U air master switch.

09:54:39.1
CAM-1 off. off.

09:54:40.6
CAM-2 pneumatic crossfeed levers are closed.

09:54:44.2
CAM-1 'kay we're goin' to three six?

09:54:45.9
CAM-2 we're goin' to three six- for uhhh charlie alpha.

09:54:48.8
CAM-1 charlie alpha- 'kay cool.

09:54:50.3
CAM-2 uhhh fuel heat.

09:54:52.1
CAM-1 off not required.

09:54:53.0
CAM-2 shoulder harness on the right.

09:54:54.3
CAM-1 on.

09:54:55.4
CAM-2 takeoff briefing.

09:54:56.5
CAM-1 complete.

09:54:56.8
CAM-2 no questions taxi checklist complete do you want before takeoff to the line?

09:55:01.3
CAM-1 please.

09:55:02.0
CAM-2 runway entrance point is gunna be three six full length at alpha.

09:55:05.0
CAM-1 three six full length.

09:55:07.1
CAM-2 F-M-A is alt takeoff takeoff two thousand feet set.

09:55:11.4
CAM-1 alt takeoff takeoff two thousand.

09:55:14.1
CAM-2 P-M-S not installed. ignition?

09:55:18.4
CAM-1 alpha.

09:55:20.3
CAM-2 uhhh annunciator panel is checked.

09:55:23.2
CAM-1 checked.

09:55:24.9
CAM-2 flaps slats.

09:55:26.8
CAM-2 at eleven eleven takeoff.

09:55:28.5
CAM-1 eleven eleven takeoff.

09:55:30.4
CAM-2 and brake temperature is checked.

09:55:34.4
CAM-2 (corrrect)?

09:55:51.0
CAM-2 ninety seven and I'm goin' over to tower.

09:56:21.5
CAM-1 yeah that- I think the problem is you gotta put that position in the very first thing you do on this F-M-S.

09:56:26.8
CAM-2 uh huh.

09:56:27.8
CAM-1 and so when you didn't do that you put all the rest of that # in and it's still thinkin' about that. it should be fine.

09:56:40.7
CAM-2 it has everything on the map.

09:56:42.5
CAM-1 yeah we can always get a vector if we need to.

09:56:46.1
CAM-1 we'll default to V-O-Rs if we have to.

09:56:48.0
CAM-2 we gotta put the ahhh umm--

09:56:52.1
CAM-2 I got it in here but--

09:56:54.3
CAM-2 too many uh power cycles

09:56:55.7
CAM-1 exactly.

09:57:31.0
CAM-1 tower time.

09:57:32.9
CAM-2 we're up on tower.

09:57:34.1
CAM-1 uppp

09:57:34.4
CAM-2 ya ready?

09:57:35.1
CAM-1 yeah.

09:57:38.8
RDO-2 tower nine eight seven alpha kilo is ready for departure.

09:57:42.8
TWR nine eight seven alpha kilo roger hold short.

09:57:45.3
RDO-2 holdin' short nine eight seven alpha kilo.

09:57:47.6
CAM-1 turn those guys on.

09:58:28.9
TWR uh november niner eight seven alpha kilo departure runway heading winds zero nine zero at six runway three six cleared for takeoff.

09:58:35.5
RDO-2 runway heading cleared for takeoff runway three six nine eight seven alpha kilo.

09:58:40.7
CAM-1 cleared for takeoff.

09:58:42.1
CAM-2 alright below the line radar TAWS- is set.

09:58:47.2
CAM-2 transponder is T-A-R-A.

09:58:49.8
CAM-1 roger.

09:58:50.8
CAM-2 compass indicating.

09:58:53.0
CAM-2 let's see uh three six on the pavement.

09:58:55.4
CAM-1 okay.

09:58:55.8
CAM-2 and that checks off to the left. aaand--

09:59:00.3
CAM-1 lights are on.

09:59:00.7
CAM-2 landing lights are on.

09:59:21.7
CAM-1 auto-throttle's armed set takeoff thrust.

09:59:25.3
CAM-2 'kay auto-throttle's on.

09:59:31.5
CAM-2 takeoff thrust is set. engines- instruments- normal.

09:59:35.8
CAM-1 roger.

09:59:36.3
CAM-2 eighty knots.

09:59:37.5
CAM-1 checks.

09:59:40.1
CAM [sound increased in ambient noise.]

09:59:47.2
CAM-2 vee one.

09:59:48.0
CAM-2 rrrotate.

09:59:50.8
CAM-2 vee two.

09:59:51.7
CAM-1 (god/gah) come on. [sound of strained voice.]

09:59:53.3
CAM-2 # # # abort.

09:59:55.5
CAM [sound of low thud.]

09:59:56.3
CAM [sound of metallic slap.]

09:59:56.8
CAM [sound of mechanical squeal.]

09:59:57.8
CAM [start of gradual decrease in ambient noise.]

09:59:59.8
CAM [sound similar to beginning of aircraft departing runway and impacting terrain.]

10:00:02.5
CAM [sound of deep bang.]

10:00:03.0
CAM [sound of second deep bang.]

10:00:03.4
CAM [sound of rapid rumbling impacts.]

1000:04.3
END OF TRANSCRIPT
END OF RECORDING

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.

Falr 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.