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

GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

ERA13MA139

By
James Cash

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
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July 2, 2013

Cockpit Voice Recorder - 12

Group Chairman's Factual Report
By James Cash

A. EVENT

Location:	Thomson, Georgia
Date:	February 20, 2013, 2006 Eastern Standard Time*
Aircraft:	Hawker Beechcraft 390, N777VG
NTSB Number:	ERA13MA139

B. GROUP

A group was convened on May 8, 2013.

Chairman:	James Cash National Transportation Safety Board
Member:	David Keenan Air safety Investigator Federal Aviation Administration
Member:	Mark Mohler Assistant Chief Pilot Beechcraft Corporation

C. SUMMARY

On February 20, 2013, at 2006 Eastern Standard Time, a Beechcraft 390 Premier 1A, N777VG, was destroyed following a collision with a utility pole, trees, and terrain following a go-around at Thomson-McDuffie Regional Airport (HQU), Thomson, Georgia. The airline transport-rated pilot and co-pilot were seriously injured, and five passengers were fatally injured. The airplane was registered to the Pavilion Group LLC and was operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a business flight. Night visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed. The flight originated at John C. Tune Airport

* All times are expressed in [EST], unless otherwise noted.

(JWN), Nashville, Tennessee, about 1828 Central Standard time (1928 Eastern Standard Time). A 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 May 8, 2013 and a partial transcript was prepared for the 30 minute digital CVR recording (see attached).

D. DETAILS OF INVESTIGATION

On April 18, 2013, the NTSB Vehicle Recorder Division's Audio Laboratory received the following CVR:

Recorder Manufacturer/Model: **L-3/Fairchild FA2100-1010**
Recorder Serial Number: **unknown**

Recorder Description

Per federal regulation, this aircraft was not required to be equipped with a CVR. The aircraft was, however, equipped with a CVR that recorded the last 30 minutes of the aircraft's 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 L-3/Fairchild FA2100-1010, records 30 minutes of digital audio stored in solid-state memory modules. Four channels of audio information are retained: one channel for each crewmember and one channel for the cockpit area microphone (CAM).

Recorder Damage

During the initial on-scene wreckage recovery, the CVR was not located in the wreckage. Several weeks later, after an extensive wreckage review, the CVR was identified on April 17, and the recorder was sent to the laboratory for download and recovery. The CVR had sustained significant heat and structural damage as a result of the accident. The aluminum recorder chassis was completely melted off and the only part that was recovered was the steel crash enclosure (See figure 1). Additionally, the underwater locater beacon, which is mounted on the front of the CVR crash case, was melted off. The orange paint and reflective tape normal attached to crash case was completely burned off.

Figure 1 Recovered CVR Recorder

The outer case was removed and the interior memory module was exposed. The recorder manufacturers place a small temperature indication dot on the interior memory module. This temperature dot changes color from a light gray to a darker brown-black color when it is exposed to a temperature greater than the temperature printed on the dot. The temperature dot on the accident memory module was dark, meaning it was exposed to a temperature of at least 360 degrees F (182 degrees C) or greater. (See Figures 2 and 3)

Figure 2 Crash Case Cover Removed

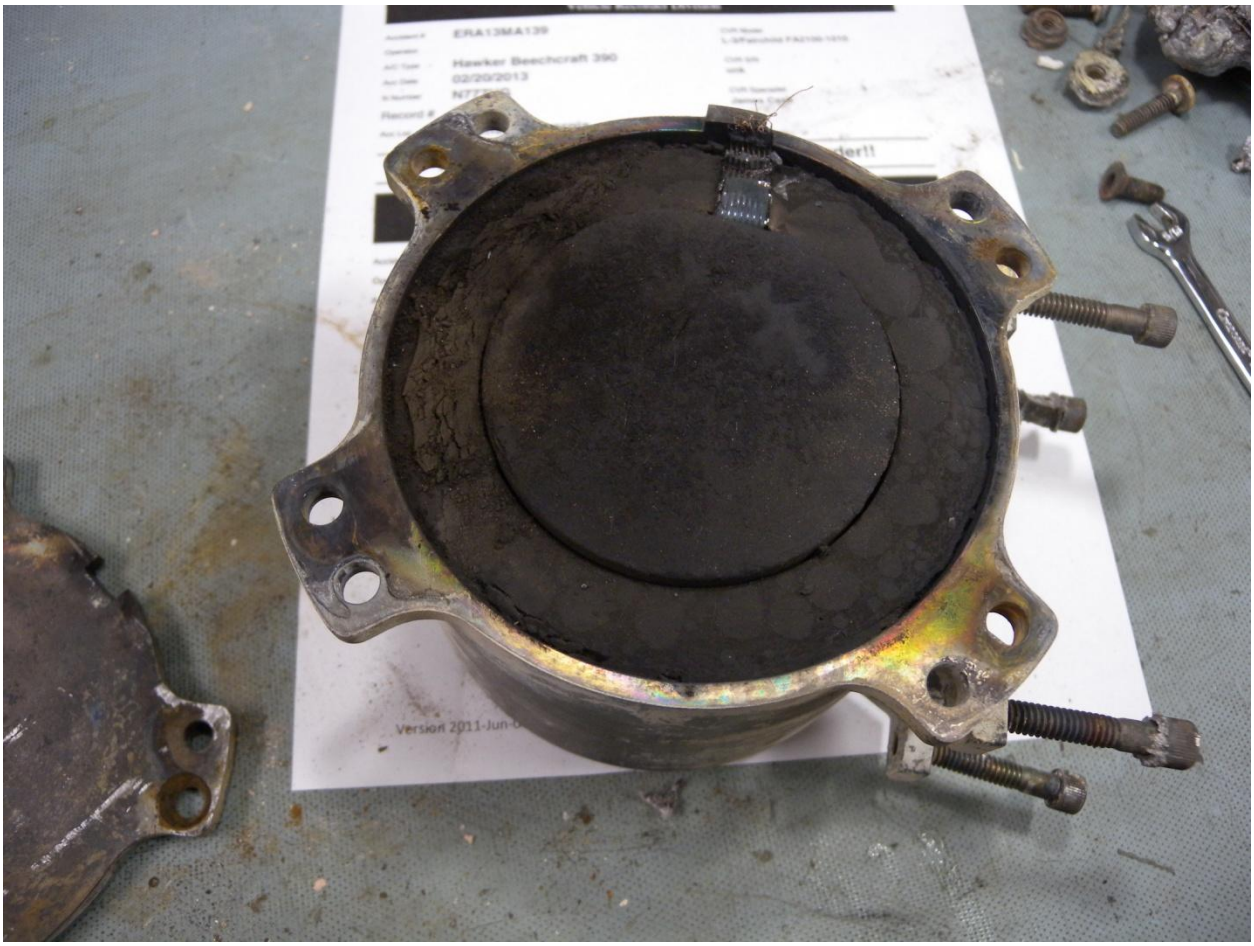

Figure 3 Memory Module and Temperature Dot

The memory module was removed from the crash enclosure. The ribbon cable that connects the memory module to the mail recorder chassis was found to be completely burned away. Additionally the memory circuit board interconnections were found to be heat damaged. The individual circuit boards of the memory module were de-stacked and cleaned. A new ribbon cable was connected to the top memory board and new circuit card interconnections were installed. The individual memory circuit cards were inspected and no additional defects were found. The memory boards were then re-stacked and the accident memory unit was placed in the NTSB's surrogate L-3 model 2100 CVR download chassis. The digital audio was successfully downloaded from the memory board.

Audio Recording Description

The 30-minute recording consisted of three channels of useable audio information. Each channel's audio quality[†] is indicated in Table 1. Notably, channel number four did not contain any audio information (nor was it required by Federal regulations).

[†] See attached CVR Quality Rating Scale.

Table 1: Audio Quality

Channel Number	Content/Source	Quality
1	Cabin PA	N/A
2	Left Seat Hot Mike/Radio	Excellent
3	Right Seat Hot Mike/Radio	Excellent

Timing and Correlation

Timing on the transcript was established by correlating the local time of the accident to the corresponding CVR event. The CVR events were offset to reflect the local eastern standard time of the accident.

Description of Audio Events

The recording began at 1935:13 as the flight is level at an assigned altitude of twenty four thousand feet. The transcript begins at 1941:56 for two minutes, during which time the crew discusses their fuel on-board, the approach speeds and landing weight at Thomson. At 1952:33 the verbatim transcript again begins as the aircraft begins the descent from cruise altitude and continues until the end of the recording. The recording stops at 2006 when electrical power was removed from the recorder.

During most of the in-flight portion of the recording, the crew is discussing the various features of the aircraft's flight management system. The left seat pilot is showing the right seat pilot the various menus and how to put information into the system. This portion of the crew conversation was not transcribed.

As part of the Safety Board's accident investigation process, the flight crew was invited to review the CVR transcript and suggest corrections or additions. Both the pilot and the right seat crewmember reviewed the recording and the group's transcript on June 17, 2013. They offered the following comment:

The HOT-1 comment at time 19:41:58 - change the * to "the other side"

James Cash
Electronics Engineer
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 L-3/Fairchild FA2100-1010 solid-state cockpit voice recorder, serial number unknown, installed on a Hawker Beechcraft 390 (N777VG), which crashed after executing a go-around at the Thomson-McDuffie Regional Airport in Thomson, Georgia.

LEGEND

CAM	Cockpit area microphone voice or sound source
HOT	Flight crew audio panel voice or sound source
RDO	Radio transmissions from N777VG
A-CTR-1	Radio transmissions from Atlanta Center-1 controller
A-CTR-2	Radio transmissions from Atlanta Center -2 controller
APR	Radio transmissions from the Augusta Approach controller
AWOS	Automated Weather Observation System
EGPWS	Enhanced Ground Proximity Warning system sound source
-1	Voice identified as the left seat pilot
-2	Voice identified as the right seat pilot
*****	Unintelligible word
( )	Questionable insertion
[ ]	Editorial insertion

Note 1: Times are expressed in Eastern Standard Time (EST).

Note 2: Generally, only radio transmissions to and from the accident aircraft were transcribed.

Note 3: Words shown with excess vowels, letters, or drawn out syllables are a phonetic representation of the words as spoken.

Note 4: A non-pertinent word, where noted, refers to a word not directly related to the operation, control or condition of the aircraft.

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
19:35:13			
CAM	start of recording		
19:41:56			
CAM	start of transcript		
19:41:58	But Dalton has a good good approach and a long runway too, so I don't know. I'm gunna go back to this just a		
HOT-1	second to look at my fuel. going to * call it ten four one eleven set and come around to one twenty five we're set there let's see if I trust you.. on that yeah yeah it looks -		
19:42:23			
HOT-1	so that's way higher than that alt fuel		
19:42:33			
HOT-2	you want to reset this to that?		
19:42:35			
HOT-1	well don't because		
19:42:36			
HOT-2	when I came out and started for a minute we had a thousand ten a thousand twenty		
19:42:43			
HOT-1	and then nine hundred at start		
19:42:45			
HOT-2	right nine forty and nine thirty		
19:42:48			
HOT-1	well		
19:42:49	so that would have been one hundred and forty -which		
HOT-2	would be fourteen		
19:42:51			
HOT-1	we should have – but I forget we had a ten six ref up there		

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
19:42:59 **HOT-1**	cause none of this matters what should have been or anything but I kind of trust these en route		
19:43:05 **HOT-2**	are we at cho cho already?		
19:43:08 **HOT-1**	we turned at the cho yeah		
19:43:09 **HOT-2**	good we should actually pick up a couple of knots here huh		
19:43:10 **HOT-1**	I tell you what I'm gunna make it fourteen fifty cause we're not gunna burn as much as I thought goin back at fourteen fifty ten six and we'll give it another knot		
19:43:33 **HOT-1**	that's your foot lights		
19:43:34 **HOT-2**	right		
19:43:44 **CAM**	[break in transcript]		
		19:52:33 **RDO-2**	Atlanta Premier triple seven victor golf two four eight for two four zero requesting lower
		19:52:40 **A-CTR-1**	November seven victor golf Atlanta Center roger descend one one thousand the Athens altimeter there zero zero eight

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
		19:52:47 **RDO-2**	thirty ought eight eleven thousand seven victor golf thank you
19:52:50 **HOT-1**	I cut it off, I didn't want it diving me at right at twenty four cause I didn't think we were gunna get it at quick you did an exquisite job -- it wasn't a TBM, it was Socata made it yeah Trinidad and Tobago		
19:52:59 **HOT-2**	Socata okay		
19:53:04 **HOT-2**	it was like a four place retractable high performance - that i think is the one that had the the schedule for		
19:53:12 **HOT-1**	so it had a fixed wastegate		
19:53:16 **HOT-2**	I only flew that a a couple of time and I really didn't fly it I was givin' instrument instruction to a guy I really didn't really didn't care for - he had alot of alot of funny ideas about the proper way to navigate in the national airspace system, much in the same way as IFR Ed.		
19:53:45 **HOT-2**	was it twenty ah - twenty sixty two?		
19:53:50 **HOT-1**	ah yeah		
		19:53:53 **Thomson AWOS**	Thomson McDuffie regional airport automated weather observation zero zero five two Zulu weather - winds calm

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
19:54:03 **HOT-2**	still calm, what do you want to do?		
19:54:12 **HOT-2**	ten twenty eight ten twenty eight		
19:54:16 **HOT-1**	set us up for a three- a five mile final for ten		
19:54:44 **HOT-2**	you're being executed		
19:54:50 **HOT-1**	I think I can take it all the way to the runway, so I'm gunna direct runway execute that - Vee path let it catch it that's gunna take me on a three point four and I can handle three point four all the way down to final - and it'll keep me a little above the trees better - so that's gunna take me all the way to three point four there		
19:55:13 **HOT-1**	where yesterday when we put the five hundred in nav you know it would have been three out of that		
19:55:16 **HOT-2**	right		
		19:55:20 **A-CTR-1**	November seven victor golf contact Atlanta Center one two eight point one
		19:55:24 **RDO-2**	twenty eight one seven victor golf
		19:55:30 **RDO-2**	Atlanta Center Premier triple seven victor golf one eight five for one one eleven thousand

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
19:55:36 **HOT-1**	what's your meter?		
		19:55:38 **A-CTR-2**	November seven seven seven victor golf Atlanta Center roger Augusta altimeter three zero one one
19:55:43 **HOT-2**	eleven		
		19:55:44 **RDO-2**	thirty eleven seven victor golf
19:55:49 **HOT-1**	ah we'll listen to Thomson again before we get there		
19:56:01 **HOT-1**	you know with the tail wind - it might be nice ah we'll see the airport-		
19:56:06 **HOT-2**	twelve at Thomson		
19:56:11 **HOT-2**	so whenever you want to start rollin'		
19:56:18 **HOT-2**	it's thirty twelve and we still have calm there		
19:56:25 **HOT-1**	let's think about this if Thomson's if Augusta's gunna hang us up there's the runway if she gives us to Augusta soon as we get em we'll just cancel with Augusta just stay with them for advisories so we can keep comin' down the hill the other choice is stay up the third choice is to ask her to call them		

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
19:56:37 **HOT-2**	gotcha		
19:56:48 **HOT-2**	which is just a whole lot easier to just cancel		
19:56:52 **HOT-1**	yeah		
19:57:09 **HOT-1**	I need to get a fuel load tonight so I can call it in tomorrow for Miami		
19:57:17 **HOT-2**	just two of them goin' down?		
19:57:19 **HOT-1**	yup		
19:57:20 **HOT-2**	top it		
19:57:21 **HOT-1**	plus my wife well they got a pretty good fuel price down there		
19:57:27 **HOT-2**	where - which one are you going in to?		
19:57:30 **HOT-1**	Opa Locka at Orion		
19:57:32 **HOT-2**	OPF		
		19:57:47 **RDO-2**	[sound of seven mike clicks]

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
19:57:48 **HOT-1**	I don't want her to hang me up at ah		
		19:57:54 **RDO-1**	and ah triple seven victor golf request
		19:57:58 **A-CTR-2**	yes sir go ahead
		19:57:59 **RDO-1**	Thomson in sight I want to keep the descent goin' so I'm gunna' cancel with ya but still like to do the hand off with Augusta to talk with them about traffic
		19:58:11 **A-CTR-2**	You want to cancel and just monitor Augusta Approach is that what I understand?
		19:58:15 **RDO-1**	canceling at this point in time and we'd like to be handed off to Augusta for advisories
		19:58:24 **A-CTR-2**	November triple seven victor golf roger and ah just ah cancellation received remain on squawk one zero four four
		19:58:36 **RDO-1**	will do
19:58:39 **HOT-1**	I think they just had a shift change - threw him off		
19:58:43 **HOT-2**	ten thousand comin' up captain and you blowin' through		

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
19:58:45 **HOT-1**	yeah ah I don't want to cause some issues thank ya thank ya thank you very much		
19:58:59 **HOT-1**	it would be hard to fudge for true versus ah		
19:59:01 **HOT-2**	[sound of laugh] - yeah		
19:59:07 **HOT-2**	ah you might want to take this opportunity also to adjust your altimeter to twelve		
		19:59:12 **A-CTR-2**	November triple seven victor golf contact Augusta Approach one two six point eight you have a good day
		19:59:17 **RDO-2**	twenty six eight seven victor golf
19:59:21 **HOT-1**	say I'm kinda out of the loop or something I don't know what happened to me there but I appreciate you lookin' after me there		
19:59:25 **HOT-2**	you ah- there was ball it was not ah not caught now we're depressurizing and I fell like four hundred is for verification		
		19:59:39 **RDO-2**	Augusta Premier triple seven victor golf is with you out of eight four hundred and we have Thomson in-sight any traffic in the area?

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
		19:59:47 **APR**	Premier seven seven seven victor golf Augusta Approach Augusta altimeter three zero zero eight and currently between you and Thomson I have no traffic. I'll switch you to advisory in a few miles unless you want to go now
19:59:57 **HOT-1**	a few miles is good		
		19:59:58 **RDO-2**	ah we'll stick with you for couple more minutes seven victor golf thanks
20:00:01 **HOT-1**	alright twenty two eight listenin' there because I mean it's not hurtin' us we're goin' all the way to the runway		
20:00:06 **HOT-2**	right		
20:00:07 **HOT-1**	that's		
20:00:09 **HOT-2**	yeah and I haven't heard anything but ah Madison - Meridian somewhere		
20:00:21 **HOT-2**	that's ah that's a lie		
20:00:24 **HOT-2**	it's got to be		
20:00:34 **HOT-1**	Ice protection - not required that's lookin' really good down there, defrost on windshield heat's off , altimeter’s set and ah seats fuel balance landing light is next		

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
20:00:52 **HOT-1**	I already got the pumps - might as well catch the sign up there		
20:00:54 **CAM**	[sound of cabin sign tone]		
20:00:59 **HOT-2**	what are we two minutes to our next track?		
20:01:08 **HOT-1**	we'll slow at five miles two minutes out		
20:01:13 **HOT-1**	alright cabin sign's we got ignitions holding		
20:01:59 **HOT-2**	(sound of singing)		
20:02:13 **HOT-1**	three point four can definitely change things as opposed to		
20:02:18 **HOT-1**	the other fix five oh		
20:02:18 **CAM**	[sound similar to engine igniters start and continues until the end of recording]		
20:02:23 **HOT-1**	alright engine sync comin' off holdin' on the flaperoonies		
		20:02:26 **RDO-2**	Ah Augusta Premier seven victor golf we'd like to go ahead and switch over to advisories at this time we'd like to cancel flight following at this time

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
		20:02:32 **APR**	Premier seven victor golf roger still no traffic observed between you and the Thomson-McDuffie airport radar service is terminated squawk VFR frequency change is approved have a good night
		20:02:41 **RDO-2**	VFR advisories appreciate the help seven victor golf
		20:02:55 **RDO-2**	Thomson traffic Premier seven seven seven victor golf is ah six and a half out inbound for ah runway one zero Thomson
20:03:05 **HOT-1**	look how slow it uh oh rolled backwards then on the slowdown speed brakes comin'		
20:03:11 **HOT-2**	speed brakes comin' and we are turnin’		
20:03:16 **HOT-1**	turnin' comin'		
20:03:22 **HOT-1**	turnin' comin' looks like we'd be slowin' down we got fifteen on the tail cause we're ground referenced all of a sudden could be the problem		
20:03:31 **HOT-1**	we're not slowin I'm gunna break it off and S turn it		
20:03:31 **CAM**	[sound similar to auto-pilot disconnect warning tone]		

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
20:03:35			
HOT-2	alright		
20:03:41			
HOT-1	and we'll catch the gear a little early		
20:03:42			
CAM	[increase in wind noise]		
20:04:00			
CAM	[sound of altitude alert tone]		
20:04:04			
HOT-2	holler when you want them lights down		
20:04:08			
EGPWS	one thousand		
20:04:08			
HOT-1	go ahead		
		20:04:09	
		RDO-2	[sound of three mike clicks]
20:04:11.8			
HOT-2	anti-skid fail		
20:04:15.0			
HOT-1	that's not good		
20:04:21.0			
HOT-1	although I don't plan on usin' it speed brakes extend - flaps uh oh		
20:04:26.4			
HOT-2	alright you're ref plus about fifty - sixty		
20:04:29.3			
HOT-1	got to get below one seventy there's that		

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
20:04:45.4			
HOT-1	put you on one ten seventy five there to be on the -		
20:04:48.0			
HOT-2	I am		
20:04:49.6			
HOT-2	you're well above the slope		
20:04:52.4			
EGPWS	five hundred		
20:04:57.5			
HOT-2	you are Ref plus twenty		
20:05:03.0			
HOT-2	on slope		
20:05:05.9			
HOT-2	below the slope		
20:05:08.9			
HOT-2	Ref plus ten		
20:05:09.3			
EGPWS	minimums		
20:05:14.8			
HOT-1	keep callin' my Ref’s		
20:05:16.4			
HOT-2	Ref plus five		
20:05:18.8			
HOT-2	Ref plus three		
20:05:22.6			
HOT-2	two		
20:05:24.7			
HOT-2	Ref		

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
20:05:25.9			
HOT-1	I do have three greens don't I?		
20:05:27.6			
HOT-2	yes sir		
20:05:28.4			
CAM	[sound similar to main gear touchdown]		
20:05:29.8			
CAM	[sound similar to nose gear touchdown]		
20:05:31.7			
CAM	[sound of snap]		
20:05:32.1			
CAM	[sound of vibration/rattling noise starts]		
20:05:35.7			
CAM	[sound of takeoff configuration warning horn starts]		
20:05:36.0			
HOT-1	we're on the go we're go- we're on the go		
20:05:37.3			
CAM	[sound of snap]		
20:05:38.7			
HOT-2	alright		
20:05:39.3			
HOT-1	what's *		
20:05:40.8			
HOT-2	fire it up		
20:05:45.9			
HOT-2	rotate		
20:05:47.5			
CAM	[vibration/rattling noise stops]		

TIME and SOURCE	INTRA-COCKPIT COMMUNICATIONS CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATIONS CONTENT
20:05:51.1			
CAM	[sound of configuration warning tone stops]		
20:05:57.5			
HOT-2	up up up		
20:05:59.0			
CAM	[sound of first impact]		
20:05:59.6			
CAM	[sound of unidentified female voice]		
20:05:60.0			
CAM	end of recording		