

**Docket No. SA-509**

**Exhibit No. 12A**

**NATIONAL TRANSPORTATION SAFETY BOARD**

**WASHINGTON, D.C.**

**COCKPIT VOICE RECORDER TRANSCRIPT**

**USAir Flight 1016**

**Charlotte/Douglas International Airport  
Charlotte, North Carolina**

**NATIONAL TRANSPORTATION SAFETY BOARD**  
Engineering Services Division  
Washington, D.C. 20594



**SPECIALIST'S FACTUAL REPORT OF INVESTIGATION**  
**Cockpit Voice Recorder**

by

**Albert G. Reitan**  
**Transportation Safety Specialist**

**Warning**

The reader of this report is cautioned that the transcription of a CVR tape is not a precise science but is the best product possible from an NTSB group investigative effort. The transcript, or parts thereof, if taken out of context, could be misleading. The attached CVR 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  
Engineering Services Division  
Washington, D.C. 20594**

**SPECIALIST'S FACTUAL REPORT OF INVESTIGATION  
Cockpit Voice Recorder  
DCA 94 MA 065**

August 20, 1994

**A. ACCIDENT**

Location: Charlotte, North Carolina  
Date: July 2, 1994  
Time: 1842 Eastern Daylight Time (EDT)  
Aircraft: Douglas DC-9-30, N954VJ

**B. GROUP**

Chairman: Albert G. Reitan  
Transportation Safety Specialist (CVR)  
National Transportation Safety Board

Member: Frank Hughes  
Accident Investigator  
Federal Aviation Administration

Member: Steven Lund  
Accident Investigator  
Douglas Aircraft

Member: Mike McGraw  
ALPA Safety Chairman, DCA  
ALPA/USAir

Member: John Anderton  
Senior Check Airman, DC-9  
USAir

Member: Dave Robertson  
Flight Operations Specialist  
United Technologies, Pratt & Whitney

**C. SUMMARY**

A Fairchild model A-100A cockpit voice recorder (CVR), s/n 52785, was brought to the audio laboratory of the National Transportation Safety Board on July 3, 1994. The Cockpit Voice Recorder committee convened on July 5, 1994, and re-convened on July 22 and again on August 9. A transcript was prepared of the entire 31 minute recording. (attached)

**D. DETAILS OF INVESTIGATION**

The outer metal jacket of the CVR showed evidence of minor structural damage. Because of the several small dents in the outer casing, it was necessary to bend and pry it to access the recorder. The outer metal casing was also covered with dried mud. The interior of the recorder and the tape sustained no apparent heat or impact damage.

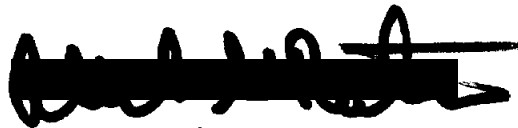
The recording consisted of four channels of good quality audio information. One channel contained the cockpit area microphone audio information. The other three channels contained the Captain, First Officer, Observer, and inter-phone audio information.

The final four minutes of the recording was further tested using the laboratory spectrum analyzer. These tests were used to complete the verification of certain cockpit sounds and accurately determine the elapsed time between key events. The FAA air traffic control tape recording was used to establish the local time of events on the CVR tape.

The recording started at 1811 EDT and continued uninterrupted until 1842 EDT when electrical power was removed from the unit. When the recording started, the crew was reading the take-off check list prior to departure. The recording continued through the taxi, take-off, climb, descent, and approach to the Charlotte Airport. The recording ended when the aircraft collided with terrain near the approach end of the runway.

As part of the Safety Board's accident investigation process, the Captain, and First Officer were invited to review the CVR group's transcript and provide suggested corrections or additions. This review was conducted on July 29, 1994 and suggested the following changes. The CVR group was subsequently re-convened on August 9, 1994 and all items except numbers three, five, and part of eight were adopted into the final transcript.

1. Statement at time 1841:18, change "folks" to "seven".
2. Statement at time 1816:54, change " \* " to "two".
3. Statement at time 1819:00, [pilots suggested this was non-pertinent].
4. Statement at time 1826:00, change to: **CAM-1**
5. Statement at time 1831:03, change to "Karen".
6. Statement at time 1835:32, change "fuel" to "four".
7. Statement at time 1838:38, after \*\*\*\*, add "VOR" .
8. Add statement at time 1842:31.5, **CAM-1** "firewall power".



Albert G. Reitan  
Transportation Safety Specialist (CVR)

Attachment:

**Transcript of a Fairchild A-100A cockpit voice recorder (CVR), s/n 52785, installed on a Douglas DC-9-30, N954VJ, which was involved in a landing accident at Charlotte/Douglas International Airport, Charlotte, North Carolina on July 2, 1994.**

## LEGEND

<b>RDO</b>	Radio transmission from accident aircraft
<b>CAM</b>	Cockpit area microphone voice or sound source
<b>-1</b>	Voice identified as Pilot-in-Command (PIC)
<b>-2</b>	Voice identified as Co-Pilot
<b>CAEGND</b>	Radio transmission from Columbia ground control
<b>CAETWR</b>	Radio transmission from Columbia tower
<b>CAEDEP</b>	Radio transmission from Columbia departure control
<b>CLTATIS</b>	Radio transmission from Charlotte air terminal information service
<b>ATL</b>	Radio transmission from Atlanta Center
<b>APR1</b>	Radio transmission from first Charlotte approach controller
<b>OPS</b>	Radio transmission from USAir flight operations
<b>APR2</b>	Radio transmission from second Charlotte approach controller
<b>TWR</b>	Radio transmission from Charlotte tower
<b>ACFT</b>	Radio transmission from unknown aircraft
<b>US983</b>	Radio transmission from USAir flight 983
<b>US806</b>	Radio transmission from USAir flight 806
<b>5211</b>	Radio transmission from flight 5211
<b>•</b>	Unintelligible word
<b>@</b>	Non pertinent word
<b>#</b>	Expletive
<b>%</b>	Break in continuity
<b>( )</b>	Questionable insertion
<b>[ ]</b>	Editorial insertion
<b>....</b>	Pause

**Note:** Times are expressed in eastern daylight time (EDT).

**INTRA-COCKPIT COMMUNICATION**

1

**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
<b>START of RECORDING</b>			
<b>START of TRANSCRIPT</b>			
1811:26 <b>CAM-2</b>	engine instruments?		
1811:27 <b>CAM-1</b>	check.		
1811:27 <b>CAM-2</b>	check.		
1811:28 <b>CAM-2</b>	start valves?		
1811:28 <b>CAM-1</b>	lights out.		
1811:29 <b>CAM-2</b>	ignition?		
1811:30 <b>CAM-1</b>	off.		
1811:30 <b>CAM-2</b>	anti ice?		
1811:31 <b>CAM-1</b>	off.		
1811:32 <b>CAM-2</b>	electrical systems?		

## INTRA-COCKPIT COMMUNICATION

2

## AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1811:33 CAM-1	checked.		
1811:33 CAM-2	A/C supply?		
1811:34 CAM-1	auto.		
1811:34 CAM-2	hydraulics?		
1811:34 CAM-1	on high on checked.		
1811:35 CAM	[sound of loud click]		
1811:36 CAM-2	annunciator panel's checked.		
1811:36 CAM-1	checked.		
1811:37 CAM-2	(door lights locked) shoulder harness?		
1811:38 CAM-1	on left.		
		1811:41 RDO-2	and ah ten sixteen taxi now.
		1811:42 CAEGND	ten sixteen taxi to runway one one.
		1811:45 RDO-2	thank you sir.



## INTRA-COCKPIT COMMUNICATION

3

## AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1811:47 CAM	[sound of loud click]		
1811:50 CAM	[three tones similar to those of takeoff warning horn]		
1811:54 CAM	[non pertinent conversation]		
1812:13 CAM	[sound of click]		
1812:24 CAM-2	ah... I'll do this take ..... air conditioning auto shut off?		
1812:27 CAM-1	it's armed.		
1812:27 CAM-2	* horizon * *.		
1812:29 CAM-1	it's checked.		
1812:30 CAM-2	waiting on a "W" ... waiting on a "W" and "B".		
1812:32 CAM-2	ahh.		
1812:34 CAM-?	* * *.		
1812:42 CAM-2	the trip I just got off here .. everybody's ... it's all running together here now.		

**INTRA-COCKPIT COMMUNICATION**

**AIR-GROUND COMMUNICATION**

**TIME &  
SOURCE**

**CONTENT**

**TIME &  
SOURCE**

**CONTENT**

1812:51  
**CAM**

[non pertinent conversation]

1814:06  
**RDO-2**

hello there Columbia ten sixteen.

1814:12  
**CAEOPS**

ten sixteen go ahead sir.

1814:13  
**RDO-2**

yeah you got the weight and balance?

1814:18  
**CAEOPS**

yes sir we've got gross weight without fuel seven two three two five gross takeoff eight six three two five .. stabilizer four point seven you've got fifty seven (or possibly "folks") on board.

1814:29  
**RDO-2**

alright ah got a good copy thank you much.

1814:32  
**CAEOPS**

have a good one.

1814:38  
**CAM-1**

I thought you said it's gonna be a light one?

1814:39  
**CAM-2**

well okay ah you got four point seven.

1814:41  
**CAM-1**

set.

1814:42  
**CAM**

[three sounds similar to stab. trim warning]

## INTRA-COCKPIT COMMUNICATION

5

## AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1814:45 CAM-1	ah [masked] trim set zero zero.		
1814:47 CAM-2	zero zero.		
1814:47 CAM-2	that's five blue light.		
1814:48 CAM-1	five five and a blue light.		
1814:55 CAM-2	and ah takeoff data eighty seven thousand is ah, thirty thirty three one forty one.		
1815:00 CAM-1	set.		
1815:01 CAM-2	takeoff warning?		
1815:03 CAM-1	checked.		
1815:04 CAM-2	takeoff briefing ... twenty-five hundred feet .. and ah thirty three four is departure.		
1815:10 CAM-1	okay.		

**INTRA-COCKPIT COMMUNICATION**

**AIR-GROUND COMMUNICATION**

**TIME &  
SOURCE**

**CONTENT**

**TIME &  
SOURCE**

**CONTENT**

1815:14  
PA-2

good afternoon folks from the flight deck we'd like to say welcome aboard to you ... ah we're next in line for departure we'll be on our way momentarily to charlotte .. once we're airborne just about twenty minutes of flight time up to ah Charlotte Douglas ah airport ... the weather up there is just about what you see out the window .. partly cloudy skies they have ninety degrees on the last hour .. sit back and enjoy the flight at this time we'd like to ask the flight attendants to please take their seats for departure ... welcome aboard.

1815:39  
CAETWR

USAir ten sixteen Columbia tower ready?

1815:42  
RDO-1

you betcha.

1815:43  
CAETWR

USAir ten sixteen fly runway heading runway one one cleared for takeoff.

1815:47  
RDO-1

alright ah runway heading we're cleared to go USAir ten sixteen.

1815:50  
CAM

[sound similar to that of increase in engine power]

1815:52  
CAM-2

\* \* (fuel) \* set we ready?

1815:53  
CAM-2

flight attendants been advised, ignition?

**INTRA-COCKPIT COMMUNICATION**

7

**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1815:55 CAM-1	both.		
1815:56 CAM-2	anti-skid?		
1815:57 CAM-1	go ahead.		
1815:58 CAM-2	no light .. flight controls?		
1815:58 CAM-1	bottom.		
1815:59 CAM-2	tops all free .. annunciator panel?		
1816:00 CAM-1	checked.		
1816:01 CAM-2	transponder DME?		
1816:04 CAM-1	TA RA TCAS.		
1816:05 CAM-2	got ah, fourteen six showing supposed to have ah, thirteen six.		
1816:08 CAM-1	that's right.		
1816:10 CAM-2	I got your ah, on the inbound radial me on the outbound radial.		

## INTRA-COCKPIT COMMUNICATION

8

## AIR-GROUND COMMUNICATION

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1816:13 CAM-1	okay ... ready to roll.		
1816:17 CAM-2	I'm gonna kick (the parking brake off).		
1816:19 CAM-1	you got it.		
1816:20 CAM	[sound of loud click similar to that of parking brake being released]		
1816:23 CAM	[sound of increase in engine power]		
1816:25 CAM-1	spooled.		
1816:30 CAM-1	power's set.		
1816:36 CAM-1	eighty knots, power check's okay.		
1816:44 CAM	[sound similar to that of nose gear on runway]		
1816:48 CAM-1	"V" one.		
1816:50 CAM-1	"R".		
1816:54 CAM-1	two.		

## INTRA-COCKPIT COMMUNICATION

9

## AIR-GROUND COMMUNICATION

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1816:59 CAM-2	positive rate, gear up.		
1817:03 CAM	[sound similar to that of gear handle actuation]		
1817:03 CAM-1	your throttles.		
1817:05 CAM	[sound similar to that of trim motion warning horn]		
1817:07 CAM	[sound similar to that of trim motion warning horn]		
1817:10 CAM	[sound similar to that of trim motion warning horn]		
		1817:18 CAETWR	USAir ten sixteen contact departure.
		1817:20 RDO-1	ten sixteen good day.
1817:28 CAM-2	flaps slats after takeoff.		
		1817:31 RDO-1	USAir ten sixteen is with you climbing * - two point five.
1817:35 CAM	[sound similar to that of flap handle actuation]		

## INTRA-COCKPIT COMMUNICATION

10

## AIR-GROUND COMMUNICATION

TIME &  
SOURCE

CONTENT

TIME &  
SOURCE

CONTENT

1817:47  
**CAM** [concurrent with previous transmission sound similar to altitude alert signal]

1817:58  
**CAM-2** Owens uh, little Owens airport right across the river over there.

1818:06  
**CAM-1** what stadium is that?

1818:07  
**CAM-2** that's the University of South Carolina, Gamecocks.

1818:10  
**CAM-1** uh huh.

1818:21  
**CAM-2** that's all part of the school right down there.

1817:36  
**CAEDEP** USAir ten sixteen Columbia departure radar contact turn left heading two niner zero .. once you're established on that heading I'll have higher for you .. maintain two thousand five hundred.

1817:43  
**RDO-1** twenty five hundred left two ninety, USAir ten sixteen.

1818:23  
**CAEDEP** USAir ten sixteen, climb and maintain one zero thousand.

1818:25  
**RDO-1** one zero thousand, USAir ten sixteen.



## INTRA-COCKPIT COMMUNICATION

11

## AIR-GROUND COMMUNICATION

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1818:30 CAM-1	ten thousand.		
1818:31 CAM-2	** on the right.		
1819:00 CAM-1	do you want me to fly while you eat?		
1819:02 CAM-2	no, I'm alright.		
1819:03 CAM-1	OK.		
1819:03 CAM-?	**.		
1819:06 CAM	[sound of several clicks]		
		1819:42 CAEDEP	USAir ten sixteen, contact Jacksonville center, one two four point seven. good day.
		1819:46 RDO-1	twenty four seven, USAir uh, ten sixteen. goodday.
		1819:56 RDO-1	USAir ten sixteen's climbing to ten.
		1819:59 JAX	USAir ten sixteen good evening, climb and maintain one two thousand, twelve.
		1820:02 RDO-1	one two thousand, USAir ten sixteen.

## INTRA-COCKPIT COMMUNICATION

12

## AIR-GROUND COMMUNICATION

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1820:05 <b>CAM-1</b>	one two thousand.		
1820:06 <b>CAM-2</b>	ten.		
1820:08 <b>CAM-1</b>	in the box.		
1820:10 <b>CAM-2</b>	they just gave us a heading, they didn't say intercept or do anything.		
		1820:16 <b>RDO-1</b>	do you want US ten sixteen to maintain the two ninety heading?
		1820:19 <b>JAX</b>	USAir ten sixteen, uh you join Columbia three fourteen radial, as filed.
		1820:26 <b>RDO-1</b>	USAir ten sixteen.
1820:29 <b>CAM-2</b>	OK, OK.		
		1821:21 <b>JAX</b>	USAir seventeen sixty six, keep your speed up for spacing with company into Charlotte and what will your speed be tonight?
		1821:28 <b>RDO-1</b>	was that for US ten sixteen?

**INTRA-COCKPIT COMMUNICATION**

13

**AIR-GROUND COMMUNICATION**

**TIME &  
SOURCE**

**CONTENT**

**TIME &  
SOURCE**

**CONTENT**

1822:59  
CAM-1 I'm off.

1822:25  
JAX

USAir ten sixteen, contact Atlanta center one three five point three five, good day.

1822:30  
RDO-1

thirty five thirty five, US ten sixteen, good day.

1822:40  
RDO-1

USAir ten sixteen, one two thousand.

1822:43  
ATL

ten sixteen, Atlanta center, current altimeter is three zero zero two. turn thirty degrees right to intercept UNARM arrival.

1822:50  
RDO-1

thirty right to the UNARM, thirty oh two for the altimeter, US ten sixteen.

1823:00  
CLTATIS

one zero weather. visibility six miles haze. temperature eight eight, dew point six seven. wind one five zero at eight. altimeter three zero zero one. ILS approaches runway one eight left, one eight right. localizer back course runway two three approach in use. if unable to comply with speed restrictions, advise. read back all hold short instructions. advise you have information, Yankee. Charlotte International Airport arrival information Yankee, Charlotte two one five one Zulu weather. five thousand scattered. visibility six miles haze.

## INTRA-COCKPIT COMMUNICATION

14

## AIR-GROUND COMMUNICATION

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1823:38 <b>CAM-1</b>	five thousand scattered. six in haze. eighty eight degrees, wind's one fifty at eight. three zero zero one. eighteen left right and two three.		
1823:45 <b>CAM-2</b>	thank you.		
1824:40 <b>CAM-2</b>	how old are you Mike?		
1824:41 <b>CAM-1</b>	thirty eight.		
1824:42 <b>CAM-2</b>	thirty eight?		
1824:44 <b>CAM-1</b>	how about yourself.		
1824:48 <b>CAM-2</b>	I'll be, forty two on the twenty sixth of July.		
1824:54 <b>CAM-1</b>	is that right? I had you figured about thirty five.		
1824:57 <b>CAM-2</b>	did you really?		
1824:57 <b>CAM-1</b>	oh yeah.		
1824:59 <b>CAM-2</b>	I knew there's something I liked about you.		
1825:05 <b>CAM-1</b>	[sound of laughter]		

**INTRA-COCKPIT COMMUNICATION**

15

**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1825:13 <b>CAM-1</b>	what kind of airplanes you fly corporate?		
1825:17 <b>CAM-2</b>	little Lear and I flew a Citation ** Diamond and a King Air, **.		
1825:28 <b>CAM-1</b>	that's nice equipment.		
1825:29 <b>CAM-2</b>	yeah, yeah, pretty nice and uh, and a lot of piston bangers, Navajos and all that stuff.		
1825:36 <b>CAM-1</b>	yeah, I've got a lot of time in Navajos, Aztecs, Senecas.		
1825:42 <b>CAM-2</b>	I got a lot of time in Navajos.		
		1825:44 <b>ATL</b>	USAir ten sixteen, fly heading, zero one zero intercept the Charlotte two thirty two UNARM arrival.
		1825:50 <b>RDO-1</b>	is that zero one zero for USAir ten sixteen?
		1825:53 <b>ATL</b>	correct, zero one zero intercept the Charlotte two thirty two UNARM arrival.
		1825:57 <b>RDO-1</b>	USAir ten sixteen.

INTRA-COCKPIT COMMUNICATION

16

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1826:00 CAM-1	I don't have much Cessna. the place I worked I was flying for a Beech and Piper dealer, so I had a lot .... I gave a lot of dual in an Aztec C ** multi-engine rating. ** got about seven hundred hours *** Apache.		
1826:17 CAM-2	I got a lot of time in Navajo Chieftain and a lot of time in Cessna four oh twos and uh, four fourteen four twenty ones.		
1826:24 CAM-1	** I always thought they were pretty good airplanes.		
1826:25 CAM-2	yeah, yeah, it is. I enjoyed flying it.		
1826:30 CAM-1	I didn't care much for uh, some of the Cessna four oh twos uh, and stuff. I just didn't think they, they didn't do what they said they'd do.		
1826:37 CAM-2	alright. you know, there's a lot of things where you know, there's trade-offs. the Cessna wasn't nearly as good a short field airplane as the Nav, Navajo. is uh, about the same speed, except the Cessna might have been a little bit faster depending on which model *.		
1826:55 CAM-1	yeah.		

**INTRA-COCKPIT COMMUNICATION**

**AIR-GROUND COMMUNICATION**

**TIME &  
SOURCE**

**CONTENT**

**TIME &  
SOURCE**

**CONTENT**

1827:27  
CAM-1 I'll be off.

1826:57  
ATL USAir ten sixteen, contact Charlotte approach one two five point three five, and before you go sir uh, slow back to two hundred and fifty knots, and Charlotte two five three five.

1827:06  
RDO-1 we'll slow 'er back, twenty five thirty five. US ten sixteen. have a good weekend.

1827:10  
ATL sir.

1827:14  
RDO-1 USAir ten sixteen, twelve thousand Yankee.

1827:17  
APR1 USAir ten sixteen, Charlotte approach, expect runway one eight right.

1827:20  
RDO-1 eighteen right.

1827:32  
RDO-1 Charlotte, ten sixteen.

1827:36  
OPS go ahead.

1827:37  
RDO-1 we should be in in about fifteen minutes, got one uh, write-up uh, maintenance.

**INTRA-COCKPIT COMMUNICATION**

18

**AIR-GROUND COMMUNICATION**

**TIME &  
SOURCE**

**CONTENT**

**TIME &  
SOURCE**

**CONTENT**

1828:11  
PA-1

ladies and gentlemen, we're forty miles from Charlotte \*\*\*\* should be on the ground \*\*\*\* safe and happy holiday. at this time we'd like our flight attendants to please prepare the cabin for arrival.

1827:42  
OPS

OK, go ahead with your write-up.

1827:43  
RDO-1

we got uh, we got some blue fluid leaking out of the uh, out of the lav.

1827:49  
OPS

\*\* OK blue fluid leaking out of the lav and give me your call sign one more time.

1827:53  
RDO-1

USAir ten sixteen aircraft nine five four.

1827:56  
OPS

OK, ten sixteen thank you sir inbound to B thirteen. that aircraft turns uh, nine eighty three to Memphis.

1828:01  
RDO-1

thank you.

1828:20  
APR1

USAir ten sixteen, descend and maintain one zero thousand.

1828:29  
RDO-1

one zero thousand, US ten sixteen.

1828:32  
APR1

normal speeds fine right now ten sixteen.



## INTRA-COCKPIT COMMUNICATION

19

## AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
		1828:33 RDO-1	ten sixteen.
1828:36 CAM-1	care to deviate?		
1828:38 CAM-2	uh well when we join this radial here, I'm gonna, we're gonna make a little right turn.		
1828:44 CAM-1	ah OK, I'm sorry, see I wasn't paying attention. ... see I understand lotta times when I say something I'm not paying attention.		
1828:51 CAM-2	uh, OK. ... your trying to understand the things you don't know are you?		
1828:51 CAM-1	I'm trying to consider the things I don't know about. and I'm not always doin'a good job of that.		
1829:04 CAM-1	B thirteen, she says.		
1829:05 CAM-2	B thirteen.		
1829:18 CAM-1	my guess is that it just spilled down through the floor, ...so I'm not going to put it in the book until I talk to a mechanic.		
1829:46 CAM-2	eleven ten.		

## INTRA-COCKPIT COMMUNICATION

20

## AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
CAM-?	**.		
1829:54 CAM-2	there's more rain than I thought there was. it's startin' ** pretty good. a minute ago. now it's held up.		
1829:56 CAM-1	yeah.		
1829:57 CAM	[four beeps similar to altitude alert signal]		
		1830:11 RDO-1	Charlotte, US ten sixteen.
		1830:14 APR1	USAir ten sixteen, go ahead.
		1830:15 RDO-1	we're gonna swing just uh, five degrees to the right here just uh, for about a quarter half mile.
		1830:21 APR1	that's fine.
1830:44 CAM-1	bumpy in there.		
1830:45 CAM-2	yeah.		
1831:03 CAM-2	I wonder if @ is going to come screaming up here in a minute?		
1831:23 CAM-2	my wife was born and raised in a little town, a little		

## INTRA-COCKPIT COMMUNICATION

21

## AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
	town right down here just south of uh, Charlotte.		
1831:28 CAM-1	oh, is that right?		
1831:30 CAM-2	Rock, Rock Hill, South Carolina.		
1831:32 CAM-1	Rock Hill.		
		1831:34 APR1	and USAir ten sixteen, let's start reducing now, if you would please.
		1831:37 RDO-1	USAir ten sixteen.
1832:18 CAM-1	looks like that's settin' just off the edge of the airport.		
1832:24 CAM-2	this thing starts to swing and then, doesn't come over there.		
1832:27 CAM-1	and it just goes to show ya.		
1832:31 CAM-2	just can't find a good VOR.		
CAM-1	yeah.		
1833:14 CAM-2	let's go right through that hole.		
1833:16 CAM-1	yeah.		

## INTRA-COCKPIT COMMUNICATION

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## AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
		1833:17 RDO-1	US. ... uh, approach, US ten sixteen.
		1833:18 APR1	ten sixteen, go ahead.
		1833:19 RDO-1	we're showin' a, little build-up here at uh, looks like it's sittin' on the radial. like to go about five degrees to the left, to the west.
		1833:27 APR1	how far ahead are you lookin' ten sixteen?
		1833:30 RDO-1	'bout fifteen miles.
		1833:32 APR1	I'm goin' to turn you before you get there, I'm goin' to turn you in about five miles northbound.
		1833:35 RDO-1	OK.
1833:38 CAM-2	good call.		
1833:57 CAM-1	we need to sashay around that right side there. you'll have enough.		
		1834:00 APR1	USAir ten sixteen turn left heading three six zero.
		1834:04 RDO-1	OK, left to three sixty, US uh, ten sixteen.

**INTRA-COCKPIT COMMUNICATION**

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**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1834:11 CAM-2	that's too far the other way **.		
1834:16 CAM-1	and let's go though this saddle here.. it won't be that bad.		
1834:17 CAM-2	OK.		
1834:37 CAM-1	now you ought to be able to come left up here. three sixty.		
1834:44 CAM-2	yeah **. *** I apologize ***.		
1834:47 CAM-1	I didn't know if you copied that or not.		
1834:51 CAM-2	yeah, I'm just trying to give them a little smoother ride than what they've had so far. ha, ha.		
		1835:01 APR1	USAir ten sixteen, descend and maintain six thousand.
		1835:04 RDO-1	out of ten for six. US ten sixteen.
1835:06 CAM-2	what runway did he say?		
1835:07 CAM-1	eighteen right.		

**INTRA-COCKPIT COMMUNICATION**

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**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
		1835:09 <b>APR1</b>	USAir ten sixteen contact approach one one niner zero.
		1835:12 <b>RDO-1</b>	nineteen zero, US ten sixteen, gooday.
		1835:18 <b>RDO-1</b>	USAir ten sixteen, ten for six.
		1835:21 <b>APR2</b>	USAir ten sixteen Charlotte approach, maintain four thousand runway one eight right.
		1835:25 <b>RDO-1</b>	four thousand for the right side.
1835:27 <b>CAM-2</b>	alright that's one eleven uh, three and uh, one eighty one.		
1835:32 <b>CAM-1</b>	OK, your cabin's down, four pumps on, seat belt sign's on, hydraulics', on high on check, altimeters flight instruments thirty oh one, set.		
1835:41 <b>CAM-2</b>	set.		
1835:48 <b>CAM-1</b>	landing data EPR, *** (eighty seven) for one twenty two.		
1835:49 <b>CAM-2</b>	twenty two.		
1835:50 <b>CAM-1</b>	EPR set, shoulder harness?		

**INTRA-COCKPIT COMMUNICATION**

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**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1835:51 <b>CAM-2</b>	fastened.		
1835:52 <b>CAM-1</b>	approach brief?		
1835:53 <b>CAM-2</b>	visual back up ILS.		
1835:54 <b>CAM-?</b>	***.		
		1835:54 <b>APR2</b>	USAir ten sixteen turn ten degrees right, descend and maintain two thousand three hundred vectors to visual approach to one eight right.
		1836:00 <b>RDO-1</b>	ten right, down to twenty three hundred, USAir ten sixteen.
1836:03 <b>CAM-1</b>	looks like we're number one.		
1836:04 <b>CAM-2</b>	(yeah) right.		
1836:21 <b>CAM-2</b>	slats.		
<b>CAM</b>	[clicks similar to flap handle being moved]		
1836:24 <b>CAM-1</b>	slats out.		

**INTRA-COCKPIT COMMUNICATION**

**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1836:28 <b>CAM</b>	[two one second sounds similar to stabilizer motion warning horn]		
1836:37 <b>CAM-1</b>	this thing just drops like a rock, doesn't it.		
1836:38 <b>CAM-2</b>	boy doesn't it.		
1836:40 <b>CAM</b>	[another sound similar to stabilizer motion warning horn]		
1836:46 <b>CAM-2</b>	better than that # Boeing can do.		
1836:48 <b>CAM-1</b>	the, the seven twos come down pretty good.		
1836:50 <b>CAM-2</b>	aw, the seven two will, yeah.		
1836:52 <b>CAM-2</b>	yeah that three hundred ...		
		1836:59 <b>APR2</b>	I'll tell you what, USAir ten sixteen, may get some rain just south of the field. might be a little bit commin' off north, just expect the ILS now. amend your altitude maintain three thousand.
		1837:08 <b>RDO-1</b>	OK, we'll maintain three, and uh, we're comin' right down. US ten sixteen.



**INTRA-COCKPIT COMMUNICATION**

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**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1837:18 <b>CAM-1</b>	three thousand.	1837:13 <b>APR2</b>	OK, I'll turn your base as soon as I can get you outside the marker.
1837:20 <b>CAM-2</b>	three thousand.	1837:15 <b>RDO-1</b>	OK.
1837:34 <b>CAM-1</b>	I'm glad we got that sandwich down there because I hate eatin' late. I'd rather eat something nasty early, than ....		
1837:41 <b>CAM-2</b>	something good late, ha ha.		
1837:43 <b>CAM-1</b>	something good late within reason.		
		1837:44 <b>APR2</b>	USAir ten sixteen, turn right heading zero nine zero.
		1837:47 <b>RDO-1</b>	zero nine zero, US ten sixteen.
1837:56 <b>CAM</b>	[sound similar to stabilizer motion warning horn]		
1838:22 <b>CAM-2</b>	four three.		

## INTRA-COCKPIT COMMUNICATION

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## AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1838:26 CAM	[four beeps sound similar to altitude alert]	1838:27 APR2	USAir ten sixteen, turn right heading one seven zero, four from SOPHE, correction four from yeah SOPHE, cross SOPHE at or above three thousand cleared ILS one eight right approach.
1838:38 CAM-1	looks like it's sittin' right on the [unreadable due to unrelated ATC transmission through cockpit speaker] *****	1838:34 RDO-1	SOPHE at or above three, cleared the right side. USAir ten sixteen.
1838:47 CAM-2	flaps to five.		
1838:48 CAM	[sound similar to flap handle being moved]		
1838:49 CAM-1	five.		
1838:50 CAM-2	I'll ding 'em.		
1838:51 CAM-1	OK.		
1838:52 CAM	[sound of three chimes]		
1839:02 CAM-1	if we have to bail out *-		

**INTRA-COCKPIT COMMUNICATION**

**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1839:03 CAM-2	.		
1839:06 CAM-1	it looks like we bail out to the right.		
1839:09 CAM-2	amen.		
1839:09 CAM-1	ten miles to the VOR which is off the end of the runway. 'bout a mile off the end of the runway.		
1839:14 CAM-2	yeah.		
1839:16 CAM-1	so I think we'll be alright.		
1839:20 CAM-1	chance of shear.		
		1839:24 APR2	Air ten sixteen, contact tower one two six point four.
		1839:27 RDO-1	twenty six four, US ten sixteen. gooday.
		1839:29 APR2	so long.
1839:30 CAM-2	fifteen.		
1839:31 CAM	[sounds similar to flap handle movement]		

**INTRA-COCKPIT COMMUNICATION**

**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1839:43 CAM-2	gear down.	1839:33 ACFT	ah that's OK, its probably better off we didn't go anyway.
1839:45 CAM	[click and sound of rushing air similar to landing gear being extended]	1839:38 RDO-1	US, USAir ten sixteen for uh, eighteen right.
1839:55 CAM-1	ignition's off, gear ?	1839:42 TWR	USAir ten sixteen ...
1839:57 CAM-2	down.	1839:44 TWR	...Charlotte tower, runway ...
1839:59 CAM-1	spoilers.	1839:47 TWR	...one eight right. cleared to land. following F one hundred short final. previous arrival reported smooth ride all the way down the final.
		1839:49 RDO-1	USAir ten sixteen, I'd appreciate a pirep from the guy in front of us.

## INTRA-COCKPIT COMMUNICATION

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## AIR-GROUND COMMUNICATION

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1839:59 CAM	[sound of click similar to spoilers being armed]		
1840:00 CAM-2	lights out and armed.		
1840:01 CAM-1	lights out and armed, did you ring 'em?		
1840:02 CAM-2	yes I did.		
CAM-1	OK.		
1840:05 CAM-2	twenty five.		
1840:06 CAM-1	twenty five.		
1840:06 CAM	[two clicks similar to flap handle being moved]		
1840:10 CAM-2	yep, laying right there this side of the airport, isn't it?		
1840:14 CAM-1	well.		
1840:15 CAM-2	the edge of the rain is, I'd say.		
1840:15 CAM-1	yeah.		

**INTRA-COCKPIT COMMUNICATION**

**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1840:19 <b>CAM</b>	[sound similar to stabilizer trim in motion warning horn]		
1840:21 <b>CAM-2</b>	flaps forty please.		
1840:22 <b>CAM-1</b>	forty flaps.		
1840:22 <b>CAM</b>	[two clicks similar to flap handle being moved]		
		1840:29 <b>TWR</b>	USAir nine eighty three, turn left the next forward high speed and say your ride uh, how the ride was on final sir?
		1840:35 <b>US983</b>	smooth, USAir nine eighty three.
		1840:37 <b>TWR</b>	nine eighty three roger, you can make the reverse. contact ground control, point niner.
		1840:40 <b>US983</b>	USAir nine eighty three.
		1840:42 <b>TWR</b>	USAir ten sixteen, company "FK" one hundred just exited the runway, sir he said smooth ride.
		1840:46 <b>RDO-1</b>	thank you uh. what are you showing the winds?
		1840:48 <b>TWR</b>	USAir nine sixteen wind is showing one zero zero at one nine.

**INTRA-COCKPIT COMMUNICATION**

**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1840:56 <b>CAM-2</b>	one zero zero at one nine. eh?	1840:53 <b>RDO-1</b>	USAir ten sixteen.
1841:05 <b>CAM-1</b>	stay heads up.	1840:59 <b>TWR</b>	USAir ten sixteen, wind now one one zero at two one.
1841:07 <b>CAM-?</b>	**** [concurrent with radio transmission]	1841:02 <b>RDO-1</b>	USAir ten sixteen.
		1841:06 <b>TWR</b>	wind shear alert northeast boundary winds one nine zero at one three.
		1841:18 <b>TWR</b>	Carolina fifty two eleven Charlotte tower, runway one eight right, cleared to land, wind one zero zero at two zero. wind shear alert, northeast boundary wind one nine zero at one seven.
		1841:29 <b>5211</b>	appreciate that, fifty two eleven.
		1841:32 <b>TWR</b>	USAir eight zero six, you want to just sit tight for a minute sir?

## INTRA-COCKPIT COMMUNICATION

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## AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
		1841:35 <b>US806</b>	yes sir, we'd like to just sit tight.
		1841:37 <b>TWR</b>	USAir seven ninety seven company aircraft in front of you is going to sit and wait a while sir. do you want to go in front of him?
		1841:43 <b>US797</b>	no no, it wouldn't sound like a good plan. we'll uh, it didn't look like a whole lot to us on the radar taxiing out so it shouldn't be uh, shouldn't be too many minutes.
1841:54 <b>CAM-1</b>	here comes the wipers.		
1841:56 <b>CAM-2</b>	alright.		
1841:57.6 <b>CAM</b>	[sound similar to rain concurrent with sound similar to windshield wipers starts and continues to impact]		
1841:58.9 <b>CAM-2</b>	there's, ooh, ten knots right there.		
1842:06.4 <b>CAM-1</b>	OK, you're plus twenty.		
1842:14.0 <b>CAM-1</b>	take it around, go to the right.		
		1842:16.1 <b>RDO-1</b>	USAir ten sixteen's on the go.
1842:17.7 <b>CAM-1</b>	max power.		



## INTRA-COCKPIT COMMUNICATION

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## AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1842:18.5 CAM-2	yeah max power ...	1842:18.5 TWR	USAir ten sixteen understand you're on the go sir, fly runway heading. climb and maintain three thousand.
1842:19.4 CAM-2	flaps to fifteen.		
1842:20.8 CAM	[clicks similar to flap handle being moved]		
1842:22.0 CAM-1	down, push it down.	1842:25.5 RDO-1	up to three we're takin' a right turn here.
1842:28.4 CAM-5	["whoop whoop terrain" sound begins and continues to first sound of impact]	1842:27.9 TWR	USAir ten sixteen, understand you're turning right?
1842:28.5 CAM-?	** power.		
1842:32.7 CAM	[vibrating sound similar to aircraft stick shaker begins]		
1842:33.5 CAM	[vibrating sound similar to aircraft stick shaker ends]		

**INTRA-COCKPIT COMMUNICATION**

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**AIR-GROUND COMMUNICATION**

<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>	<b>TIME &amp; SOURCE</b>	<b>CONTENT</b>
1842:35.3 CAM	[one beep similar to trim in motion]		
1842:35.6 CAM	[sound of impact]		
1842:36.0 CAM	[sound of impact]		
1842:36.5 CAM	[sound of impact]		
1842:36.6			
<b>END of RECORDING</b>			
<b>END of TRANSCRIPT</b>			