

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.

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SPECIALIST'S FACTUAL REPORT OF INVESTIGATION
Cockpit Voice Recorder
DCA 94 MA 076

October 5, 1994

A. ACCIDENT

Location: Pittsburgh, Pennsylvania
Date: September 8, 1994
Time: 1903 Eastern Daylight Time (EDT)
Aircraft: Boeing B-737-300, N513AU

B. GROUP

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

Member: Eric Van Opstal
Aviation Safety Inspector
Federal Aviation Administration

Member: Capt. Mike Carriker
Senior Engineering Pilot, B-737
Boeing Commercial Airplane Group

Member: Capt. James G. Dunham
Production Test Pilot
Boeing Commercial Airplane Group

Member: Jean-Marc Lapene
Flight Recorder Engineer
Bureau Unquetes - Accidents, France

Member: Capt. Paul Sturpe
Flight Operations
USAir

Member: F/O Colby Johnson
ALPA/USAir

C. SUMMARY

A Fairchild model A-100A cockpit voice recorder (CVR) was brought to the audio laboratory of the National Transportation Safety Board on September 9, 1994. Its serial number and identification plate was missing. The Cockpit Voice Recorder committee convened on September 11, 1994 and re-convened on October 5, 1994. A transcript was prepared of the entire 30:56 minute recording. (attached)

D. DETAILS OF INVESTIGATION

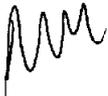
The outer metal jacket of the CVR showed evidence of structural damage. The entire unit was compressed about three inches along the longitudinal axis. It was necessary to cut the outer metal case to access the recorder. The interior circuitry of the recorder was crushed but the memory module was only slightly dented. 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, and jump seat/observer position audio information.

The final minute of the recording was 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.

Additional tests were conducted on a USAir B-737-300 at Washington's National Airport. First, the aircraft was configured with audio equipment identical to the accident aircraft. Sound tests were conducted after which the aircraft's CVR tape was studied to determine possible sound sources on the accident aircraft. A report of these tests is attached.

The recording started at 1832:29 EDT and continued uninterrupted until 1903:22 EDT when electrical power was removed from the unit. When the recording started, the flight was at cruise altitude. The recording continued through the descent and approach to the Pittsburgh Airport.

Albert G. Reitan
Transportation Safety Specialist (CVR)

Attachment:

September 22, 1994

Albert G. Reitan
United States of America
National Transportation Safety Board
490 L'Enfant Plaza East, S.W.
Washington, D.C. 20594

BOEING

Dear Al:

A summary of our tests on an USAir 737 on Sunday 11 Sept. 1994 is:

Albert Reitan, Captain Paul Sturpe and myself conducted an impromptu CVR test on an USAir 737-300 aircraft, parked at the gate, at Washington National Airport.

Capt. Sturpe insured that the aircraft's CVR system was the same as on record for the USAir Flight 427 aircraft.

We used APU power for ships power to insure the 400 frequency. No engine runs were performed.

The main idea of the test was to see if audible, distinct cross talk between channels was possible. To that end, we did have a small amount of cross talk, but found it to be muted and of disturbed frequency, thus easy to recognize.

We also performed some noise tests to help us identify CVR noises. These included:

- Flipping of the yoke clip holder
- Talking with the head set up or off
- Autopilot wailer
- Stick shaker
- Trim Wheel
- Flap handle movement
- Dropping objects (notebooks) on the cockpit floor
- Various located foot stomps in the forward galley/
forward entry area

Albert G. Reitan
September 22, 1994
Page 2

Summary:

We did find easy to recognize crosstalk. Normal cockpit sounds (trim wheel etc.) are distinguishable. We gained an overall better understanding of how and why the CVR records at volumes and locations through the cockpit.

If any extra defining information is required, please let me know.

BOEING

Sincerely,

 NTSB CXR Group Member.

Mike Carriker
Senior Engineering Pilot 737
206-655-4031 14-HA

Transcript of a Fairchild A-100 cockpit voice recorder (CVR), s/n unknown, installed on a Boeing B-737-300, N513AU, which was involved in an accident while approaching Pittsburgh international Airport, Pittsburgh, Pennsylvania on September 8, 1994.

LEGEND

RDO	Radio transmission from accident aircraft
CAM	Voice or sound source recorded through cockpit area microphone
HOT	Voice or sound source recorded through cockpit hot microphone
PA	Voice or sound source recorded through public address system
JSAP	Voice or sound source recorded through jump seat audio panel
-1	Voice identified as Pilot-in-Command (PIC)
-2	Voice identified as Co-Pilot
-3	Voice identified as female flight attendant
-4	Voice identified as male flight attendant
CTR-?	Radio transmission from unidentified Center controller
CLE1	Radio transmission from 1st Cleveland Center controller
CLE2	Radio transmission from 2nd Cleveland Center controller
CLE3	Radio transmission from 3rd Cleveland Center controller
CLE4	Radio transmission from 4th Cleveland Center controller
ATIS	Radio transmission from Pittsburgh air terminal information service
APR1	Radio transmission from first Pittsburgh approach controller
APR2	Radio transmission from second Pittsburgh approach controller
US1417	Radio transmission from USAir flight 1417
US1499	Radio transmission from USAir flight 1499
US1874	Radio transmission from USAir flight 1874
US1462	Radio transmission from USAir flight 1462
US1674	Radio transmission from USAir flight 1674
DL1083	Radio transmission from Delta flight 1083
US374	Radio transmission from USAir flight 374
285LM	Radio transmission from aircraft 285 LM

US309	Radio transmission from USAir flight 309
*	Unintelligible word
@	Non pertinent word
#	Expletive
%	Break in continuity
()	Questionable insertion
[]	Editorial insertion
....	Pause

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

INTRA-COCKPIT COMMUNICATION		AIR-GROUND COMMUNICATION	
TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
START of RECORDING			
START of TRANSCRIPT			
		1832:29 CTR-?	... contact Chicago's Cleveland center one two six point niner seven.
		1832:33 RDO-1	twenty six ninety seven, USAir four twenty seven, good day.
		1833:08 RDO-1	center USAir four twenty seven at two nine oh.
		1833:14 CLE2	USAir four twenty seven, Cleveland center roger.
		1833:32 CLE2	USAir four twenty seven, cleared direct to uh, Akron, rest of route unchanged give me the best forward airspeed in-trail spacing.
		1833:37 RDO-1	direct Akron, best forward, you got it, four twenty seven USAir.
1835:04 HOT-1	[sound similar to person yawning]		
1837:46 CAM	[interruption in CVR audio similar to passing of CVR tape splice]		
		1838:00 RDO-1	blocked.

INTRA-COCKPIT COMMUNICATION		AIR-GROUND COMMUNICATION	
TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
		1840:38 CLE2	USAir four twenty seven, contact Cleveland center one one niner point eight seven.
		1840:43 RDO-1	nineteen eighty seven, USAir four twenty seven, good day.
		1840:50 RDO-1	Cleveland, USAir four twenty seven at two niner zero.
		1840:54 CLE3	USAir four twenty seven Cleveland center roger and what is the indicated airspeed now?
		1840:57 RDO-1	uh, we're indicating uh, 'bout uh, three hundred uh, assigned.
		1843:23 CLE3	USAir fourteen seventeen, contact Cleveland center one three three point three seven.
		1843:27 us1417	three three three seven, USAir's uh, fourteen seventeen. good day.
1843:32 HOT-1	had a four and a seven in it.		
1843:34 HOT-2	hahaha.		
1843:37 HOT-1	do youwanta let 'em up for a while?		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1843:42 CAM	[sound of single chime similar to seat belt switch being moved]		
		1845:31 CLE3	USAir four twenty seven, descend and maintain flight level two four zero.
		1845:35 RDO-1	out of two nine oh for two four oh, USAir four twenty seven.
1845:55 HOT-2	ah you piece of #.		
1845:56 HOT-1	what?		
1845:58 HOT-2	I said, aw c'mon, you piece of #, this damn thing is so # slow.		
1846:07 HOT-2	there it is.		
		1847:23 CLE3	USAir four twenty seven contact Cleveland center one two eight point one five.
		1847:27 RDO-1	twenty eight fifteen, USAir four twenty seven. good day.
		1847:35 RDO-1	center, USAir four twenty seven descending two four oh.

INTRACOCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
		1847:38 CLE4	USAir four twenty seven Cleveland center roger.
		1850:11 DL1083	and center, Delta ten eighty three's with you leaving seventeen five going down to one one thousand.
		1850:15 CLE4	Delta ten eighty three Cleveland center, roger. cross CUTTA at one zero thousand. Pit altimeter three zero one one.
1850:18 CAM	[aural tone similar to attitude alert]		
		1850:21 DL1083	CUTTA at ten thousand, Delta ten eighty three.
		1850:56 CLE4	USAir four twenty seven cross CUTTA at and maintain one zero thousand Pit altimeter three zero one one.
		1851:01 RDO-1	CUTTA at ten, thirty eleven, USAir four twenty seven.
1851:08 HOT-2	ten. CUTTA.		
1851:11 HOT-1	its true.		
1851:18 HOT-1	I'm off.		
1851:18 HOT-2	alright.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
		1851:22 ATIS	..Pittsburgh tower arrival information Yankee. two one five two Zulu weather. two five thousand scattered. visibility one five. temperature seven five. dew point five one. wind, two seven zero at one zero. altimeter three zero one zero. multiple approaches ILS runway three two and ILS runway two eight right in use. notams, runway two eight right middle marker decommissioned. south entrance Air Force Reserve ramp closed. Morgantown vortac out of service. advise on initial contact you have information Yankee.
1851:54 HOT-1	three two and two eight right.		
1851:57 HOT-2	three two and two eight right?		
1851:58 HOT-1	yep		
1851:59 HOT-?	.		
1852:18 HOT-2	oh why did it *?		
1853:15 CAM	[sound similar to cockpit door being opened and closed]		
1853:26 CAM-3	um, they didn't give us connecting flight information or anything. do you know what gate we're coming in on?		
1853:29 CAM-I	not yet.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1853:30 CAM-3	any idea *.		
1853:31 CAM-1	no.		
1853:32 CAM-3	doya' know what I'm thinkin' about? pretzels.		
1853:34 HOT-1	pretzels.		
1853:37 CAM-3	you guys need drinks here?		
1853:38 CAM-1	uh, I could use a glass of somethin', whatever's open. water uh, water, a juice..		
1853:44 CAM-2	I'll split a yeah, a water, a juice, whatever's back there I'll split one with 'im.		
1853:48 CAM-3	OKedoky.		
1853:51 CAM-3	do you want me to make you my special fruity juice cocktail? (you wanna try it?)		
1853:56 CAM-1	how fruity is it?		
1853:57 CAM-3	(try it?)		
1853:58 HOT-2	alright, I'll be a guinea pig.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME 8
SOURCE

CONTENT

TIME &
SOURCE

CONTENT

1854:02
CAM [sound similar to cockpit door being closed]

1854:07
HOT-I [sound similar to person taking a deep breath]

1854:36
HOT-2 this thing's gonna scream and holler. I can't do that.

1854:42
HOT-I thirty eleven.

1854:43
HOT-2 thirty eleven set.

1854:44
HOT-I you can't make it?

1854:45
HOT-2 its gonna say it can't.

1854:49
HOT-2 because its . . . it it uh. it'll do it. I'll make it do it.

1854:19
CLE4 Delta ten eighty three, reduce speed to two ten. contact Pit approach one two one point two five.

1854:24
DL1083 twenty one twenty five, good day.

1854:27
CLE4 USAir four twenty seven cross CUTTA one zero thousand two five zero knots now.

1854:30
RDO-1 ten two fifty over CUTTA, USAir four twenty seven.

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1854:53 CAM	[sound of unidentified click]		
1854:55 HOT-2	see, it's callin' me names like it did you.		
		1856:16 CLE4	USAir four twenty seven reduce speed to two one zero now that's at the request of Pit approach I'll take the speed first.
		1856:22 RDO-1	OK speed back to two ten USAir four twenty seven. uh, we'll do our best to make the restriction.
		1856:27 CLE4	don't have to now. just uh, speed first uh, pd to ten.
		1856:31 RDO-1	you got it.
		1856:32 CLE4	USAir four twenty seven, contact Pit approach one two one point two five.
		1856:36 RDO-1	twenty one twenty five, USAir four twenty seven, good day.
1856:43 HOT-1	two ten, he said.		
1856:45 HOT-2	two ten? oh, I heard two fifty, #.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1856:49 HOT-I	I may have misunderstood him.	1856:52 RDO-1	approach, USAir four twenty seven is descending to ten.
		1856:55 APR	Shuttle twenty nine zero eight, turn right heading zero niner zero. contact approach one two three point niner five.
		1857:05 APR	USAir fourteen ninety nine, turn left heading one zero zero. contact approach one two four point one five.
1857:07 CAM	[sound similar to cockpit door being opened]		
1857:08 CAM-3	here it is.		
1857:09 HOT-I	alright.		
1857:09 HOT-2	alright. thank you, thank you.		
1857:10 CAM-3	(now ** be fooled) if you don't like, I didn't taste 'em so I don't know if they came out right.	1857:11 US1499	one hundred degrees and twenty four fifteen, US fourteen ninety nine.

INTRACOCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME &
SOURCE

CONTENT

TIME &
SOURCE

CONTENT

1857:14
HOT-1 that's good [simultaneous with previous ATC transmission]

1857:15
CAM-3 •

1857:16
HOT-2 that is good

1857:17
CAM-3 it's good.

1857:17
HOT-2 ..that is different. be real, be real good with some dark rum in it.

1857:20
CAM-3 yeah right. (can I get you something else?)

1857:26
HOT-2 what kind of speed? OK.

1857:14
APR USAir eighteen seventy four, descend and maintain six thousand.

1857:23
APR USAir four twenty seven, Pittsburgh approach. heading one six zero vector ILS runway two eight right final approach course. speed two one zero.

1857:29
RDO-1 we're, comin' back to two ten and uh, one sixty heading down to ten, USAir four twenty seven, and uh, we have Yankee.

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME &
SOURCE

CONTENT

TIME &
SOURCE

CONTENT

1857:40
HOT-I what runway did he say? OK.

1857:43
APR USAir fourteen sixty two, Pittsburgh approach heading zero four zero vector ILS three two final approach course.

1857:43
HOT-2 ***.

1857:45
HOT-I it tastes like a . *

1857:46
HOT-2 good

1857:47
HOT-I there's little grapefruit in it.

1857:49
CAM-3 no. [sound of laughter]

1857:54
APR USAir sixteen seventy four turn left heading one zero zero. contact approach one two four point one five.

1857:54
HOT-2 . * cranberry.

1857:55
CAM-3 yeah. you saw that from the color.

1858:00
US1674 twenty four fiieen and a hundred on the heading US sixteen seventy four.

INTRA-COCKPIT COMMUNICATION		AIR-GROUND COMMUNICATION	
TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1858:02 CAM-1	how else is in it?		
1858:03 CAM-2	uh, sprite?		
		1858:03 APR	Delta ten eighty three, descend and maintain six thousand.
1858:04 CAM-3	diet sprite.		
1858:06 CAM-2	huh.		
		1858:07 DL1083	six thousand, ten eighty three.
1858:08 CAM-3	and I guess you could do it with sprite. prob'ly be a little better if you do.		
1858:10 CAM-1	yeah, there's more?		
1858:11 CAM-3	one more.		
1858:13 CAM-2	ah.		
1858:13 HOT-2	oh jay?		
		1858:14 APR	USAir three seventy four, turn right heading one one zero.

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1858:14 CAM-3	you got it.		
1858:17 HOT-2	huh.		
1858:17 CAM-3	cranberry orange and diet sprite.		
1858:17 CAM-2	really nice.		
1858:18 CAM-3	it's different. could ya keep comin' out aaah, whataya' got different and .		
1858:20 CAM-1	I always mix the cranberry and the grapefruit, I like that.		
		1858:21 APR	USAir eighteen seventy four, reduce speed please to one niner zero then continue the descent to maintain six thousand.
1858:24 CAM	[sound of aural tone similar to altitude alert]		
1858:25 CAM-3	** OK, back to work.		
1858:26 CAM-2	OK.		
1858:29 CAM	[sound similar to cockpit door opening and closing]		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME &
SOURCE

CONTENT

TIME &
SOURCE

CONTENT

1858:29
HOT-2

I suspect we're gonna get the right side.

1858:33
APR

USAir four twenty seven, descend and maintain six thousand.

1858:36
RDO-1

cleared to six, USAir four twenty seven.

1858:36
HOT-I

[intermittent static sound (heard on captain's channel only) lasting for three seconds]

1858:48
CAM

[sound of click similar to approach plate clip being snapped]

1858:50
HOT-2

oh my wife would like that [non-pertinent comment]

1858:56
HOT-I

cranberry orange and sprite.

1858:57
APR

USAir sixteen seventy four, contact approach one two four point one five.

1858:58
HOT-2

yeah.

1859:04
HOT-2

I guess we ought to do a preliminary Pete.

1859:06
HOT-I

altimeters and flight instruments thirty eleven?

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1859:08 HOT-2	my side.		
1859:11 HOT-I	aah, where are we landing data is .		
		1859:12 285LM	Pit, two eight five Lima Mike is thirteen for uhh, ten with Allegheny's Hotel.
1859:14 HOT-2	posted on my side for a hundred and nine.		
		1859:15 APR	November two eight five Lima Mike, Pittsburgh approach. direct Montour vector ILS runway two eight final approach course.
1859:16 HOT-I	thirty three, forty three an two hundred.		
		1859:21 285LM	Montour on the vectors, Lima Mike...
1859:22 HOT-I	shoulder harness?		
		1859:24 APR	USAir fourteen sixty two, descend and maintain six thousand.
1859:25 HOT-2	on.		
1859:28 CAM	[sound of clicks similar to shoulder harness being fastened]		

INTRA-COCKPIT COMMUNICATION		AIR-GROUND COMMUNICATION	
TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1859:28 HOT-1	approach brief?	1859:30 APR	USAir three seventy four, contact approach one two three point niner five, good day.
1859:31 HOT-2	plan two eight right. two seventy nine inbound, one eleven seven.	1859:41 APR	USAir three zero nine, Pittsburgh approach, heading zero five zero vector ILS runway three two final approach course.
1859:36 HOT-2	[sound similar to deep inhale and exhale]	1900:08 APR	Delta ten eighty three, turn left heading one three zero. reduce speed to one niner zero.
1859:54 HOT-1	ah, don't do this to me.	1900:12 HOT-1	[intermittent static sound (heard on captain's channel only) for seventeen seconds]
1859:56 HOT-2	[sound of chuckle] froze up did it?	1900:12 HOT-1	I hate it when you don't hear the other transmissions.
		1900:13	one thirty one ninety speed, Delta ten eighty three.

INTRA-COCKPIT COMMUNICATION		AIR-GROUND COMMUNICATION	
TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1900:14 HOT-2	[chuckle] yeah.		
		1900:15 APR	USAir four twenty seven turn left heading one four zero, reduce speed to one niner zero.
		1900:20 RDO-1	OK, one four zero heading and one ninety on the speed, USAir four twenty seven.
1900:24 CAM	[sound of three clicks similar to flap handle being moved]		
1900:26 CAM	[sound of single chime similar to seat belt chime]		
1900:26 HOT-2	oops, I didn't kiss 'em 'bye.		
1900:28 CAM	[clicking sound similar to trim wheel turning at auto-pilot trim speed]		
1900:31 HOT-2	what was the temperature, 'member?		
		1900:33 APR	five Lima Mike contact Pittsburgh departure one two four point seven five.
1900:34 HOT-I	seventy five.		
1900:35 HOT-2	seventy five?		

INTRA-COCKPIT COMMUNICATION		AIR-GROUND COMMUNICATION	
TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1900:37 CAM	[clicking sound similar to trim wheel turning at auto-pilot trim speed]	1900:40 285LM	twenty four seventy five, Lima Mike.
1900:43 PA-4	seatbelts and remain seated for the duration of the flight.		
1900:44 PA-2	folks, from the flight deck we should be on the ground in 'bout ten more minutes. uh, sunny skies, little hazy. temperature, temperature's ah, seventy five degrees. wind's out of the west around ten miles per hour. certainly 'preciate you choosing USAir for your travel needs this evening, hope you've enjoyed the flight. hope you come back and travel with us again. this time we'd like to ask our flight attendants please prepare the cabin for arrival. ask you to check the security of your seatbelts. thank you.	1900:46 APR	Delta ten eighty three, turn left heading one zero zero.
		1900:48 DL1083	one zero zero, ten eighty three.
		1901:04 RDO-1	did you say two eight left for USAir four twenty seven?
1901:06 CAM	[chime similar to seatbelt chime]	1901:06 APR	uh, USAir four twenty seven, it'll be two eight right.

INTRA-COCKPIT COMMUNICATION		AIR-GROUND COMMUNICATION	
TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1901:10 HOT-1	two eight right.	1901:08 RDO-1	two eight right, thank you.
1901:11 HOT-2	right, two eight right. that's what we planned on. autobrakes on one for it.	1901:18 APR	Delta ten eighty three contact approach one two four point one five.
1901:35 HOT-1	I can't ●***.	1901:22 DL1083	twenty four fifteen, good day.
1901:42 HOT-2	Bravo thirty nine that's not too bad that's ...	1901:26 APR	USAir fourteen sixty two at six thousand, reduce speed to one niner zero.
1901:48 HOT-2	'bout half way.	1901:36 APR	USAir three zero niner, descend and maintain six thousand then reduce speed to one niner zero.
		1901:47 APR	USAir eighteen seventy four turn right heading one zero zero. contact approach one two three point niner five.

INTRA-COCKPIT COMMUNICATION		AIR-GROUND COMMUNICATION	
TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1901:50 CAM	[aural tone similar to altitude alert]		
1901:51 HOT-2	(then) . . . (works)		
1901:56 HOT-1	seven for six.		
		1901:57 APR	USAir fourteen sixty two turn right heading zero eight zero.
1901:58 HOT-2	seven for six.		
1902:06 HOT-1	boy, they always slow you up so bad here.		
1902:08 HOT-2	that sun is gonna be just like it was takin' off in Cleveland yesterday too. I'm just gonna close my eyes. [sound of laughter] you holler when it looks like we're close. [sound of laughter]		
1902:24 HOT-1	[sound of chuckle] OK.		
		1902:24 APR	USAir four twenty seven, turn left heading one zero zero. traffic will be one to two o'clock, six miles, northbound Jetstream, climbing out of thirty three for five thousand.
		1902:32.0 RDO-1	we're looking for the traffic, turning to one zero zero, USAir four twenty seven.

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1902:32.9 CAM	[sound similar to aircraft engines increasing in RPM to a steady value]		
1902:34.8 CAM	[clicking sound similar to trim wheel turning at auto-pilot trim speed]		
1902:54.3 HOT-2	oh ya, I see zuh Jetstream.		
1902:57.0 HOT-1	[sound similar to three electrical clicks within one second]		
1902:57.5 HOT-1	sheeez.		
1902:57.6 HOT-2	zuh.		
1902:58.1 CAM	[sound of thump]		
1902:58.6 CAM	[sound of "clickety click"]		
1902:58.7 HOT-1	[sound similar to person inhaling/exhaling quickly one time]		
1902:59.1 CAM	[sound of thump of less magnitude than the first thump]		
1902:59.4 HOT-1	whoa		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1902:59.5 CAM	[sound of "clickety click"]		
1903:00.7 CAM	[clicking sound similar to trim wheel turning at auto-pilot trim speed]		
1903:01.1 HOT-I	hang on		
1903:01.5 CAM	[sound similar to aircraft engines increasing in RPM]		
1903:01.6 HOT-2	[sound similar to pilot grunting]		
1903:02.0 HOT-1	hang on.		
1903:02.1 CAM	[sound of click and wailing horn similar to auto-pilot disconnect]		
1903:03.6 HOT-1	hang on.		
1903:04.6 HOT-2	oh #.		
1903:05.2 HOT-1	hang on.		
1903:07.5 CAM	[sound of increasing amplitude similar to onset of stall buff et]		
1903:08.0 HOT-I	what the hell is this?		

INTRA-COCKPIT COMMUNICATION		AIR-GROUND COMMUNICATION	
TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
1903:08.1 CAM	[vibrating sound similar to aircraft stick shaker starts and continues to end of recording]		
1903:08.3 CAM	[sound of aural tone similar to attitude alert]		
1903:09.4 JSAP	traffic traffic		
1903:09.4 CAM	traffic traffic		
1903:09.6 HOT-1	what the .		
1903:09.9 HOT-2	oh...		
1903:10.6 HOT-1	oh God.. oh God.		
		1903:13.3 APR	USAir....
		1903:15.0 RDO-1	four twenty seven emergency.
1903:17.4 HOT-2	#		
1903:16.1 HOT-1	pull		
1903:18.5 HOT-2	oh #.		

INTRA-COCKPIT COMMUNICATION

AIR-GROUND COMMUNICATION

**TIME &
SOURCE****CONTENT****TIME &
SOURCE****CONTENT**

1903:19.1

HOT-1 pull

1903:19.7

HOT-1 (pull)

1903:20.8

HOT-2 God.

1903:21.1

HOT-1 [sound of screaming]

1903:22.5

HOT-2 no.**END of RECORDING****END of TRANSCRIPT**