

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



GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

ERA22FA004

**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

August 15, 2023

Cockpit Voice Recorder

Group Chairman's Factual Report By Sean Payne

1. EVENT SUMMARY

Location: Thomson, GA
Date: October 5, 2021
Aircraft: Dassault Falcon 20E-5
Registration: N283SA
Operator: Pak West Airlines
NTSB Number: ERA22FA004

2. GROUP

A group was convened on November 3, 2021, at the NTSB's Vehicle Recorder Division laboratory in Washington, D.C. The group consisted of the following individuals:

Chairman:	Sean Payne Branch Chief – Vehicle Recorder Division National Transportation Safety Board (NTSB)
Member:	Adam Gerhart Investigator-In-Charge (IIC) NTSB
Member:	Todd Gentry Sr. Accident Investigator Federal Aviation Administration (FAA)
Member:	David Gridley Commercial Flight Safety Investigator GE Aviation
Member:	Herve Camelin Director of Operations/Chief Pilot/Check Pilot Pak West Airlines

3. DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division received the following CVR:

Recorder Manufacturer/Model: **Fairchild GA-100**
Recorder Serial Number: **01844**

3.1 CVR Carriage Requirements

Per federal regulation, turbine engine powered aircraft operating under 14 *CFR* Part 135 that have less than 6 passenger seats are not required to contain a cockpit voice recorder. As such, this aircraft was not required to have a CVR, however, a magnetic tape style CVR was found to be installed.

3.2 Recorder Description

This model CVR, the Fairchild GA-100 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

Upon arrival at the laboratory, it was evident that the exterior of the CVR had sustained light structural damage. The outer case was removed, and the interior crash-protected case did not appear to have any heat or structural damage. The magnetic tape was retrieved from within the crash-protected case and was successfully read out. The recorder is pictured in figure 1, as received at the NTSB lab.



Figure 1. The Fairchild GA-100 from N283SA.

3.4 Audio Recording Description

Each channel's audio quality is indicated in Table 1.¹ As a result of the group transcription activity, it was determined that the aircraft was not equipped with an intercom system. According to the operator, the communications with air traffic control were typically established in this aircraft by using the hand microphone and cockpit speaker. As such, the cockpit area mic (CAM) was the sole source for determining flight crew statements during the accident flight.

The quality of the cockpit area microphone channel was poor and extensive digital filtering was utilized to determine flight crew statements. In general, the captain's voice was detected on the CAM channel. At times, the first officer's voice was detected on the CAM channel. An absence of first officer's statements in the transcript does not necessarily reflect the number of statements the first officer made during the accident flight, but only a record of what could be detected on the poor quality CAM recording.

Table 1. Audio Quality.

Channel Number	Content/Source	Quality	Duration
1	Cockpit Area Mic (CAM)	Poor	30m27s
2	Unknown crew position	Poor	30m27s
3	Unknown crew position	Un-usable	30m27s
4	Unknown crew position	Un-usable	30m27s

3.5 Timing and Correlation

Timing on the transcript was established by correlating the local time of the accident to the corresponding air traffic control events. Specially, air traffic control tapes were used to determine the times of certain transmissions from the accident aircraft and those transmissions were correlated in the CVR transcript and a timing offset was created. The CVR events were offset to reflect the local eastern daylight time (EDT) of the accident.

3.6 Description of Audio Events

In agreement with the Investigator-In-Charge, a CVR group convened. A transcript of events from the CVR follows. The transcript includes transcribed portions from air traffic control tapes.

The first portion of ATC transcript data occurred outside of the CVR's 30-minute recording window. Transmissions between the accident aircraft and the Atlanta Air Route Control Center position R03 occurred at this time. Transmissions transcribed directly from air traffic control tapes appear in *italic font*. This portion of the transcription appears first.

The CVR recording then began at 5:13:44 EDT. At this time, a summary of the first 11 minutes of the recording begins. The summary is found between the Atlanta Air Route Control Center position R03 and the full CVR transcript which follows.

¹ See attached CVR Quality Rating Scale.

The final portion of the report is the full CVR transcript, which follows the summarized section. The full CVR transcript begins at 5:25:05.5 EDT. At this time, the aircraft was in contact with Atlanta Air Route Control position R20. ATC tapes were also used during the 30-minute CVR portion of the transcript to help understand and provide context to the poor-quality CAM channel recording. Transmissions transcribed directly from air traffic control tapes appear in *italic font*.

As stated in section 3.4 above, statements from the first officer were rarely detected on the CVR. The captain's statements were of higher amplitude and were generally detected on the CAM channel. The first officer's statements, when detected, were of lesser amplitude. Due to the poor-quality recording, and inability to detect many of the first officer's comments, the transcript does not completely represent the cockpit environment.

All times are presented in EDT.

Transcript of a Fairchild GA-100 tape cockpit voice recorder, serial number 01844, installed on a Dassault Falcon 20E-5, N283SA, which crashed on approach to Thomson-McDuffie County Airport (KHQU) in Thomson, GA.

LEGEND

CAM	Cockpit area microphone voice or sound source
RDO	Radio transmissions from N287SA
CTR03	Radio transmission from Atlanta Air Route Traffic Control Center position R03
CTR20	Radio transmission from Atlanta Air Route Traffic Control Center position R20
-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 (EDT).

Note 2: Generally, only radio transmissions to and from the accident 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
START OF ATLANTA AIR ROUTE TRAFFIC CONTROL CENTER POSITION R03 ATC TRANSCRIPT			
		05:03:07 RDO-1	<i>Atlanta center platinum west eight eight seven uh question.</i>
		05:03:11.0 CTR03	<i>platinum west eight eight seven Atlanta center go ahead.</i>
		05:03:14.0 RDO-1	<i>yes sir do you have any information that the uh I-L-S localizer one zero is out of service at uh McDuffie uh kilo hotel quebec uniform.</i>
		05:03:26.0 CTR03	<i>uhh platinum west eight eight seven stand by.</i>
		05:03:51.0 CTR03	<i>platinum west eight eight seven what was that uh I-L-S approach?</i>
		05:03:57.0 RDO-1	<i>yeah uh I was inquiring about the uh I-L-S approach for runway one zero.</i>
		05:04:28.0 CTR03	<i>and platinum west eight eighty-seven uh standby we're lookin' it up.</i>
		05:04:33.0 RDO-1	<i>eight eight seven wilco.</i>

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
		05:05:26.0 CTR03	<i>platinum west uh eight eighty seven on the NOTAMs for hotel quebec uniform- there's (a/some) NOTAMs that says ummm executing that navigational I-L-S one zero G-P. but uh we do not know what G-P means - and then slash U-S unserviceable.</i>
		05:05:52.0 RDO-1	<i>uh platinum west eight eight seven roger.</i>
		05:06:29.0 CTR03	<i>[A different controller is now speaking] yeah platinum west I am looking at the bottom of the NOTAM it shows uh H-Q-U I-L-S runway one zero localizer uh out of service- but it shows it starts on- well the fifth - so at twelve hundred- so I would assume that's in Z- correct?</i>
		05:06:50.0 RDO-1	<i>yeah uh that's what I was looking at- little confused uh (pointers) two differing NOTAMs there- but it looks to me like it's still in service 'till- up until uh- eight or nine o'clock.</i>
		05:07:02.0 CTR03	<i>yeah uh that's the way I'm reading it that it's uhh- that it will be out of service in uhh in three hours. Roughly- 'cause it's zero nine zero seven Z [0907Z]- so I mean I'm reading it that it's in service right now until- until twelve hundred Z.</i>
		05:07:17.0 RDO-1	<i>yeah uh I think that's the way we read it but thanks for looking it up for us eight eight seven.</i>
		05:07:23.0 CTR03	<i>you're welcome.</i>

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
		05:07:50.0 CTR03	<i>platinum west eight eight- eight eighty seven- descend pilot's discretion maintain flight level two four zero.</i>
		05:07:55.0 RDO-1	<i>pilot's discretion two four zero present uh- eight eight seven and how does this uh our track look for the uh weather up ahead for eight eight seven?</i>
		05:08:07.0 CTR03	<i>platinum west eight eighty seven I'm tryin' get you stay higher (cut out) all the moderate precipitation on your route but uh on the low side we're showing some moderate heavy extreme precipitation just west of the Atlanta V-O-R all the way to Atlanta.</i>
		05:08:24.0 RDO-1	<i>yeah that's what our radar is showin' yeah we're gunna stay up here as long as we can here. eight eigthy seven.</i>
		05:08:29.0 CTR03	<i>platinum west eight eight seven roger- yeah- you-</i>
		05:11:43.0 CTR03	<i>platinum west contact Atlanta center one one nine point three seven good day.</i>
		05:11:48.0 RDO-1	<i>one one nine three seven platinum west eight eight seven.</i>

END OF ATLANTA AIR ROUTE TRAFFIC CONTROL CENTER POSITION R03 ATC TRANSCRIPT.

A SUMMARY OF THE FIRST PORTION OF THE CVR RECORDING FROM THE ACCIDENT AIRCRAFT APPEARS BELOW.

The recording began at 5:13:44 EDT.

The recorded audio was of poor quality.

Around 5:17:26, there was audio consistent the cadence of an AWOS recording. It could not be determined if this was for Thomson-McDuffie airport. Shortly thereafter, the captain made a comment stating “there’s gunna be lightning all around us.” Around 5:18:09, there were sounds consistent with the aircraft’s pitch trim clacker.

Around 5:18:10, there were some comments from the captain related to instructing the first officer about altitude control. The captain later commented, “you need to stay at three five zero.” Shortly thereafter, the captain stated, “you can go down but you can’t go up,” reminded the first officer of altitude control and then made a statement about the autopilot. Because of the poor recording quality it was unclear if the captain stated the autopilot was on, autopilot was armed, or was offering the use of the autopilot to the first officer.

The pilot made an unintelligible radio call addressing “approach” mentioned “two four zero,” and then instructed the first officer in a stern manner to “fly the airplane.” Shortly thereafter, he made a second exclamation to “fly the airplane” and then sternly stated, “I’ve got the airplane.” The first officer then stated in an argumentative tone that they experienced an “up and down draft.” The captain then responded in frustrated tone that they were “going through an area of storms” and “just fly the airplane.” The first officer then asked, “we going down?” The captain stated that they we’re going down to flight level 240 and that they were “descending like an escalator.”

Around 5:19:52, there was a radio call and the aircraft was assigned a heading of 130 degrees. The captain then asked in an elevated, frustrated tone, “you’ve flown in bad weather before?” The captain then made multiple raised voice statements related to the first officer having to come 15 degrees left and that the first officer was flying a heading of 144 degrees and not the assigned heading of 130 degrees. For the next minute, the captain continually informed the first officer to come left approximately 15 to 20 degrees and stated, “he’s probably keeping us out of the worst of it.”

At 5:21:04, the captain read back an ATC instruction of 110 degrees for an assigned heading. The CAM picked up some argumentative conversation, and the captain was heard stating, “you fly the damn airplane.” The captain made some more statements related to the first officer’s heading. There was some conversation consistent with running the descent checklist. The captain later stated, “descent checklist complete.”

Around 5:23:56, there were some comments consistent with the captain reading the approach plate for runway the 10 ILS/LOC approach at Thomson McDuffie. Those comments were quickly interrupted with the captain making another heading instruction to the first officer.

At 5:25:05.5 EDT, the full transcript of the remainder of the recording begins, with ATC transmissions from Atlanta Air Route Control Center position R20 appended in *italic font*.

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
START OF TRANSCRIPT			
05:25:05.5 CAM-1	(Approach)* * *.		
		05:25:14.7 RDO-1	<i>Atlanta center platinum west eight eight seven uh twenty-two descending to one five uh thousand heading one one zero.</i>
		05:25:23.0 CTR20	<i>and I need the callsign one more time?</i>
		05:25:24.1 RDO-1	<i>platinum west eight eight seven.</i>
		05:25:27.0 CTR20	<i>platinum west eight eight seven Atlanta center good morning the Augusta altimeter is three zero zero two. You've got an area of heavy to moderate precipitation present position extends (parallel) to the field. just to verify you have the weather and NOTAMs for McDuffie?</i>
		05:25:39.0 RDO-1	<i>uhh you're coming in pretty broken up we're gunna try again eight eight seven.</i>
		05:25:44.0 CTR20	<i>* uh platinum west eight eight seven roger and uh what approach do you guys want this morning?</i>

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
		05:25:47.0 RDO-1	<i>requesting I-L-S uh runway one zero approach platinum eight eight seven.</i>
		05:25:51.0 CTR20	<i>roger. stand by for that.</i>
05:25:52.9 CAM-?	[unintelligible comments related to descent checklist completion.]		
05:26:02.7 CAM-1	do you want a - do you want (the) approach checklist?		
05:26:05.2 CAM-2	(yup/yes).		
05:26:10.0 CAM-1	approach checklist altimeters set * * flight and nav instruments		
05:26:15.4 CAM-2	set on the right.		
05:26:17.8 CAM-1	(set on the left).		
		05:26:18.0 CTR20	<i>and uhhh platinum west when able when able cleared direct CEDAR then direct McDuffie.</i>
		05:26:25.0 RDO-1	<i>rog(er) can you spell that fix eight eight seven?</i>
05:26:25.1 CAM-1	approach checklist (set/?) (okay).		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
		05:26:27.0 CTR20	<i>platinum west eight eight seven affirmative it's uh when able direct charlie echo delta alpha romeo. C-E-D-A-R. that's the initial approach fix for the uh one zero approach in to uh McDuffie so it's CEDAR then direct the airport.</i>
		05:26:43.0 RDO-1	<i>CEDAR direct the airport platinum west eight eight seven.</i>
05:26:55.6 CAM-?	[unintelligible comments, the word "yeah" was detected.]		
05:27:02.6 CAM	[Automated Voice.] Transition altitude * * three zero zero two * * *.		
		05:27:29.0 RDO-1	<i>(this is umm) uhhh approach plat west eight eight seven can we get an initial heading for uh CEDAR? for eight eight seven.</i>
		05:27:36.0 CTR20	<i>and platinum eight eight seven - when able with the weather turn fifteen degrees left.</i>
		05:27:42.0 RDO-1	<i>fifteen degrees left platinum eight eight seven.</i>
		05:27:44.0 CTR20	<i>and platinum west eight eight seven pilot's discretion maintain one one eleven thousand.</i>
05:27:44.2 CAM-1	you're coming up on altitude.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:27:49.5 CAM-1	altitude. [exclaimed.]		
05:27:51.7 CAM-1	I'll get— I'll get that. you fly the damn airplane. [shouted] I don't want you to (kill) me.		
		05:27:44.0 CTR20	<i>and platinum west eight eight seven pilot's discretion maintain one one eleven thousand.</i>
		05:28:00.0 RDO-1	<i>pilot's discretion one one thousand platinum west eight eight seven. [ATC repeated this transmission.]</i>
05:28:02.4 CAM-1	I'll set up the airport - you fly the airplane [spoken in a frustrated tone.]		
05:28:27.1 CAM-1	listen you fly * give you a heading.		
05:29:07.4 CAM	[sound similar to increase of engine power.]		
		05:29:17.0 CTR20	<i>platinum west eight eight seven pilot's discretion maintain three thousand.</i>
		05:29:23.0 RDO-1	<i>pilot's discretion maintain three thousand platinum west eight eight seven.</i>
05:29:35.8 CAM-1	(pilot's discretion) okay that's direct CEDAR that's one five five on the heading.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:30:35.9 CAM-1	you got it.		
05:30:38.2 CAM-2	(that's wrong.)		
05:30:39.7 CAM-1	yeah yeah I'll take care of it. [spoken in a frustrated tone.]		
		05:30:45.0 RDO-1	<i>and approach platinum west * eight eight (seven) can we just get a vector for the final approach course?</i>
		05:30:50.0 CTR20	<i>and uh platinum west eight eight seven I am unable to do that (here/during) in the enroute environment unfortunately uh I don't uh depict the approaches and uh I'm not allowed to vector for it.</i>
		05:31:00.0 RDO-1	<i>yes sir can you spell CEDAR again? for platinum eight eight seven.</i>
		05:31:03.0 CTR20	<i>yessir let me double check in here make sure I got all my work is correct. I'm showing C-E-D-A-R and let me uhh— let's see here— C-E-D-A-R and that is for the uh I-L-S to uh the localizer to runway one zero at uh McDuffie that's what we're looking for correct?</i>
		05:31:22.0 RDO-1	<i>that's correct uhhh charlie echo delta alpha romeo.</i>
		05:31:26.0 CTR20	<i>that is correct. yes sir.</i>

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:31:35.0 CAM	[sound of clunk.]		
		05:31:38.0 CTR20	<i>and uhh platinum west eight eight seven uhh try maybe the uh identifier for the N-D-B I am being told its A- A alpha alpha. see if that uh makes sense.</i>
		05:31:52.0 RDO-1	<i>* * * say that uh hh spell that again for plat(inum) west eight eight seven.</i>
		05:31:57.0 CTR20	<i>yes sir it's alpha alpha— just A-A.</i>
		05:32:00.0 RDO-1	<i>alpha alpha roger.</i>
05:32:09.8 CAM-1	I'll fly the airplane you— I'll fly the airplane— you get alpha and alpha		
05:32:22.4 CAM-2	(I'm) loading alpha * *. (I already loaded ANNAN) (how you load ANNAN).		
05:32:24.6 CAM-1	yeah go ahead and do that.		
		05:32:33.0 CTR20	<i>and platinum west eight eight seven I am looking at the plate right here its right underneath the uhh the initial uhh name there the N-D-B is alpha alpha. I'm not sure if you're seeing that on the plate or not.</i>

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:32:44.2 CAM-1	you got the airplane.		
		05:32:48.0 RDO-1	<i>yeah we've got it now platinum eight eight seven.</i>
		05:32:50.0 CTR20	<i>roger.</i>
05:32:51.4 CAM-1	you've got that entered?		
05:32:54.4 CAM-1	heading direct is zero seven zero - you've gotta come uhh zero seven zero.		
05:33:02.0 CAM-2	* * *.		
05:33:04.7 CAM-1	yeah I got it set up here * * it's (check triple times).		
05:33:18.2 CAM-1	you gotta get down to uh three thousand feet.		
05:33:24.1 CAM-1	you got (a fix/ * *) you got to bleed it.		
05:33:27.2 CAM	[sound similar to engine power increase.]		
05:33:29.9 CAM-1	[Unintelligible comment, some words detected were "gotta come" and "right speed"]		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:33:41.6 CAM-1	[unintelligible comment, some words detected were "far out" and "real low."]		
05:33:50.2 CAM-1	you gotta come right- right.		
05:33:56.7 CAM	[sound similar to engine power decrease.]		
05:34:12.9 CAM	[sound similar further sound decrease, close to idle setting.]		
05:34:34.1 CAM-1	okay you're doing something (wrong here).		
05:34:51.5 CAM-1	(okay) you gotta go to the right. I'm—		
05:34:54.2 CAM	[sound of engine power increase.]		
05:35:01.1 CAM-1	you gotta come- you gotta come to the right about um twenty * degrees.		
05:35:09.6 CAM-1	[unintelligible comment potentially related to heading. the words "you want" were detected.]		
05:35:30.2 CAM-1	[unintelligible comment potentially related to a crossing altitude at CEDAR, the altitude "two thousand" was detected.]		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:35:41.6 CAM-1	(right) watch your altitude.		
05:36:39.8 CAM-1	altitude altitude.		
05:36:42.1 CAM-2	* * *.		
05:36:47.3 CAM-1	well then you gotta- you gotta adjust your trim wheel. * *. [spoken in frustration.]		
05:36:53.7 CAM-1	okay you fly the aircraft (thank you). [spoken in a frustrated tone.]		
05:37:01.5 CAM-1	okay looking (good).		
05:37:07.3 CAM-2	* *.		
05:37:09.7 CAM-1	* * just a little closer.		
05:37:14.4 CAM-1	over sixty knots wheels out.		
		05:37:17.6 RDO-1	[cadence of radio clicks consistent with pilot-controlled lighting activation.]
05:37:21.1 CAM-1	ummm altitude.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
		05:37:25.0 CTR20	<i>platinum west eight eight seven I am showing you fifteen miles southwest of the CEDAR intersection cross CEDAR at or above three thousand cleared I-L-S localizer one zero into uh Thomson McDuffie.</i>
		05:37:35.5 RDO-1 (ON GUARD)	okay uhh maintain three thousand to uhh CEDAR and we're cleared to the I-L-S runway one zero approach into McDuffie platinum west eight eight seven.]
		05:37:44.0 CTR20	<i>platinum west eight eight seven that was a good read back it did go out on guard but I got it- good readback please report back established on the procedure.</i>
		05:37:52.3 RDO-1 (ON GUARD)	uhh we'll report established platinum west eight eight seven thanks for your help.
05:37:56.9 CAM-1	okay (we can set the two) uhh- we are thirteen miles and uhh your speed checks flaps fifteen.		
		05:38:13.0 CTR20	<i>and uhh platinum west eight eight seven I don't think you're gunna be able to get (anyone/me) there on the ground for a cancelation I got a few airplanes wantin'- few aircraft on the ground wanting to depart Augusta so I'm gunna give you a phone number to call that way you can just call us directly to cancel when you're ready.</i>
		05:38:30.0 CTR20	<i>and uhh you're still going out on guard.</i>

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:38:23.9 CAM	[sound of soft click.]		
05:38:26.4 CAM	[sound of softer subtle click.]		
		05:38:38.0 RDO-1	<i>platinum west eight eight seven ready to copy.</i>
		05:38:40.0 CTR20	<i>okay platinum west it's [Atlanta Center phone number redacted, stated twice, correctly, by ATC.]</i>
05:38:39.8 CAM	[sound increase engine power.]		
		05:38:50.0 RDO-1	<i>[Atlanta Center phone number redacted, stated once, correctly, by the captain.] we'll call you on the ground.</i>
		05:38:54.0 CTR20	<i>thanks guys and like I said just report established on the procedure and I'll have a frequency change for you</i>
05:38:58.3 CAM	[sound of click.]		
		05:39:00.0 RDO-1	<i>platinum west eight eight seven roger.</i>
05:39:02.1 CAM-1	[long unintelligible comment.]		
05:39:19.2 CAM-1	I don't know.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:39:23.5 CAM	[sound similar to radio frequency change.]		
05:39:24.8 CAM-1	yeah uh yeah I'll get it (first).		
05:39:28.3 CAM-1	would you fly the airplane- man- uhh man- I've been doing everything else. [spoken in a frustrated tone.]		
		05:39:31.3 RDO-?	[Cadence of radio clicks consistent with pilot-controlled lighting activation. The clicks were more deliberate this time.]
05:39:43.9 CAM-1	here it is right over (here) * *.		
05:39:51.4 CAM-?	* * *.		
05:39:55.9 CAM	[Sound similar to landing gear extending.]		
05:39:59.8 CAN-2?	* * *.		
05:40:01.7 CAM-1	fly the (I-L-S approach).		
05:40:33.8 CAM-?	* * *		
05:40:35.6 CAM	[sound of trim wheel clacker.]		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:40:36.7 CAM-1	* * airbrakes stowed * flaps * flaps (forty) before landing list completed.		
		05:40:48.7 RDO-1	[cadence of radio clicks consistent with pilot-controlled lighting activation.]
05:40:55.9 CAM-1	should be coming in shortly.		
05:41:15.7 CAM-1	follow the glideslope (without that).		
05:41:43.9 CAM-1	locs alive.		
05:41:48.7 CAM-1	speed and present heading.		
05:41:55.8 CAM-2	* * *.		
05:42:00.5 CAM-1	yea.		
05:42:09.1 CAM-1	okay returning to flight (director).		
05:42:17.3 CAM-2?	* *.		
05:42:20.9 CAM-1	(aw/off/uhh) [sound of stutter] I want you to— I want you to fly the airplane.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:42:28.3 CAM	[sound of high-pitched tone.]		
05:42:29.3 CAM-1	okay your speed checks landing flaps selected.		
		05:42:40.0 RDO-1	and approach platinum west eight eighty seven we've joined the localizer we've got- we've got a visual on the uh runway we can cancel I-F-R at this time.
05:42:49.4 CAM	[sound similar to trim wheel clacker.]		
		05:42:53.0 RDO-1	<i>[RDO-1 Steps on UPS aircraft transmission, resulting in the first portion of the call being recorded as unintelligible] * * * one zero if I can cancel I-F-R at this time?</i>
		05:42:57.0 CTR20	<i>platinum west eight eight seven uhh roger I have a different frequency there but I believe you said you wanted to cancel is that correct?</i>
		05:43:02.0 RDO-1	<i>that's affirmative eight eight seven.</i>
		05:43:03.5 CTR20	<i>platinum west uh no traffic observed between you and the field at this time. cancelation I-F-R is received. squawk V-F-R you guys have a good (one/morning).</i>
05:43:06.3 CAM	[sound similar to engine power decreasing, potentially to flight idle.]		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
		05:43:10.0 RDO-1	<i>roger that uh squawk V-F-R thanks for your help platinum west eight eight seven.</i>
		05:43:13.0 CTR20	<i>no worries guys.</i>
05:43:22.0 CAM-1	hey watch your speed you gotta slow up a lot- and we're high.		
05:43:28.1 CAM-1	we're high and fast.		
05:43:29.8 CAM	[sound further decrease engine power.]		
05:43:32.4 CAM-1	you gotta lose twenty knots here.		
05:43:34.8 CAM-1	let's use your air brakes again.		
		05:43:40.0 RDO-1	McDuffie airport platinum eight eight seven is on a uh two mile final runway one zero McDuffie full stop.
05:43:51.8 CAM-1	you're way high.		
05:43:52.6 CAM-2	(no I'm not).		
05:43:54.2 CAM-1	look.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:43:55.8 CAM-1	and you're fifteen knots fast we got a short runway.		
05:43:59.0 CAM-?	use your air brake.		
05:44:04.6 CAM-1	now you're low.		
05:44:04.8 CAM	[sound of deep click.]		
05:44:06.1 CAM	[sound similar to trim wheel operating.]		
05:44:06.4 CAM	[sound of rapid increase engine power.]		
05:44:06.6 CAM-1	you got trees (in this/here)(?) [spoken in elevated voice.]		
05:44:06.8 CAM	[sound of electronic pulsating stall warning.]		
05:44:07.7 CAM	[start of sound of initial impact.]		
05:44:07.9 CAM-1	(we've got trees.)		
05:44:08.8 CAM-1?	ahh #.		
05:44:09.8 CAM-?	#.		

Time and Source	Intra-Aircraft Communication	Time and Source	Over-the-Air Communication
05:44:10.8 CAM	[second distinct impact noise.]		
05:44:11.5 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.
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.