

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



GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

ERA12IA166

**By
Bill Tuccio**

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

March 13, 2012

Cockpit Voice Recorder - 12

Group Chairman's Factual Report By Bill Tuccio

A. EVENT

Location: Baltimore, Maryland
Date: January 30, 2012, 1844 Eastern Standard Time (EST)*
Aircraft: Gulfstream G150, N272CB
Operator: Chattem Inc.
NTSB Number: ERA12IA166

B. GROUP

A group was convened on February 13, 2013.

Chairman: Bill Tuccio
Aerospace Engineer
National Transportation Safety Board

Member: Eric West
Air Safety Investigator
Federal Aviation Administration

Member: Bruce Barefoot
Senior Production Test Pilot
Gulfstream Aerospace Corporation

Member: Barry Roche
Aviation Manager
Sanofi-Aventis[†]

C. SUMMARY

On January 30, 2012, at 1844 eastern standard time (EST), an Israel Aerospace Industries Gulfstream G150, N272CB, operated by Chattem Inc., sustained minor damage during a landing overrun at Baltimore Washington International Airport (BWI), Baltimore, Maryland. The two certificated airline transport pilots were not injured. The

* All times are expressed in eastern standard time (EST), unless otherwise noted.

[†] Chattem, Inc. is a wholly-owned subsidiary of Sanofi-Aventis.

corporate repositioning flight was conducted under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and an instrument flight rules flight plan was filed for the flight that departed from Pocono Mountains Municipal Airport (MPO) Mount Pocono, Pennsylvania, at 1808. 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 February 13, 2012 and a partial transcript was prepared for the last 25 minutes of the 2-hour, 8-minute digital recording (see attached).

D. DETAILS OF INVESTIGATION

On February 2, 2012 the NTSB Vehicle Recorder Division's Audio Laboratory received the following CVR:

Recorder Manufacturer/Model: **Universal CVR-120**
Recorder Serial Number: **2112**

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 or 2 hours of CVR operation, depending on the CVR model. This model CVR, the Universal CVR-120, is a solid-state CVR that records 2 hours of digital cockpit audio. Specifically, it contains a 2-channel recording of the last 2 hours of operation and separately contains a 4-channel recording of the last 30 minutes of operation. The 2-hour portion of the recording is comprised of one channel of audio information from the cockpit area microphone (CAM) and one channel that combines two audio sources: the captain's audio panel information and the first officer's audio panel information. The 30-minute portion of the recording contains 4 channels of audio data; one channel for each flight crew and one channel for the CAM audio information.

Recorder Damage

Upon arrival at the audio laboratory, it was evident that the CVR had not sustained any heat or structural damage and the audio information was extracted from the recorder normally, without difficulty.

Audio Recording Description

For the 2-hour portion of the CVR recording, the CAM channel recording contained fair quality[‡] audio information, and the mixed flight crew channel contained excellent quality audio information. As shown in the table below, the 30-minute portion of the recording consisted of four channels of 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	Captain	Excellent
2	First Officer	Excellent
3	CAM	Fair
4	None	N/A

Timing and Correlation

Timing on the transcript was established by correlating three air traffic control (ATC) supplied radar points with CVR audio. Specifically, ATC radar points at 1841:07, 1842:21, and 1842:43, indicating aircraft altitudes of 966 feet, 399 feet, and 148 feet, respectively, were compared to CVR audio information. The corresponding CVR information occurred at CVR Elapsed times of 0030:04, 0031:29, and 0031:46, indicating Electronic Ground Proximity Warning System callouts of 1,000 feet, 300 feet, and 50 feet, respectively. Using this information, 1811:00 was added to the 30-minute CVR Elapsed times to convert to EST.

Description of Audio Events

The recording began at 1635, as the accident crew was enroute to the MPO airport. After the crew landed at MPO and refueled, they departed MPO at about 1808 for BWI. The PIC was the flying pilot. The aircraft climbed to 14,000 feet enroute to BWI.

The partial transcript began at 1821:26. The transcript covers the enroute portion of the flight, approach, landing and overrun. The recording ended abruptly during the overrun at 1843:14.8.

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. On February 24, 2012 the crew reviewed the transcript. The crew agreed the comment at 1835:47.6, "f* in balance," was "fuel in balance." There were no other pertinent comments.

Bill Tuccio
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 Universal CVR-120 solid-state cockpit voice recorder, serial number 2112, installed on an Gulfstream G150 (N272CB), which overran the runway at the Baltimore Washington International Thurgood Marshall Airport in Baltimore, Maryland.

LEGEND

CAM	Cockpit area microphone voice or sound source
HOT	Flight crew audio panel voice or sound source
RDO	Radio transmissions from N272CB
CTR-A	Radio transmission from first New York center controller
CTR-B	Radio transmission from second New York center controller
APR-C	Radio transmission from first Potomac approach controller
APR-D	Radio transmission from second Potomac approach controller
AC	Radio transmission from aircraft Piedmont 4529
TWR	Radio transmission from the BWI airport tower controller
EGPWS	Electronic Ground Proximity Warning System
-1	Voice identified as the PIC
-2	Voice identified as the co-pilot
-?	Voice unidentified
*	Unintelligible word
#	Expletive
@	Non-pertinent 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.

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
16:35:08.0			
START OF RECORDING			
18:21:26.4			
START OF TRANSCRIPT			
18:21:26.4			
HOT-2	boy I'm hungry.		
18:21:39.3			
HOT-2	[sound of lip smacking] calm four degrees zero three zero...visuals three three left and right two two. birds.		
18:22:06.3			
HOT-1	thirty three.		
18:22:16.8			
HOT-2	three three right.		
18:22:25.6			
HOT-2	visuuual...is it okay to put a visual?		
18:22:27.5			
HOT-1	yeah.		
18:22:33.5			
HOT-1	does he have an I-L-S?		
18:22:35.0			
HOT-2	ahhh. I don't know I'll check.		
18:22:44.1			
HOT-2	there's the visual.		

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>
18:22:46.6 HOT-2	ahhh. let's see. I-L-S. I got aaaahh... I-L-S.
18:22:51.8 HOT-1	there you go...yeah.
18:22:52.0 HOT-2	three three right.
18:22:56.1 HOT-1	I can still visualize it. but...help me with altitudes.
18:23:15.0 HOT-2	[sound of lip smacking] let's see....four...three...zero point three zero.
18:23:49.6 HOT-2	twelve.
18:23:50.3 HOT-1	I see twelve.
18:23:56.5 HOT-2	I think we better put--

<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:23:41.3 CTR-A	Gulfstream seven two charlie bravo descend and maintain one two thousand.
18:23:44.7 RDO-2	one two thousand...two charlie bravo.

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>
18:24:12.0 HOT-2	I think we better correct that...twenty one seven [laughter].
18:24:34.0 HOT-2	v speeds. there we go.
18:24:36.3 HOT-1	we're not a heading anymore are we?
18:24:38.2 HOT-2	nope.

<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:23:56.8 CTR-A	* seven two charlie bravo contact New York Center one three five point four five. have a good day.
18:24:00.9 RDO-2	thirty five forty five two charlie bravo. good day.
18:24:20.7 RDO-2	New York Gulfstream two seven two charlie bravo thirteen seven descending one two thousand.
18:24:25.0 CTR-B	Gulfstream two seven two charlie bravo New York Center good evening Baltimore altimeter three zero three zero.
18:24:29.6 RDO-2	thirty thirty two charlie bravo. good evening.
18:24:37.8 CTR-B	two seven two Charlie Bravo reduce speed now to two five zero.

**TIME and
SOURCE**

INTRA-COCKPIT CONTENT

18:24:43.3
HOT-2 I don't think so.

18:24:47.8
HOT-1 two fifty?

18:24:48.8
HOT-2 yep.

18:24:51.9
HOT-1 it's already in.

18:24:54.0
HOT-2 [sound of lip smack]

18:24:54.7
HOT-2 alright.

18:25:00.3
HOT-2 I wonder why my...let's see here ah.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:24:40.8
RDO-2 slow to two hundred and fifty knots two hundred two charlie bravo.

18:25:05.5
CTR-B * two seven two charlie bravo turn twenty degrees right for traffic. ah correction. twenty degrees to the left for traffic.

18:25:10.2
RDO-2 twenty to the left. two charlie bravo.

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:25:24.8 HOT	[sound of c chord tone, similar to altitude alert]		
18:25:33.0 HOT-2	one to go.		
		18:26:00.8 CTR-B	two seven two charlie bravo fly heading one two zero.
		18:26:04.6 RDO-2	one twenty on the heading. two charlie bravo.
18:26:07.0 HOT-1	damn.		
18:26:09.0 HOT-2	wrong way #.		
18:26:21.6 HOT-1	this reminds me of going to Teterboro one day.		
18:26:37.5 HOT-2	[sound of lip smack]		
18:26:40.5 HOT-2	yeah you know you would think. okay maybe just two hundred knots instead of going two hundred and fifty knots. ninety degrees the other way...what do I know...not my job.		
18:26:51.6 HOT-1	[laughter]		

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>
18:26:56.1 HOT-2	I don't know why this stuff is not up.
18:27:00.4 HOT-2	I don't know.
18:27:04.7 HOT-1	(altituder) didn't (approach).
18:27:24.2 HOT-2	#.
18:27:25.4 HOT-2	[mumbling] oh I went the wrong way here.
18:27:28.7 HOT-2	alright let's see...
18:27:31.2 HOT-2	...there we go.
18:27:32.3 HOT-2	direct Baltimore...B-A-L...direct Baltimore is executed.
18:27:37.7 HOT-1	thank you.

<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:27:04.7 CTR-B	two seven two charlie bravo turn right fly heading two five zero direct Baltimore when you get it set up.
18:27:09.0 RDO-2	two five zero direct Baltimore. two charlie bravo. thanks.

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:27:45.7 HOT-2	so she said direct Baltimore.		
18:27:50.3 HOT-2	she did say direct Baltimore?		
18:27:50.9 HOT-1	yes.		
18:27:51.3 HOT-2	right. yeah.		
18:27:58.9 HOT-2	[sound of lip smack]		
18:28:02.8 HOT-2	so how far is the V-O-R off the field?...		
18:28:07.1 HOT-2	...or is it?		
18:28:11.0 HOT-2	I don't think that's gonna show.		
18:28:19.1 HOT-2	I actually should put the airport in there right?...instead of the V-O-R....		
18:28:25.9 HOT-2	...don't you think?		
18:28:27.3 HOT-1	it might work.		

**TIME and
SOURCE**

INTRA-COCKPIT CONTENT

18:28:35.9
HOT-2 one twenty five fifty two.

18:29:01.2
HOT-2 that's not what we wanted...

18:29:04.9
HOT-2 ...is it.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:28:27.4
CTR-B two seven two charlie bravo. thank you for your help. contact Potomac approach on one two five point five two.

18:28:32.4
RDO-2 twenty five fifty two. two charlie bravo. so long.

18:28:45.8
RDO-2 Baltimore Approach Gulfstream two seven two charlie bravo one two thousand two hundred and fifty knots assigned. Victor.

18:28:51.9
APR-C Gulfstream two seven two charlie bravo Potomac Approach roger. ahhh. expect visual approach runway three three left.

18:28:58.0
RDO-2 expect a visual three three left two charlie bravo.

18:29:07.2
APR-C [advises Piedmont 4529 to expect visual approach 33L]

18:29:14.5
AC [Piedmont 4529 confirms 33L]

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
		18:29:17.0 APR-C	[controller corrects Piedmont 4529 to 33R and thanks Piedmont 4529 for checking]
18:29:18.6 HOT-1	[laughter]		
18:29:41.0 HOT-2	yeah I should...ahhhhh....I don't know how far...let's see.		
18:29:58.7 HOT-2	oh well. doesn't matter. looks like it's on the field.		
18:30:02.8 HOT-2	[sound of lip smack] but I should put B-W-I instead of B-A-L but.		
18:30:16.4 HOT-2	they're gonna start vectors anyway soon. do you want. do you want me to ask for thirty three right? or you want ah. cause I mean this guy...doesn't matter to me but it's gonna be a long...cluster...you know.		
18:30:28.5 HOT-1	yeah.		
18:30:29.0 HOT-2	I don't like doing three three right with people on board. but I don't mind doing it when it's just you and I.		
18:30:33.3 HOT-1	yeah we can do the right side.		

**TIME and
SOURCE**

INTRA-COCKPIT CONTENT

18:30:55.6
HOT-2 holy # what is this big # city.

18:30:58.9
HOT-1 Baltimore.

18:30:59.6
HOT-2 is that Cleveland Tennessee?

18:31:01.0
HOT-1 [laugh] yeah.

18:31:36.5
HOT-2 clear night.

18:32:29.8
HOT-1 probably turn the engines off. we're out of the clouds.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:30:35.6
RDO-2 two charlie bravo ah put three three right on request please.

18:30:39.6
APR-C november two three. November two charlie bravo I have your request. ah descend and maintain ah four thousand.

18:30:44.4
RDO-2 four thousand. two charlie bravo.

18:30:48.0
APR-C and two charlie bravo expect three three right.

18:30:50.2
RDO-2 thanks a bunch. down to four and we'll expect that.

**TIME and
SOURCE**

INTRA-COCKPIT CONTENT

18:32:31.4
HOT-2 [sound of lip smacking] [low volume] yeah.

18:32:42.2
HOT-2 twenty seven miles to the airport.

18:32:45.9
HOT-2 I wouldn't hustle to four thousand. [stammer] I'm just sayin'.

18:33:10.2
HOT-1 two hundred degrees.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:32:58.7
APR-C november two charlie bravo ah fly heading two zero zero. two hundred.

18:33:03.0
RDO-2 heading two zero zero. two charlie bravo.

18:33:05.2
APR-C november two charlie bravo contact Potomac approach on one one niner point seven. have a good day.

18:33:08.8
RDO-2 nineteen seven. good night.

18:33:16.0
RDO-2 Potomac approach Gulfstream two seven two charlie bravo out of eight point five descending four thousand. two zero zero on the heading.

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
		18:33:21.7 APR-D	Gulfstream two charlie bravo. (from present) proceed direct Baltimore. descend and maintain three thousand.
		18:33:25.7 RDO-2	direct Baltimore down to three thousand. two charlie bravo.
18:33:29.4 HOT-1	go ahead.		
18:33:30.2 HOT-2	#.		
18:33:30.9 HOT-1	[laughter].		
18:33:31.4 HOT-2	direct to Baltimore...		
18:33:33.4 HOT-1	we just did that a minute ago.		
18:33:34.6 HOT-2	...ahh. execute.		
18:33:36.6 HOT-2	three thousand is in the window.		
18:33:39.1 HOT-1	nav.		
18:33:40.0 HOT-2	you see three. I see three.		

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>
18:33:50.6 HOT-2	K...B...W...I
18:34:17.1 HOT-2	twenty miles to Baltimore.
18:34:21.8 HOT-2	crab cakes await. the best crab cakes in the U-S. best crab cakes I've ever had period.
18:34:59.5 HOT-2	ATIS we have. field elevation sea level.
18:35:08.6 HOT-2	oop. one forty six.
18:35:25.2 HOT-2	F-M-Ss are good--
18:35:33.5 HOT-2	fifteen miles to the airport.
18:35:41.2 HOT-1	couldn't we have stayed on the [laugh] one eighty last time.

<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:35:26.8 APR-D	two charlie bravo turn left heading one eight zero vector for descent.
18:35:29.6 RDO-2	one eighty heading two charlie bravo.

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:35:47.6 HOT-2	f* in balance. [mumble] is good. pressurizations good. crew brief visual. altimeters are ah...		
18:35:55.6 HOT-1	we can land.		
18:35:56.0 HOT-2	...set.		
18:35:57.3 HOT-1	twenty pounds under landing.		
18:35:57.5 HOT-2	windshield...windshield heat is off.		
18:36:03.3 HOT-2	[lip smacking] anti-ice de-ice off. landing lights are pulsing right now.		
18:36:07.5 HOT-2	windshield heat is [mumble]...ignition's good.		
18:36:12.1 HOT-2	A-P-R is on. slats and flaps remain.		
18:36:21.3 HOT	[sound of c chord tone, similar to altitude alert]		
18:36:23.9 HOT-2	three three right.		

**TIME and
SOURCE**

INTRA-COCKPIT CONTENT

18:36:40.7
HOT-2 two thousand.

18:36:41.6
HOT-1 I see two.

18:36:44.7
HOT-2 I'm gonna go ahead and throw direct to ahh...

18:36:49.0
HOT-1 ORIOL.

18:36:49.4
HOT-2 DUDDS. okay ORIOL.

18:36:52.4
HOT-2 direct toooo.

18:36:56.7
HOT-2 ORIOL. execute. there you are on zee chart.

18:37:01.4
HOT-1 thank you.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:36:34.7
APR-D Gulfstream two charlie bravo descend and maintain two thousand.

18:36:37.8
RDO-2 two thousand two charlie bravo.

**TIME and
SOURCE**

INTRA-COCKPIT CONTENT

18:37:10.2
HOT-1 descend it down.

18:37:13.2
HOT-2 (they decided) just not doing a very good job of it [laughter].

18:37:31.2
HOT-1 when you turned us away from the airport.

18:37:33.6
HOT-2 because you weren't. they didn't think you were gonna get down.

18:37:39.7
HOT [sound of c chord tone, similar to altitude alert]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:37:01.9
APR-D and two charlie bravo verify you are still descending. I show you thirty five hundred for a couple of miles.

18:37:08.2
RDO-2 affirm we are.

18:37:010.0
APR-D okay.

18:37:25.0
APR-D two charlie bravo turn right heading two two zero.

18:37:27.4
RDO-2 two twenty heading two charlie bravo.

**TIME and
SOURCE**

INTRA-COCKPIT CONTENT

18:38:21.3
HOT [sound of increased airflow, similar to 1.5psid cabin drain]

18:38:26.9
HOT-2 do you see it?

18:38:27.8
HOT-1 no.

18:38:30.6
HOT-1 unfamiliar.

18:38:39.7
HOT-1 yes.

18:38:40.6
HOT-2 I see it now. see it?

18:38:42.9
HOT-1 no I don't.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:38:22.5
APR-D november two seven two charlie bravo the airport is two o'clock and ten miles.

18:38:32.0
RDO-2 yeah we have the beacon. we haven't picked up the runway just quite yet. two charlie bravo.

18:38:35.4
APR-D very well. my book says just the beacon for me to clear you. but if you would like me to vector you onto the I-L-S or give you a different approach I'll be happy to.

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>
18:38:45.3 HOT-1	oh I * it.
18:38:57.0 HOT-1	slats.
18:39:14.5 HOT	[sound of rapid repeating chimes, similar to autopilot disconnect]
18:39:21.9 HOT-?	oop.
18:39:22.1 HOT-1	that the right runway?

<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:38:43.0 RDO-2	alright negative. we just now picked it up two charlie bravo. we do have the runway.
18:38:46.4 APR-D	--visual approach three three right. contact tower on one one niner point four. good night.
18:38:50.0 RDO-2	nineteen four. goodnight. thanks. see ya.
18:39:10.5 RDO-2	Baltimore Tower Gulfstream two seven two charlie bravo visual three three right.

**TIME and
SOURCE**

INTRA-COCKPIT CONTENT

18:39:26.5
HOT-1 that's not three three.

18:39:29.7
HOT-1 that's not the right runway.

18:39:31.9
HOT-2 no but you're going to...either cut--

18:39:36.6
HOT [sound of c chord tone, similar to altitude alert]

18:39:40.5
HOT-2 it's gonna be over here on this side.

18:39:45.3
HOT-2 you know.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:39:23.1
TWR November two seven two charlie bravo Baltimore Tower
runway three three right cleared to land wind one six zero at
five.

18:39:30.4
RDO-2 two charlie bravo cleared to land.

18:39:33.7
TWR and again November two seven two charlie bravo. runway
three three right cleared to land.

18:39:38.0
RDO-2 three three right cleared to land two charlie bravo.

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:39:46.1 HOT-1	okay.		
18:39:47.7 HOT-2	so here let me get you another direct...to...well actually you're already inside it so I mean...probably the best thing to do at this point would be square it. see the runway is gonna be right over here.		
18:40:02.7 HOT-1	give me flaps twelve.		
18:40:06.5 HOT-1	flaps twelve.		
18:40:09.1 HOT-2	selected. see the end of the runway marker.		
18:40:13.1 HOT-2	see the flashing...end of the runway there?		
18:40:16.9 HOT-1	I see the beacon and I see the runway. but I don't see the other runway.		
18:40:21.2 HOT-2	uuhhhmm.		
18:40:21.8 HOT-1	yeah I got it now.		
18:40:22.3 HOT-2	okay.		

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:40:22.9 HOT-2	you see that white--		
18:40:23.5 HOT-1	yeah. flaps twenty.		
18:40:23.8 HOT-2	okay.		
18:40:25.6 HOT-2	twenty selected.		
18:40:31.0 HOT-2	what is that other runway?...		
18:40:33.4 HOT-2	...without me pulling up ahhh...let's see.		
18:40:39.8 HOT-1	put the gear down please.		
18:40:42.0 HOT-2	that's two eight your lookin' at.		
18:40:44.1 HOT	[sound of click, similar to gear handle]		
18:40:47.8 CAM	[sound of increased noise, similar to gear extended]		
18:40:53.1 HOT-1	take the two thousand out of the window.		

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:40:55.2 HOT-2	oh yeah.		
18:41:04.7 EGPWS	one thousand.		
18:41:09.7 HOT	[sound of about 6 clicks over 20 second period]		
18:41:31.7 HOT-1	so it's (ah) (on) okay.		
18:41:44.3 HOT-2	you better turn...you see it right here?...you see the runway right here?		
18:41:49.1 HOT-1	yeah.		
18:41:49.4 HOT-2	okay.		
18:42:01.3 HOT-2	alright I'm going to [sound of switch] on.		
18:42:12.3 EGPWS	five hundred.		
18:42:13.8 HOT-2	flaps remain.		
18:42:15.2 HOT-1	full flaps.		

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:42:16.8 HOT-2	selected.		
18:42:29.3 EGPWS	three hundred.		
18:42:31.5 HOT-2	oh let's see. rev. [stammer] you're below rev. below rev. power. power. power. power. power. you're one twenty nine rev remember.		
18:42:37.0 EGPWS	two hundred.		
18:42:42.9 HOT-2	there you go.		
18:42:45.8 HOT-2	you're rev and about three.		
18:42:46.8 EGPWS	fifty forty thirty twenty ten.		
18:42:56.1 HOT	[sound of rattle, similar to landing gear handle solenoid]		
18:42:58.6 CAM	[change in sound, similar to deceleration]		
18:42:59.5 HOT-2	two thousand remaining.		

<u>TIME and SOURCE</u>	<u>INTRA-COCKPIT CONTENT</u>	<u>TIME and SOURCE</u>	<u>AIR-GROUND COMMUNICATION CONTENT</u>
18:43:02.9 HOT-1	I can't get these suckers up.		
18:43:03.8 HOT-2	holy #.		
18:43:06.0 HOT-1	they're not on.		
18:43:07.3 HOT-2	ah #.		
18:43:08.6 HOT-2	we're going off the end @.		
18:43:10.7 HOT-2	#.		
18:43:11.7 HOT-2	##### [same expletive, 5 times].		
18:43:14.8 CAM	[sound of rumbling, similar to crash]		
END OF TRANSCRIPT			
END OF RECORDING			
18:43:14.8			