

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



GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

DCA06MA064

**By
Albert G. Reitan**

WARNING

The reader of this report is cautioned that the transcription 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
Washington, D.C. 20594

November 17, 2006

Cockpit Voice Recorder - 12

Group Chairman's Factual Report By Albert G. Reitan

A. EVENT

Location: Blue Grass Airport, Lexington, Kentucky
Date: August 27, 2006, 0607 EDT
Aircraft: Canadair CL-600, N431CA
Operator: Comair, Flight 191
NTSB Number: DCA06MA064

B. GROUP A group was convened on 8/28/06.

Chairman: Albert G. Reitan
CVR Group Chairman
National Transportation Safety Board

Member: Daniel P. Diggins
Air Safety Investigator
Federal Aviation Administration

Member: Captain Brian C. Emmett
Director of Training
Comair, Inc.

Member: F/O Scott H. Seely
CMR Airport Liaison Representative, RIC
ALPA/Comair, Inc.

C. SUMMARY

On August 27, 2006, a Canadair CL-600, registration N431CA operated by Comair, Inc. impacted terrain beyond the departure end of runway 26 at the Blue Grass Airport, Lexington, Kentucky. A thirty-minute solid-state cockpit voice recorder (CVR) was sent to the National Transportation Safety Board's Audio Laboratory for readout. The CVR group meeting convened on August 28, 2006 and a complete transcript was prepared for the 30:29 minute digital recording (see attached).

D. DETAILS OF INVESTIGATION

On August 27, 2006, the NTSB Vehicle Recorder Division's Audio Laboratory received the following CVR:

Recorder Manufacturer/Model: **Fairchild Model A 100S**
Recorder Serial Number: **03035**

Recorder Description

Per Federal regulation, CVRs record a minimum of the last 30 minutes 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 30 minutes of CVR operation. This model CVR, the Fairchild Model A 100S, records 30 minutes of digital audio stored in solid-state memory modules. Four channels of audio information are retained: one channel for each flight crew and one channel for the cockpit area microphone (CAM).

Recorder Damage

Upon arrival at the audio laboratory, it was evident that the exterior of the CVR had sustained some heat and structural damage. The outer case was removed and the interior crash-protected case did not appear to have any heat or structural damage (see Figures 1 and 2). The digital audio was successfully downloaded from the memory board.

Audio Recording Description

The 30:29 minute recording consisted of four channels of useable audio information. Each channel's audio quality* is indicated in the table below.

* See attached CVR Quality Rating Scale.

Channel Number	Content/Source	Quality
1	Captain	good
2	First Officer	good
3	CAM	good
4	FSK timing signal	good

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 a linear interpolation between the remaining CVR events. Once a correlation between the two recorders was established, a reference to local time was determined. Using a partial transcript from the FAA Lexington control tower, the UTC time of the final radio transmission from the accident aircraft was linked to the corresponding CVR event. The CVR and FDR times were offset to reflect the local eastern daylight time of the accident.

Description of Audio Events

The recording and transcript began at 05:36:07.7 eastern daylight time (EDT) as the crew entered the cockpit for preflight preparations. At 05:48:24 the crew received Lexington ATIS information Alpha, which included information that runway 22 was in use for takeoff and landings. The First Officer then called clearance delivery and received a clearance to Atlanta and stated that he had received information Alpha.

The transcript continued as the crew read checklists, conducted the departure briefing and advised ground control of their pending pushback. After pushback and engine start, the First Officer called for taxi clearance from ground control and received clearance to runway two two. The First Officer acknowledged the clearance.

While taxiing to the runway, the crew performed the pre-takeoff items, read the checklist and briefed the passengers about the flight. At 06:05:15 the First Officer advised Lexington tower that flight was ready for takeoff. The tower cleared Comair one ninety one for takeoff and directed they fly runway heading. The crew then read the line-up checklist.

The Captain transferred control of the aircraft to the First Officer who then advised he had the controls. After the engine takeoff thrust was set, the First Officer made a comment about "no lights". Shortly after the Captain called "V one, rotate", he made a comment "whoa", followed by [sound of an impact]. The recording ended shortly thereafter at 06:06:36.2 EDT as power was removed from the recorder.

As part of the Safety Board's accident investigation process, the First Officer has been invited to review the CVR transcript and suggest corrections or additions. To date, he has not reviewed the transcript.

Albert G. Reitan
Vehicle Recorder Division

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. |

Transcript of a Fairchild Model A100S thirty-minute solid-state cockpit voice recorder, serial number 03035, installed on a Comair Canadair CL-600, N431CA, which crashed after an attempted takeoff and runway 26 overrun at the Blue Grass Airport, Lexington, Kentucky on August 27, 2006.

LEGEND

CAM	Cockpit area microphone voice or sound source
HOT	Flight crew audio panel voice or sound source
RDO	Radio transmissions from accident aircraft
PA	Voice transmitted over aircraft public address system
CLR	Radio transmission from the Blue Grass Airport clearance controller
GND	Radio transmission from the Blue Grass Airport ground controller
TWR	Radio transmission from the Blue Grass tower controller
E882	Radio transmission from Eagle flight eight eighty two
S6819	Radio transmission from Skywest flight sixty eight nineteen
-1	Voice identified as the Captain
-2	Voice identified as the First Officer
-3	Voice identified as the male Flight Attendant
-4	Voice identified as the aircraft mechanical voice
-5	Voice identified as ACM (additional crew member pilot)
-?	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: Radio transmissions from CLR, GND and TWR all appear to be the same controller.

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:36:07.7	START of RECORDING START of TRANSCRIPT		
05:36:18.4	CAM [sound of rustling similar to someone entering the cockpit]		
05:36:50.2	CAM-3 *** well, I reported at five-thirty *****.		
05:37:26.9	CAM-1 *** differed.		
05:37:50.9	CAM-1 everything else is good.		
05:37:52.7	CAM [sound similar to crewmember testing oxygen mask]		
05:38:03.4	HOT-? [sound similar to crewmember conducting hot microphone test]		
05:38:04.3	CAM-1 circuit breakers, checked, nose wheel steering is off, hydraulic pumps, all off, landing gear lever, down, spoiler lever, lever, retracted, flaps lever, set to flaps twenty, radar, off, AHRS, mag, landing gear manual release, ADG manual release, battery master, on, fire protection, checked, nav lights, on, external ** A/C, no APU, hydraulic pump 3A is on, nosewheel door, closed, aircraft/crew docs, on board, flight compartment safety inspection is complete.		
05:38:28.4	CAM [sound similar to crewmember checking an oxygen mask]		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:38:40.9 HOT	[three tones similar to CVR test tone]		
05:38:53.0 CAM-?	[sound of person whistling]		
05:38:55.7 CAM	[sound of hi-lo chime]		
05:39:07.6 CAM-4	[sound of chimes similar to fire protection fire test signal] smoke.		
05:39:13.3 CAM-1	smoke.		
05:39:20.8 CAM-4	[sound of triple chime] bleed air duct.		
05:39:24.9 CAM-1	I was talking to another guy I flew with yesterday. he was uh, had put his, bid in for uh, JFK captain. he wasn't real happy about it but.....		
05:39:35.4 CAM-2	First Officer?		
05:39:36.3 CAM-1	yeah.		
05:39:37.9 CAM-3	would you turn the smoking-seatbelt sign on for me?		
05:39:40.2 CAM	[sound of chime]		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:39:41.0 CAM-1	you got it. here come the lights.		
05:39:43.5 CAM-2	why wasn't he too happy about it? he can always change it.		
05:39:46.8 CAM-1	yeah, you know he just uh, he's just not really looking forward to reserves, that's all. but he feels like you know and I think he's right if he wants to get out of here. that's his decision he wants to do but. he's gotta get that PIC....		
05:40:01.1 CAM-2	exactly.		
05:40:01.9 CAM-1	...you gotta bite the bullet sometimes but, I mean, nobody wants to do reserve there.		
05:40:08.5 CAM-2	nope, not here. not the way they do it. they just they have.....		
05:40:11.0 CAM	[sound of chime]		
05:40:12.9 CAM-2	...no clue. they don't utilize....		
05:40:14.3 CAM-?	it's time.		
05:40:14.4 CAM-4	all right.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:40:16.5 CAM-2	... the people effectively.		
05:40:17.3 CAM	[sound of chime]		
05:40:21.9 CAM-2	you know, you're on for six days and you might fly eight hours 'cause they *.		
05:40:27.1 CAM-1	it's amazing though right now, they are using everybody pretty efficiently. um, just shows you what they can do. like I mean I don't have more than ten hours in a hotel, any of these days that I've been on....		
05:40:38.2 CAM-2	really.		
05:40:38.7 CAM-1	...and it's been that way for all month. now September rolls around and I'll guarantee you it'll be a different story.		
05:40:47.4 CAM	[sound of chime]		
05:40:50.3 CAM-2	because I know Cincinnati base, they have a lot of reserves. but I understand.		
05:40:55.8 CAM-1	*.		
05:40:56.0 CAM-1	then, they send them all to New York.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:40:57.1 CAM-2	right, exactly.		
05:40:58.4 CAM-1	yeah.		
05:40:59.9 CAM	[sound similar to stick shaker test]		
05:41:04.6 CAM-4	glideslope whoop whoop, pull up, wind shear, wind shear, wind shear, terrain, terrain, whoop whoop, pull up. [sound of chime]		
05:41:09.4 CAM-?	[sound of person whistling]		
05:41:22.6 CAM-4	[sound of triple chime] gear bay overheat.		
05:41:45.7 CAM-4	TCAS system tests okay.		
05:41:50.1 INT-1	test, test.		
05:41:52.4 CAM	[sound of three hi-lo chimes]		
05:42:10.8 CAM-1	funny you were talking about @ I mean, I, I, I flew with a guy who was, he said he filled out the application process, he filled out the application and went through the background checks. actually I did my uh, my MV/LOE with him uh, about three or four weeks ago and uh, he was telling me all about it.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:42:33.3 CAM-2	well that might do all that stuff prior to actually, giving you, the interview date.		
05:42:38.5 CAM-1	uh huh.		
05:42:39.3 CAM-2	but you are by no means guaranteed anything....		
05:42:42.2 CAM-1	yeah.		
05:42:44.4 CAM-2	but.		
05:42:45.1 CAM-1	I just talked to my wife about it, we looked at, we looked at it on line. you know and I was looking at the pay scales and uh, yeah I know they provide a place ta, for you to live and things like that and was at four thousand, I don't know, forty-four hundred dollars.		
05:43:01.8 CAM-2	fifty-two, fifty-two twelve, a month for the first * month tax free.		
05:43:07.9 CAM-?	how is it?		
05:43:08.4 CAM-2	yeah.		
05:43:09.4 CAM-1	yeah the last time I looked at it or it was like forty-five or something and but. I talked to a guy who was in the military, he said he was, he said it's really pretty for a desert, you know it's....		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:43:22.8 CAM-2	yeah well there's a guy, a military guy, up uh, a first officer, in Kennedy, he's like I think you're doing the right thing. he says if not to visit, maybe to be an ex-patriot and live there is not a good thing.		
05:43:40.9 CAM-1	yeah, what I heard, you know you can't buy land uum, they'll let you buy a condo, like on a high rise or something, thank you, but you can't buy property.... here they come Kelly.		
05:44:04.9 CAM-2	yeah howdy, like yeah, yeah * and then I kept thinking about it... I guess, when I'm, I'm deciding on making a major decision, if it doesn't feel right in my gut. or if I don't have a little voice, if it's starts talking to me and I'm like I need to re-evaluate.		
05:44:29.5 CAM-1	yeah		
05:44:43.2 CAM-2	you know it'd be nice to go over there and fly heavy metal, fly international, but they work you hard over there I've been told.		
05:44:50.3 CAM-1	oh do they?		
05:44:51.1 CAM-2	yeah, they fly you if they can up to a hundred hours ** they have triple sevens *. like for you with the kids, you'd get a housing allowance at a villa. and for me and my wife with no kids, we'd get an apartment. the apartments don't allow any animals and I have four dogs and I'm not, I'm not about to give up, I've had 'em for a while. if I fly overseas, I wanna start and finish here in the States.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:45:32.4 CAM-1	yeah.		
05:45:32.9 CAM-2	***.		
05:45:36.1 CAM-1	you were overseas already. is that what you said?		
05:45:36.9 CAM-2	no, if I, if I did fly overseas.		
05:45:38.8 CAM-1	ah, okay.		
05:45:44.8 CAM-1	emergency equipment, checked, crew oxygen masks, checked left and right, ** psi, CVR, checked, standby instruments, checked, fire protection, checked, gravity cross-flow, checked, duct monitor, checked, hydraulics, auto and on, ice detector, has been checked, cabin signs are on, emergency lights are armed , stall protection system, checked, anti-skid, checked and armed, MLG bay overheat, checked, stab/mach trim, engaged, engine controls, checked, aileron rudder trims checked yaw damper engaged, cabin/exterior checks complete gear and safety pins, have been removed acceptance checklist is complete.		
05:46:19.5 CAM-2	*** it just became ** I started looking at it a little more, there was just too many * to get through.		
05:46:30.3 CAM-1	you know I....		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:46:31.4 CAM-2	is this First Officer single?		
05:46:34.8 CAM-1	I don't think so but his, his name is, he's got an Arab uh.		
05:46:40.5 CAM-2	oh.		
05:46:42.3 CAM-1	he got a, he has some kind of Arab name. @ or something er.		
05:46:50.9 CAM-1	he might blend in a little bit but I heard it's like sixty or seventy percent European I mean.		
05:46:55.2 CAM-2	well it's not even owned by United Arab Emirates. it's owned by a British company.		
05:47:01.1 CAM-1	oh really.		
05:47:08.9 CAM-2	yeah but you gotta deal with a lot of Brits and Australians. you know it some of these Brits are a little up tight.		
05:47:34.5 CAM-2	if circumstances were different I, I'd consider it, they are as such.		
05:47:46.7 CAM-2	plus if I have the opportunity to make Captain.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:47:51.0 CAM-1	yeah.		
05:47:55.9 CAM-2	I'm gonna talk to my dad to see if maybe he can help me out but I think I'm gonna invest in a seven three type rating. if I make Captain here. I need like three hundred PIC to be eligible to meet their requirements and then I'll....		
05:48:14.1 CAM-1	who's that, Southwest? isn't that three thousand PIC?		
05:48:16.7 CAM-2	fifteen hundred.		
05:48:18.6 CAM-1	fifteen hundred?		
05:48:18.7 CAM-2	actually no, thirteen hundred PIC.		
05:48:20.8 CAM-1	oh, okay.		
05:48:21.1 CAM-2	like thirteen hundred, that's a weird number.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
		05:48:24.4	ATIS Lexington Bluegrass information Alpha, 0854 automated weather. wind one niner zero at eight, visibility eight, few clouds six thousand, sky broken niner thousand. temperature two four, dew point one niner, altimeter three zero zero zero. ILS and visual approaches in use. landing and departing runway two two. runway two two glideslope out of service. pilots use caution for construction on air carrier ramp. hazardous weather information available on HIWAS, Flight Watch or Flight Service frequencies. all departures contact ground control on one two one point niner. advise you have information Alpha.
		05:49:42.2	RDO-2 clearance good morning. Comair one ninety one's going to Atlanta with ALPHA.
		05:49:49.3	CLR Comair one ninety one, Lexington clearance. cleared to Atlanta Airport via Bowling Green, ERLIN TWO arrival. maintain six thousand, expect flight level two seven zero one zero minutes after departure. departure's one two zero point seven five. squawk six six four one.
		05:50:06.5	RDO-2 okay, got uh, Bowling Green uh, missed the other part. six thousand, twenty point seven five. six six four one.
		05:50:14.1	CLR Comair one ninety one, it's ERLIN TWO, Echo Romeo Lima, India, November Two arrival.
		05:50:20.4	RDO-2 'kay ERLIN Two, 'preciate it, Comair one ninety one.
05:50:38.0	CAM-2 nothing like **.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:50:41.2 CAM	[sound of click]		
05:50:44.6 CAM-?	[sound of person whistling]		
05:50:53.7 CAM-1	direct Bowling Green, Bowling Green the ERLIN TWO. is that good?		
05:50:58.4 CAM-2	any easier than that.		
05:50:59.9 CAM-1	[sound of laughter]		
05:51:29.3 CAM-1	Chattanooga looks good for the alternate.		
05:51:29.8 CAM-5	well, how's it going guys?		
05:51:30.5 CAM-2	dude, what's up?		
05:51:32.6 CAM-5	how you doin'?		
05:51:33.3 CAM-1	hey good, how you doin'?		
05:51:34.8 CAM-5	I'm @ with Air Tran trying to get a lift to work this morning.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:51:37.1 CAM-1	hey, no problem any seat, * you already got one.		
05:51:38.8 CAM-5	there you go.		
05:51:40.0 CAM-1	beauty.		
05:51:43.2 CAM-5	all right sir.		
05:51:44.4 CAM-1	'preciate it.		
05:51:45.1 CAM-5	you bet.		
05:51:46.1 CAM-1	any time.		
05:51:47.2 CAM-5	thanks a lot.		
05:51:47.7 CAM-1	can I get the white sheet from you?		
05:51:48.9 CAM-5	all right.		
05:51:51.2 CAM-1	there you go sir.		
05:51:52.5 CAM-5	thanks a lot.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:51:53.8 CAM-1	any time.		
05:52:04.3 CAM-1	well @ did you bring it in the other day or what's the sequence? keep on with whatever you're doing.		
05:52:09.1 CAM-2	it don't matter to me.		
05:52:11.3 CAM-1	oh. I'm easy buddy. but, I tell you, I always feel good like I could eat a little more when I get a seatbelt like this man. [sound of laughter]		
05:52:19.6 CAM-2	Jesus.		
05:52:22.9 CAM-2	*, I'll take us to Atlanta.		
05:52:24.0 CAM-1	sure.		
05:52:24.5 CAM-2	I looked at, for some weird reason, I don't have that. I have the airport diagram and the arrival and departure plates. I don't have the San Antonio charts.		
05:52:36.3 CAM-1	uh, okay.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:52:42.2			
CAM-2	either I'm just waiting for the stuff to come up from Cincinnati or for now or the secretary there.		
05:52:50.6			
CAM-1	[sound of chuckle]		
05:52:51.8			
CAM-2	very capable.		
05:52:52.8			
CAM	[sound of click]		
05:52:55.2			
CAM-2	plus we have, we don't have a chief pilot any more.		
05:52:57.9			
CAM-1	oh, that's right. I heard @ got promoted or something.		
05:53:00.2			
CAM-3	** passenger's request for an electric cart in the gatehouse for a passenger.		
05:53:03.7			
CAM-1	@, can I grab another Coke from you?		
05:53:05.2			
CAM-3	would you like ice?		
05:53:06.1			
CAM-1	no thanks.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:53:27.2 CAM-1	thank you.		
05:53:27.7 CAM-3	can I have the PA please so I can do my verification?		
05:53:29.4 CAM-1	sure.		
05:53:58.3 CAM-2	** three *.		
05:54:12.5 CAM-2	sixteen-forty *.		
05:54:20.2 CAM-?	[sound of person whistling]		
05:55:04.4 CAM-2	I think I have *** this thing I got. my wife called a little excited about it but *** yeah you'd be gone like three or four days at a time, which you know with your wife and kids it might be a little difficult.		
05:55:20.2 CAM-3	it's all yours.		
05:55:21.0 CAM-1	all right.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:55:24.9 PA-1	ladies and gentlemen from the flight deck, like to take this time to welcome you also on board Comair flight fifty one ninety one direct flight to Atlanta. we'll be cruising at uh, twenty-seven thousand feet this morning. and once we do get in the air, it looks like one hour and seven minutes enroute. distance of travel today, we got we got four hundred and twenty two miles. weather conditions Atlanta, * some light winds out of the east, looks like some broken clouds and current temperature of seventy-two degrees Fahrenheit. we'll try to keep it as quiet as possible. hopefully you can catch a nap going into Atlanta. it's our pleasure having you all on board.		
05:56:14.0 CAM-1	for our own briefing, Comair standard. run the checklist your leisure. keep me out of trouble. I'll do the same for you. I don't jump on the brakes on your landing. I'll follow along with you. just let me know when you want me to take it. that's it.		
05:56:23.8 CAM	[sound of two clicks similar to pilot seat adjustment]		
05:56:25.2 CAM-2	I'll do the same whenever you're ready.		
05:56:26.9 CAM-1	all right.		
		05:56:27.6 GND	information Bravo is now current. the altimeter's three zero zero zero.
05:56:28.0 CAM-2	* control ***.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:56:30.4 CAM-1	sounds good.		
05:56:34.1 CAM-2	right seat flex takeoff procedures off of um.... he said what runway? one of 'em. * two four.		
05:56:43.4 CAM-1	it's two two.		
05:56:45.9 CAM-2	one ninety at eight		
05:56:49.9 CAM-2	two two up to six, white data * FMS, flaps twenty. * smokes or breaks come back here. come into four or two two. on two two the ILS is out. or the glideslope is, the REILS are out. the uh, came in the other night it was like [sound similar to audible ex-hale] lights are out all over the place.		
05:57:07.8 CAM-1	all right.		
05:57:08.4 CAM-2	right. remember this runway predicated, before we just go back to Cincinnati.		
05:57:12.9 CAM-1	okay.		
05:57:13.7 CAM-2	uum, no continuous, anti-ice, weather radar, hand fly 'til about ten. taxi instructions with ATC.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:57:21.7 CAM-1	all right.		
05:57:23.3 CAM-2	let's take it out and um, take uuuh, Alpha. two two's a short taxi.		
05:57:31.1 CAM-1	yeah.		
05:57:35.4 CAM-2	any questions?		
05:57:36.5 CAM-1	no questions. before starting at your leisure.		
05:57:38.4 CAM-2	ACM crew briefing.		
05:57:39.3 CAM-1	complete.		
05:57:40.0 CAM-2	takeoff brief.		
05:57:40.4 CAM-1	complete.		
05:57:40.7 CAM-2	radios, NAV aids.		
05:57:42.0 CAM-1	uh, six thousand, your side, both in white data, confirmed the flight plan. we got uh, tower, ground twenty one *, is everything on one? do you know?		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:57:49.7 CAM-2	no it's not.		
05:57:50.7 CAM-3	do you want to do a brief?		
05:57:53.5 CAM-1	nothing differed back there that I saw. weather's good Atlanta, scattered to broken clouds. seventy degrees uum, standard chimes, standard calls. if we do have an emergency, I like to open the door and talk face to face.		
05:58:04.5 CAM-3	okay.		
05:58:06.0 CAM-1	that's about it. anything for me?		
05:58:07.0 CAM-3	sounds great.		
05:58:07.9 CAM-1	all right.		
05:58:08.4 CAM-3	see you in Atlanta.		
05:58:12.2 CAM-1	uuh, start engines your leisure.		
05:58:14.8 CAM-2	uuuh, ACM crew brief.		
05:58:16.7 CAM-1	complete.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:58:17.1 CAM-2	takeoff brief		
05:58:18.3 CAM-1	hey man, we already did that one.		
05:58:20.5 CAM-2	we did?		
05:58:21.0 CAM-1	yeah.		
05:58:21.2 CAM-2	I'm sorry.		
05:58:22.2 CAM-?	[sound of laughter]		
05:58:23.3 CAM-2	I'll get it to ya.		
05:58:24.1 CAM-1	[sound of laughter]		
05:58:24.6 CAM-2	papers, manifest.		
05:58:26.0 CAM-1	it's complete out the door.		
05:58:27.2 CAM-2	fuel quantity.		
05:58:27.4 CAM-1	required to have (seventy), seventy-three.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:58:30.0 CAM-?	**.		
05:58:33.3 CAM	[sound of several clicks similar to cockpit door operation]		
05:58:35.1 CAM-2	V speeds, takeoff data fifty temp. V one, V r is thirty-seven forty-two * forty-five *****. [spoken at a very fast speed] you got normal thrust ** point two.		
05:58:43.5 CAM-1	set for flaps twenty.		
05:58:44.5 CAM-2	doors.		
05:58:44.9 CAM-1	closed.		
05:58:45.3 CAM-2	beacon.		
05:58:45.6 CAM-1	on.		
05:58:46.0 CAM-2	fuel pumps.		
05:58:46.8 CAM-1	number one's on.		
05:58:48.7 CAM-2	see this is telling me that I really need to do something.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:58:51.7 CAM-1	[sound of laughter]		
		05:59:05.7 RDO-1	and ground, Comair one ninety one, just a heads-up on the push.
		05:59:11.1 GND	Comair one ninety one advise ready to taxi.
		05:59:13.3 RDO-1	roger.
		05:59:14.1 INT-1	hey, how you doin'? you ca.... can you hear me? okay, brakes released, we're cleared to push sir.
05:59:24.6 HOT-2	must be one of us, skinny flight attendant.		
05:59:26.5 HOT-1	[sound of laughter]		
05:59:42.0 HOT-1	he said it's okay to turn one at your leisure.	05:59:33.0 E882	ground, Eagle flight eight eighty two ready to taxi with Alpha.
05:59:45.4 HOT-2	that's pretty cool the family got to come down.	05:59:43.6 GND	Eagle flight eight eighty two taxi to runway two two. altimeter three zero zero zero and the wind's two zero zero seven.

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
05:59:47.2 HOT-2	how long of a ride is that?		
05:59:50.9 HOT-1	uuuuh. maybe, maybe an hour.		
		05:59:52.9 E882	taxi to **, Eagle flight eight eighty two.
05:59:57.5 HOT-2	that's cool.		
06:00:09.4 HOT-1	both kids were sick though, they, well they all got colds. it was an interesting br, dinner last night.		
06:00:16.1 HOT-2	really.		
06:00:16.6 HOT-1	huh, oh gosh.		
06:00:19.1 HOT-2	how old are they?		
06:00:20.0 HOT-1	three months and two years old. who was sneezing, either nose wiped, diaper change I mean that's all we did all night long.		
06:00:31.0 HOT-2	oh yeah I'm sure.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
		06:00:32.2 GND	** sixteen ninety two thanks, turn right heading two seven zero runway two two, cleared for takeoff.
06:00:32.4 HOT-2	[sound of laughter]		
06:00:34.9 HOT-2	that's a nice range, age range.		
06:00:37.7 HOT-1	yeah, I like two years apart basically and that's the kinda what we were going for.		
06:00:45.3 HOT-1	my wife wants four, I, I, I'm, I was good at one.		
06:00:48.5 HOT-2	she wants four.		
06:00:49.9 CAM	[sound of chime]		
06:00:50.1 HOT-1	yeah.		
06:00:50.2 HOT-1	[sound of chuckle]		
06:00:52.7 HOT-2	it'd be like honey....		
06:01:02.7 CAM	[sound of chime]		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
06:01:07.1 HOT-2	yeah, it's especially being on reserve it, it's gotta be tough being away.		
06:01:12.2 HOT-1	ah, tough on her, oh my God. that's why she came down yesterday. she's like, I just need to get out of this house.		
06:01:18.0 HOT-2	yeah, I bet.		
06:01:18.9 HOT-1	I'm like I understand. I, I told her, why don't you just spend the night. she said well, if you're gonna get up at oh dark thirty and she said you'll end up waking up the babies. I'm like yeah, you're probably right.		
06:01:32.1 HOT-2	yeah it would just be like being at home.		
06:01:35.5 HOT-1	yeah, she's like you know, I don't know, she's like I'll....		
06:01:38.5 HOT-2	instead of having her rush back and drive....		
06:01:40.6 HOT-1	and we got a dog.		
		06:01:40.8 GND	*** Lexington tower roger, hold short.
06:01:42.9 HOT-2	aah, trust me the dog *. be on the @ slim-fast diet * for a night.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
06:01:47.4 HOT-1	[sound of laughter]		
06:01:48.7 HOT-2	uh, parking brake.		
06:01:49.6 HOT-1	that's on.		
06:01:50.0 HOT-2	number two, actually, engine.		
06:01:51.7 HOT-1	one and two are started.		
06:01:52.5 HOT-2	starting engines complete.		
06:01:54.3 HOT-1	and before taxi.		
06:01:55.6 HOT-2	anti-iiiiice.		
06:01:56.6 HOT-1	windshields and probes are low and on.		
06:01:58.3 HOT-2	nosewheel steering.		
06:01:59.5 HOT-1	that's armed.		
06:02:00.0 HOT-2	taxi check complete.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
		06:02:01.3 RDO-2	Comair one ninety one is ready to taxi we have ALPHA.
		06:02:03.8 GND	Comair one ninety one, taxi to runway two two. altimeter three zero zero zero and the winds are two zero zero at eight.
		06:02:08.9 RDO-2	three triple zero and taxi two two, Comair one ninety one.
		06:02:12.6 GND	Eagle flight runway two two, cleared for takeoff.
06:02:15.1 HOT-1	clear left.		
06:02:17.3 HOT-2	on the right.		
06:02:18.9 HOT-1	flaps twenty, taxi check.	06:02:17.9 GND	Skywest six eight nineteen radar contact, say altitude leaving.
06:02:21.0 HOT-2	full right.		
06:02:24.0 HOT-2	full left.	06:02:23.8 GND	Skywest sixty eight nineteen, climb and maintain one zero thousand, ten thousand, join Victor one seventy one and resume *, own navigation.

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
06:02:25.5 HOT-1	test your brakes any time.		
06:02:31.1 HOT-2	I want to *** down.		
06:02:32.3 HOT-1	sure.		
06:02:41.5 HOT-2	let's see, comin' back.		
06:02:51.6 HOT-1	brakes.		
06:02:52.3 HOT-1	they're checked.		
06:02:53.2 HOT-2	right, flaps.		
06:02:54.4 HOT-1	set twenty, indicating twenty.		
06:02:55.6 HOT-2	flight controls.		
06:02:56.3 HOT-1	check left.		
06:02:58.3 HOT-2	on the right, trims.		
06:02:59.5 HOT-1	engage zero seven point two.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
06:03:02.2 HOT-2	radar terrain displays. [spoken in a yawning voice]		
06:03:04.0 HOT-2	all the taxi check's complete. [spoken in a yawning voice]		
06:03:12.0 HOT-1	finish it up your leisure.		
06:03:16.4 HOT-2	yeah, I know three guys at Kennedy. actually two guys uh.... @@ he went but he didn't get past the sim.		
06:03:26.7 HOT-1	oh, really.		
06:03:29.1 HOT-2	and then um, a First Officer from Cinci....		
		06:03:34.5 GND	Eagle flight radar contact, radar contact. say altitude leaving.
06:03:35.1 HOT-2	got through the second part....		
06:03:37.2 HOT-2	what do you do the uh, these tests.... and he didn't, and that's as far as he got.		
		06:03:40.8 GND	Eagle flight eight eighty two, climb and maintain one zero thousand, ten thousand.
06:03:49.3 HOT-2	and then @@ he actually got offered the position.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
06:03:54.5 HOT-1	did he take it or....		
06:03:55.5 HOT-2	yeah.		
06:03:56.1 HOT-1	ah, okay.		
06:04:01.2 HOT-2	second engine started, anti-ice probes windshield low.		
		06:04:03.1 GND	* sixteen ninety one, previous question.
06:04:05.6 HOT-2	hydraulics checked, APU's on, FMS we got runway two two out of Lexington up to six.		
06:04:13.3 HOT-2	thrust reversers are armed, auto crossflow is manual, ignition is off, altimeters three triple zero across the board, crosschecked. I'll be in the back.		
06:04:24.8 HOT-1	got one.		
		06:04:25.7 TWR	Skywest sixty eight nineteen contact Indy center one two six point three seven.
		06:04:29.6 S6819	two six three seven, Skywest sixty eight nineteen.

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
		06:04:32.6 TWR	Eagle flight eight eighty two, turn right heading two seven zero, join Victor one seventy-one. resume navigation.
		06:04:37.5 E882	two seven zero, join victor one seventy one, ****.
06:04:38.2 PA-2	and folks one * time from the flight deck, we'd like to welcome you aboard. we're going to be underway momentarily.... sit back relax enjoy the flight. Kelly, when you have a chance, please prepare the cabin.		
06:04:48.2 CAM	[sound hi-lo chime similar to cabin/cockpit interphone signal]		
06:04:49.3 HOT-2	pre-takeoff * complete cabin report received CAS.		
06:04:53.4 HOT-1	checked and clear.		
06:04:54.4 HOT-?	**, six seven, **. [whispered]		
06:04:56.6 HOT-1	oh.		
06:04:58.1 HOT-2	oh yeah.		
06:04:59.4 HOT-2	I'm looking at it 'cause like, okay I see seven but it's....		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
06:05:01.9 HOT-1	yeah there's a green extra one there but....		
06:05:06.3 HOT-2	uuuh, cabin report's received, CAS clear, ** before takeoff check's complete, ready.		
06:05:12.6 HOT-1	all set.		
		06:05:15.1 RDO-2	"churliser" [at your leisure spoken very fast] Comair one twenty one ready to go.
		06:05:17.7 TWR	Comair one ninety one, Lexington uh, tower, fly runway heading, cleared for takeoff.
06:05:19.2 HOT-?	*		
		06:05:21.0 RDO-1	runway heading, cleared for takeoff, one ninety one.
06:05:23.7 HOT-1	and line-up check.		
		06:05:25.1 TWR	Eagle flight eight eighty two, that heading work for you, do you wanna go uh, northwest around the uh, weather that's ahead of you?
		06:05:30.7 E882	no that looks fantastic. thank you very much.

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
		06:05:32.7 TWR	* say again please.
		06:05:33.8 E882	*** eight eighty two.
06:05:34.4 HOT-1	throw that bad boy on.		
		06:05:36.3 TWR	Eagle flight eight eighty two, contact Indy center one two six point three seven. good day.
		06:05:39.5 E882	twenty six, thirty seven, * eight eighty two.
06:05:41.3 HOT-2	transponder's on, packs on, bleeds closed, cleared for takeoff, runway heading. six grand.		
06:05:45.4 HOT-1	all right.		
06:05:46.4 HOT-2	anti-ice off, lights set, takeoff config's okay, line-up check's complete.		
06:05:51.2 CAM	[sound of clicks similar to pilot adjusting his seat]		
06:05:57.6 HOT-1	all yours Jim.		
06:05:58.9 HOT-2	my brakes, my controls.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
06:06:05.0 CAM	[sound similar to increase in engine RPM]		
06:06:07.8 HOT-2	set thrust please.		
06:06:11.7 HOT-1	thrust set.		
06:06:16.3 HOT-2	dat is weird with no lights.		
06:06:18.0 HOT-1	yeah.		
06:06:24.2 HOT-1	one hundred knots.		
06:06:25.1 HOT-2	checks.		
06:06:31.2 HOT-1	V one, rotate.		
06:06:31.8 HOT-1	whoa.		
06:06:32.2 CAM	[unknown ambient noise]		
06:06:32.6 HOT-1	#.		
06:06:33.0 CAM	[sound of impact]		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME (EDT) & SOURCE	CONTENT	TIME (EDT) & SOURCE	CONTENT
06:06:33.3 HOT-?	[unintelligible exclamation]		
06:06:33.8 CAM	[sound similar to stick shaker]		
06:06:34.7 CAM	[sound of chime]		
06:06:34.7 CAM	[sound similar to stall warning starts and continues to end of recording]		
06:06:35.1 HOT-?	#.		
06:06:35.7 HOT-1	[unintelligible exclamation]		
06:06:36.2 END of RECORDING END of TRANSCRIPT			