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

GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

CEN14LA127

By
Bill Tuccio, Ph.D.

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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August 8, 2014

Cockpit Voice Recorder

Group Chairman's Factual Report
By Bill Tuccio, Ph.D.

A.   EVENT

Location:	Springfield, Illinois
Date:	January 31, 2014
Aircraft:	Piaggio P180, N700FE
Operator:	Mountain Aviation Inc., Flight 70
NTSB Number:	CEN14LA127

B.   GROUP
A group was convened on March 12, 2014[*].

Chairman:	Dr. Bill Tuccio Aerospace Engineer National Transportation Safety Board
Member:	Andrew Todd Fox Investigator-in-Charge National Transportation Safety Board
Member:	Chris Grinnell Director of Customer Support Piaggio America, Inc.
Member:	Ron Cardwell Chief Pilot Mountain Aviation Inc.

C.   SUMMARY

On January 31, 2014, at 1312 central standard time (CST), a Piaggio model P180 airplane, N700FE, was substantially damaged when the landing gear collapsed during landing roll at Abraham Lincoln Capital Airport (SPI), Springfield, Illinois. The pilot, copilot, and 3 passengers were not injured. The airplane was registered to Peregrine

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[*] The Federal Aviation Administration was invited to attend but declined the invitation.

Falcon, Inc. and operated by Mountain Aviation, Inc., under the provisions of 14 *Code of Federal Regulations* Part 91, while on an instrument flight rules flight plan. Day instrument meteorological conditions prevailed for the cross-country business flight, which departed Dane County Regional Airport (MSN), Madison, Wisconsin, at 1157. 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 and a partial transcript was prepared for the last 23-minutes of the event flight that was recorded on a 2-hour and 4-minute digital recording (see attached).

D.   DETAILS OF INVESTIGATION

The NTSB Vehicle Recorder Division's Audio Laboratory received the following CVR:

Recorder Manufacturer/Model: **L-3/Fairchild FA2100-1020**
Recorder Serial Number: **851267**

Recorder Description
Per Federal regulation 14 CFR 91.609(h), multi-engine turbine aircraft manufactured after April 7, 2010 must be equipped with a CVR that records a minimum of the last 2 hours 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 2 hours of CVR operation. This model CVR, the L-3/Fairchild FA2100-1020, records 2 hours of digital audio stored in solid-state memory modules. Four channels of audio information are retained: one channel for each flight crew and one channel for the cockpit area microphone (CAM).

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

Audio Recording Description
The 2-hour 4-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).

Table 1: Audio Quality

Channel Number	Content/Source	Quality
1	Captain	Excellent
2	First Officer	Excellent
3	CAM	Good
4	N/A	N/A

[†] See attached CVR Quality Rating Scale.

Timing and Correlation

Timing on the transcript was established by correlating air traffic control (ATC) supplied events to the corresponding CVR event. Specifically, ATC reported that N700FE cancelled its emergency at 1258 CST, which corresponded to the CVR recording of the same event at 0144 CVR Elapsed Time (time from the beginning of the recording). All CVR events were offset to reflect the local CST of the accident. This correlation resulted in adding 1114:00 to CVR elapsed time to convert to CST.

Description of Audio Events

The first 5 minutes of the recording were from a prior flight at an indeterminate time. The accident flight recording began at about 1119 CST when N700FE, operating as flight Foothills 70, received its IFR clearance from MSN clearance delivery.

Foothills 70 departed MSN at about 1156 CST and climbed to flight level 270 by 1221 CST. At about 1222 CST, Foothills 70 received the 1817 Zulu ATIS information Uniform at SPI. The ATIS reported: winds from 20 degrees at 9 knots; 2 miles visibility in light snow; sky condition of 2,900 feet broken, 3,900 feet overcast; temperature -5 degrees Celsius; dewpoint -8 degrees Celsius; ILS runway 4 in use; and NOTAMS including runways 13/31 and 18/36 closed with thin wet snow on runway 4-22 and braking action fair.

After receiving the ATIS, the crew briefed the ILS approach to runway 4 at SPI. By 1239 CST, Foothills 70 began receiving radar vectors for the ILS runway 4 approach. By 1243 CST, the aircraft was at 2,300 feet. At about 1247 CST, ATC cleared Foothills 70 for the first ILS runway 4 approach into SPI. At about 1248:44 CST, the crew noted the ILS 4 course was alive.

The transcript began at 1249:57 CST and continued until 1313:39 CST as passengers and crew evacuated the aircraft at SPI and power was removed from the CVR.

The last 4 minutes of the recording occurred at an indeterminate time when power was re-applied to the aircraft by ground personnel.

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. They declined the invitation.

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 an L-3/Fairchild FA2100-1020 solid-state cockpit voice recorder, serial number 851267, installed on a Mountain Aviation Inc. Piaggio P180 (N700FE), which experienced a gear collapse during landing at the Abraham Lincoln Capital Airport in Springfield, Illinois.

LEGEND

CAM	Cockpit area microphone voice or sound source
HOT	Flight crew audio panel voice or sound source
RDO	Radio transmissions from N700FE
APR	Radio transmission from the Springfield approach controller
TWR	Radio transmission from the Springfield airport tower controller
EGPWS	Enhanced Ground Proximity Warning System
RADIO-??	Unidentified radio transmission
-1	Voice identified as the captain
-2	Voice identified as the first officer
-?	Voice unidentified
*	Unintelligible word
#	Expletive
( )	Questionable insertion
[ ]	Editorial insertion

Note 1: Times are expressed in central standard time (CST).

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-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT

11:19:22 CST[‡]
START OF FOOTHILLS 70 FLIGHT RECORDING

12:49:57.0 CST
START OF TRANSCRIPT

12:49:58.2
HOT-1   and ah gear down flaps mid.

12:49:60.0
HOT-2   gears ah...glideslope's alive. speed checks.

12:50:00.4
HOT-1   before landing checks.

12:50:02.3
CAM   [sound of click, similar to gear handle]

12:50:02.5
CAM   [sound of whining begins, similar to hydraulic motor on]

12:50:10.1
HOT-1   [sound of exhale] #.

12:50:11.4
CAM   [sound of thunk]

12:50:12.8
HOT-2   alright [exhaling]. that's not what I wanted. okay.

12:50:13.8
CAM   [sound of click]

[‡] The CVR contained 5 minutes of content prior to the start of the Foothills 70 recording.

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:50:17.3 HOT-1	I'm just gonna go heading.		
12:50:31.2 HOT-1	I'm gonna stay at this altitude. are you okay with that?		
12:50:33.8 HOT-2	(yeah). uhm [cough]. yeah.		
		12:50:43.3 RDO-1	and Foothills Seventy were gonna stay at ah twenty three hundred feet. and ah we'd like to execute execute a missed approach and troubleshoot a problem here.
12:50:45.8 HOT-2	execute a missed [low volume].		
		12:50:50.4 TWR	flight...correction ah Foothills Seventy you can go around. fly runway heading. climb maintain three thousand.
		12:50:55.9 RDO-1	runway heading three thousand for Foothills Seventy.
12:50:58.3 HOT-2	runway heading. three thousand set.		
12:50:58.5 HOT-1	okay three thousand set.		
12:51:00.3 HOT	[sound of high pitched tone, similar to altitude alert]		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:51:06.0 **HOT-1**	positive rate. gear up. flaps up. ta ta ta ta. alright we're good.		
12:51:08.0 **CAM**	[sound of click] [sound of whining stops, similar to hydraulic motor off] [sound of thunk]		
12:51:09.5 **HOT-1**	that's ah...pisser.		
12:51:14.4 **HOT-1**	let's go to the checklist. I got the radios.		
12:51:16.6 **HOT-2**	well'p checklist is on the column.		
12:51:19.3 **HOT-2**	we're all staying in Springfield.		
12:51:21.3 **HOT**	[short chuckle]		
12:51:30.0 **HOT-2**	give it full power man. (let's) get up there.		
12:51:34.7 **CAM**	[sound of two clicks]		
12:51:34.8 **HOT-1**	okay [sigh].		
12:51:39.0 **HOT-2**	go around check. after take-off go around checklist.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:51:43.7 **HOT-2**	landing gear.		
12:51:44.7 **HOT-1**	it's up.		
12:51:45.7 **HOT-2**	flaps.		
12:51:46.5 **HOT-1**	are up.		
12:51:47.4 **HOT-2**	landing light.		
12:51:48.0 **HOT-1**	it's off.		
12:51:49.0 **HOT-2**	(awe) yaw damp.		
12:51:50.4 **HOT-1**	it's ahhh engaged.		
12:51:52.4 **HOT-2**	autofeather.		
		12:51:53.1 **TWR**	Foothills Seventy contact departure on one two six point one five.
12:51:54.1 **HOT-1**	off.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
		12:51:57.8 **RDO-2**	going to departure one two six decimal one five Foothills Seventy goodday.
12:52:02.6 **HOT-2**	I'm going to give it one more go. sl...slow it down to one eighty.		
12:52:05.7 **HOT-1**	okay.		
12:52:08.8 **HOT-1**	that's three thousand.		
12:52:09.7 **HOT-2**	yep.		
		12:52:10.3 **RDO-2**	departure Foothills Seventy is level three thousand runway heading.
		12:52:15.3 **APR**	Foothills Seventy Springfield Departure radar contact.
12:52:19.3 **HOT**-?	alright.		
12:52:20.0 **HOT-1**	** it's in.		
12:52:21.3 **HOT-2**	yeah. we're (going to) put it up and then back then down.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:52:21.6 **CAM**	[sound of two clicks]		
12:52:23.9 **HOT-2**	slow to one eighty.		
		12:52:26.6 **APR**	Foothills Seventy do you require any assistance or ah where would you like me to take yah?
		12:52:30.3 **RDO-2**	ah just standby for ahhh one more minute please.
12:52:37.7 **HOT-2**	speed checks.		
12:52:41.4 **CAM**	[sound of click, similar to gear handle]		
12:52:41.8 **CAM**	[sound of whining begins, similar to hydraulic motor on]		
12:52:47.1 **CAM**	[sound of thunk]		
12:52:47.2 **CAM**	[sound of whining stops, similar to hydraulic motor off]		
12:52:48.0 **HOT-1**	that's a pisser.		
12:52:49.9 **HOT-2**	alright.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:52:51.2 HOT-1	you want to talk to uhm...		
12:52:52.3 HOT-2	yeah I got him.		
12:52:53.0 HOT-1	okay.		
12:52:53.0 CAM	[sound of thunk]		
		12:52:54.9 RDO-2	and approach Foothills Seventy.
		12:52:59.1 APR	Foothills Seventy go ahead.
		12:53:00.5 RDO-2	yeah we're having ah gear issues here. it looks like we're going to have to run a checklist and ah pump the gear down. uhm we'll go ahead and declare an emergency at this time.
12:53:10.3 HOT-?	[short laughter]		
12:53:13.4 HOT-1	uhm--		
		12:53:13.7 APR	Foothills Seventy roger. when able say souls on board and fuel remaining in time please.

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
		12:53:19.5 **RDO-2**	okay we got ah five souls on board. we have four hours of fuel.
		12:53:26.7 **APR**	Foothills Seventy roger and are you okay with a ah left turn back to the west for right now?
		12:53:30.8 **RDO-2**	yeah we can do that.
		12:53:32.2 **APR**	Foothills Seventy turn left heading...actually a little bit to the northwest ah. might be better for yah. turn left heading three one zero.
		12:53:38.9 **RDO-2**	heading three one zero Foothills Seventy.
12:53:41.7 **HOT-2**	three one zero.		
12:53:42.4 **HOT-1**	three ten. uhm do you think we should go to a runway that's not as ah snowy?		
12:53:46.0 **HOT-2**	shhhh good luck around here.		
12:53:48.7 **HOT-1**	this one didn't have any mu problems did it?		

12:53:48.9
HOT-2   *.

12:53:50.7
HOT-2   no.

12:53:51.1
HOT-1   okay.

12:53:51.7
HOT-1   uhm I got the radios while you do that thing.

12:53:53.1
HOT-2   okay.

12:53:53.9
HOT-1   and we're going to three ten heading. autopilot's on.

12:54:09.1
HOT-2   alright. gear unlocked or down so...emergency gear handle push make sure it's in.

12:54:14.4
HOT-1   it's in.

12:54:14.8
HOT-2   hydraulic pressure hydraulic.

12:54:16.8
HOT-1   it's ahhh zero duty right now.

12:54:18.7
HOT-2   okay.

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:54:20.1 **HOT-2**	we're below one seventy. try it one more time.		
12:54:22.9 **CAM**	[sound of click, similar to gear handle]		
12:54:23.0 **CAM**	[sound of whining begins, similar to hydraulic motor on]		
12:54:24.9 **HOT-1**	* up.		
12:54:24.9 **HOT-2**	one two three four okay bring it up.		
12:54:27.9 **CAM**	[sound of click] [sound of whining stops, similar to hydraulic motor off]		
12:54:28.4 **HOT-2**	(first) * gear * shhh.		
12:54:32.2 **HOT-2**	let's do the ahh....		
12:54:37.1 **HOT-1**	what do you think about doing the emergency gear extension checklist.		
12:54:39.0 **HOT-2**	that's what we're going to have to do. emergency gear handle...checklist.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:54:42.8 HOT-2	landing gear handle down.		
12:54:44.2 HOT-1	it's down.		
12:54:44.3 CAM	[sound of click, similar to gear handle] [sound of whining begins, similar to hydraulic motor on]		
12:54:45.4 HOT-2	hydraulic pump switch off.		
12:54:47.4 HOT-1	it's off.		
12:54:48.2 CAM	[sound of switch] [sound of whining stops, similar to hydraulic motor off]		
		12:54:48.3 APR	and Foothills Seventy ah just whenever you get a chance ah are you just getting a bad gear indication or are they frozen in the up position. do you know anything more about it?
12:54:48.9 HOT-2	emergency landing gear handle select.		
		12:54:57.8 RDO-2	yeah it looks like they're frozen in the up position. we're going to try the manual extension and see if that works.

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:55:03.7 **HOT-1**	will you ask him about the---		
		12:55:04.3 **APR**	Foothills Seventy roger just advise when you can take a downwind turn.
		12:55:07.3 **RDO-2**	**.
12:55:07.3 **HOT-1**	will you ask him about the runway conditions just so we know.		
		12:55:09.8 **RDO-2**	yeah do you have any updated runway conditions there in Springfield.
		12:55:12.9 **APR**	Foothills Seventy the runway four runway conditions ah I will be able to get a ah braking action report from a Merlin that was following you in on the approach. but the mu readings are all above forty.
12:55:22.9 **HOT-1**	cool.		
		12:55:23.1 **RDO-2**	okay thanks very much.
12:55:24.1 **HOT-1**	alright.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:55:24.4 **HOT-2**	alright emergency landing gear handle selector. pull.		
12:55:26.6 **HOT-1**	it's pulled.		
12:55:27.0 **CAM**	[sound of thunk, similar to emergency landing gear selector valve being pulled]		
12:55:28.3 **HOT-2**	pump it down.		
12:55:29.1 **HOT-1**	okay. it's all you brother. I got the radios.		
12:55:31.6 **HOT-2**	alright.		
12:55:32.6 **CAM**	[sound of thunk]		
12:55:33.6 **CAM**	[sound of multiple thunks and squeaks begin, similar to operation of the emergency landing gear pump handle]		
12:55:38.3 **HOT-2**	there we go.		
12:55:41.0 **HOT-1**	give you a little slower speed here.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:55:47.6 CAM	[increased background sound, similar to gear doors open]		
12:55:48.3 CAM	[sound of multiple thunks continue, similar to operation of the emergency landing gear pump handle]		
12:55:57.2 HOT-2	got one.		
12:55:58.2 CAM	[sound of multiple thunks and squeaks continue, similar to operation of the emergency landing gear pump handle]		
12:56:12.3 HOT-(1)	there you go. atta' boy.		
12:56:13.6 CAM	[sound of multiple thunks continue, similar to operation of the emergency landing gear pump handle]		
		12:56:24.5 APR	Foothills Seventy the Merlin that just landed reported braking action fair.
12:56:26.6 CAM	[sound of multiple thunks continue, similar to operation of the emergency landing gear pump handle]		
		12:56:28.0 RDO-1	alright Foothills Seventy thank you.

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
12:56:37.0 **HOT-1**	okay. three green.		
12:56:38.4 **HOT-2**	ahhh alright [exhaling].		
12:56:40.4 **HOT-1**	do you want to talk to---		
12:56:40.7 **HOT-2**	standby I'm going to tell him.		
12:56:41.7 **HOT-1**	yeah thank you.		
12:56:43.3 **HOT**	[sound of rustling]		
12:56:48.9 **CAM-2**	[HOT-2/CAM-2 talks to passengers advising them of the gear issue and logistics of next planned flight leg. also mentions "hydraulic pump working great" and then mentions something about landing gear selector valve (partially unintelligible).]		
12:58:03.5 **HOT-1**	you want to tell them to buckle in.		
12:58:06.1 **HOT-2**	alright let's go land it.		
		12:58:08.1 **RDO-1**	Foothills Seventy and ah we're ready to come on in.

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
		12:58:11.3 **APR**	Foothills Seventy turn left heading two zero zero vector to runway four final approach course. descend at pilot's discretion maintain two thousand (three hundred).
		12:58:17.8 **RDO-1**	okay left two zero zero pilot's discretion we'll go ahead and start down now two thousand three hundred. Foothills Seventy.
12:58:22.8 **HOT**	[sound of high pitch tone, similar to altitude alert]		
12:58:23.9 **HOT-2**	alright two thousand three hundred.		
12:58:25.4 **HOT-1**	three thousand descending two thousand three hundred. do you mind setting up that ah ILS four again?		
		12:58:40.1 **APR**	and Foothills Seventy ah do you have three green lights on all the gear now?
		12:58:44.6 **RDO-2**	yeah we ah after the manual extension we got three green (down).
12:58:50.6 **HOT-1**	you got the radios.		
12:58:51.6 **HOT-2**	yep.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
		12:58:52.4 APR	Foothills Seventy roger did you want to continue with the emergency or cancel it?
		12:58:55.9 RDO-2	oh we'll go ahead and cancel it at this time.
		12:58:59.4 APR	Foothills Seventy roger.
		12:59:01.0 APR	and ah just one more question. did you want. ah the ceilings are kind of low today. did you want to fly this approach to a low approach and have us have a look and come back for another approach. or are you just gonna try it on the first one?
12:59:11.0 HOT-2	what do you think?		
12:59:12.4 HOT-1	we've got three green. I'm comfortable with it if you are.		
		12:59:14.4 RDO-2	we should ah. we're just gonna come on in with ah the three green now we should be okay. and we [stammer] weren't getting any indications at all before so we should be good.
		12:59:24.0 APR	Foothills Seventy roger.
12:59:26.6 HOT-1	okay.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT

12:59:29.9
HOT-1   everything's same as before. uhm. we'll go ahead and do ahhh flaps down. and ah ref of one twenty. and ah.

12:59:43.1
HOT-2   do you want the hydraulic pressure on for steering and braking?

12:59:45.8
HOT-1   I was going to say. I think ah we should do that. do you think that's ah acceptable?

12:59:48.7
HOT-2   okay.

12:59:49.6
HOT-2   I do.

12:59:50.1
HOT-1   alright I like that.

12:59:50.9
CAM   [sound of two thunks]

12:59:51.4
CAM   [sound of click] [sound of whining begins, similar to hydraulic motor on]

12:59:52.3
HOT-1   ah let's do the approach checks.

12:59:58.0
HOT-2   approach checklist. avionics flight instruments FMS are set...

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
13:00:02.0 **HOT-2**	...radar. baro mins are set as before. approach briefing is complete...		
13:00:07.4 **HOT-2**	...prop sync is off. autofeather is armed.		
13:00:12.9 **HOT-2**	approach check complete.		
13:00:14.4 **HOT-1**	glad we're not getting any ice on those wheels. that's nice.		
13:00:17.2 **HOT-2**	yeah.		
13:00:27.1 **HOT-1**	we're still tuned and ID'ed. everything's good.		
13:00:29.8 **HOT-2**	wow we're a long ways away. took us a while.		
13:00:31.7 **HOT**-?	[short chuckle]		
13:00:33.2 **HOT-2**	dude that was really hard to pump down.		
13:00:35.6 **HOT-1**	I know it was.		
13:00:36.8 **HOT-1**	I could see you working over there.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT

13:00:36.8
HOT-2   my arm is aching right now.

13:00:44.7
HOT-1   oh boy.

13:00:51.0
HOT-1   I hope you got some piss saved up.

13:01:16.7
HOT-1   there wasn't anything else in the checklist after pumping it down correct?

13:01:20.8
HOT-2   it comes down three green.

13:01:22.4
HOT-1   okay.

13:01:23.0
HOT-1   it didn't say go to any others?

13:01:24.2
HOT-2   no. [low volume]

13:01:34.5
HOT-2   checklist doesn't regard (it)...doesn't really have a checklist for...gear stuck. it has...it has has landing gear it has hydraulic...failure. which would say pump the gear down. but here landing [stammer]. yup see. the only landing gear is landing gear up checklist. and then nose gear lock-- unlocked or main gear unlocked.

TIME and SOURCE	**INTRA-AIRCRAFT CONTENT**	**TIME and SOURCE**	**AIR-GROUND COMMUNICATION CONTENT**
13:01:38.0 **HOT-1**	* right there...yeah...		
13:01:59.1 **HOT-1**	huh.		
13:01:59.5 **HOT-2**	none of them really estab--I just read the main landing gear unlocked one initially because...		
13:02:05.9 **HOT-2**	...yeah obviously checked the hydraulic pump and it's more along the lines of...		
13:02:10.6 **HOT-2**	...(once you're in) final approach touchdown...		
13:02:23.8 **HOT-2**	...so I can go to...		
13:02:31.0 **HOT-2**	...hydraulics annnnd...		
		13:02:39.4 **APR**	Foothills Seventy turn left heading one eight zero.
		13:02:41.9 **RDO-2**	left turn one eight zero Foothills Seventy.
13:02:43.9 **HOT-1**	one eighty.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
13:02:44.1 HOT-2	one eighty.		
13:02:46.2 HOT-2	man...I knew this was a bad news aircraft.		
13:02:49.6 HOT-1	[short chuckle] that's just enough of that.		
13:03:32.4 HOT-2	well looks like two four X jay will be going to Mexico...sorry Jamaica.		
13:03:37.6 HOT-?	[short chuckle]		
13:03:48.9 HOT-2	or we're not.		
		13:04:34.4 APR	Foothills Seventy turn left heading one four zero.
		13:04:37.3 RDO-2	heading one four zero Foothills Seventy.
13:04:39.5 HOT-1	one forty set.		
13:04:41.4 HOT-2	cool. I see it.		
13:04:51.8 HOT-1	got the approaches done. right?		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
13:04:53.5 HOT-2	yep. approach checklist is complete.		
13:04:55.2 HOT-1	thanks.		
		13:05:55.8 APR	Foothills Seventy turn left heading zero six zero intercept the runway four localizer.
		13:06:00.6 RDO-2	zero six zero to intercept Foothills Seventy.
13:06:03.2 HOT-2	zero six zero.		
13:06:04.6 HOT-1	zero six zero set.		
13:06:05.5 HOT-2	yep...		
13:06:07.6 HOT-2	...ish.		
13:06:10.3 HOT-1	looks like it will actually work this time.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
		13:06:16.1 **APR**	Foothills Seventy information Victor is now current. visibility two and a half. light snow. ceiling one thousand broken. four thousand four hundred broken. five thousand overcast. temperature minus four. dewpoint minus eight. altimeter three zero one four.
		13:06:33.6 **RDO-2**	three zero one four thanks.
		13:06:35.7 **APR**	Foothills Seventy five miles from HUSKK maintain two thousand three hundred till established on the localizer. cleared ILS runway four approach. contact tower when established. goodday.
		13:06:44.5 **RDO-2**	okay ah maintain two thousand three hundred until established and cleared ILS runway four. and we're going over to tower. thanks for the help today.
13:06:53.7 **HOT-1**	set missed approach altitude please.		
13:06:55.9 **HOT-2**	missed approach altitude is...		
13:06:58.2 **HOT**	[sound of high pitch tone, similar to altitude alert]		
13:06:59.6 **HOT-2**	...settttt.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
13:07:03.3 **HOT**	[sound of high pitch tone, similar to altitude alert]		
13:07:11.3 **HOT-1**	course alive. captured.		
13:07:13.3 **HOT-2**	I (see) that.		
		13:07:14.7 **RDO-2**	tower hello again. Foothills Seventy. just outside HUSKK ILS four.
		13:07:19.5 **TWR**	Foothills Seventy Springfield Tower runway four cleared to land.
		13:07:22.9 **RDO-2**	runway four cleared to land. Foothills Seventy.
13:07:30.3 **HOT-2**	cleared to land runway four.		
13:07:31.8 **HOT-1**	thank you.		
13:07:35.1 **HOT-1**	I'm still going to do flaps down.		
13:07:36.6 **HOT-2**	we're good.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
13:07:38.1 HOT-2	probably best to land as slow as you can.		
13:07:50.7 HOT-2	what's our pressure at. it's seven fifty.		
13:07:52.9 HOT-1	yeah. it's been hanging out around there.		
13:07:57.4 HOT-1	I was a little worried.		
13:07:57.4 HOT-2	what did I do with my pen. or your pen? what did I do with it.		
13:08:00.3 HOT-1	here you go.		
13:08:01.4 HOT-2	thank you.		
13:08:02.2 HOT-2	I mean I'll use this one. I was just like what what. did I did I eat it.		
13:08:15.6 HOT-2	it's right here man.		
13:08:19.5 HOT-2	glideslope's alive.		
13:08:21.2 HOT-1	alright.		

13:08:22.8
HOT-1   gear is already down indicating three green--green. flaps mid please.

13:08:25.7
HOT-2   speed checks.

13:08:26.6
CAM   [sound of thunk]

13:08:27.1
HOT-1   before landing checklists.

13:08:30.4
HOT-2   before landing checklistssssss.

13:08:33.3
HOT-2   landing gear down three green no red.

13:08:36.3
HOT-?   *.

13:08:37.2
HOT-2   hydraulic pressure is checked.

13:08:38.7
HOT-2   condition levers are full forward. landing light...

13:08:42.7
HOT-1   let's go ahead and turn it on.

13:08:43.7
HOT-2   speed checks.

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
13:08:44.2 **CAM**	[sound of click] [sound of whining, similar to electric motor and landing light extension]		
13:08:47.3 **HOT-2**	flaps arrrrre...		
13:08:49.1 **HOT-1**	flaps down please.		
13:08:49.4 **HOT-2**	...speed checks.		
13:08:50.3 **CAM**	[sound of click]		
13:08:52.9 **HOT-2**	glide slope's captured. flaps indicate down.		
13:08:57.0 **HOT-1**	indicating down.		
13:08:57.7 **HOT-2**	autopilot. yaw damp.		
13:08:58.8 **CAM**	[sound of mid-level tone, similar to autopilot disconnect]		
13:08:59.5 **HOT-1**	it's off.		
13:08:59.8 **HOT-2**	annndd steering.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
13:09:01.6 **HOT-1**	it's off.		
13:09:01.9 **HOT**	[sound of clacks, similar to trim in motion]		
13:09:03.7 **HOT-2**	before landing checklist complete.		
13:09:11.2 **HOT**	[sound of clack, similar to trim in motion]		
13:09:30.6 **HOT**	[sound of clack, similar to trim in motion]		
13:09:35.4 **HOT**	[sound of clacks, similar to trim in motion]		
13:09:49.3 **HOT-2**	there's a thousand above...I missed it by a hundred feet.		
13:09:51.5 **HOT**	[sound of clacks, similar to trim in motion]		
13:10:16.7 **HOT-2**	five hundred above. runway's twelve o'clock.		
13:10:19.3 **HOT-1**	alright. I'm visually landing.		
13:10:34.1 **HOT-1**	how's our pressure?		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT

13:10:35.0
EGPWS   five hundred.

13:10:37.1
HOT-2   we're set. we've got three green no red. hydraulic pressure is seven fifty. and we've got zero diff.

13:10:49.4
HOT-2   on glide. on speed.

13:11:19.6
HOT   [sound of cyclical high to low tone, similar to stall warning (4.6 seconds in duration)]

13:11:24.2
HOT-2   we're there.

13:11:24.7
CAM   [sound of thunk, similar to main gear touchdown]

13:11:25.4
HOT-1   props forward.

13:11:25.8
CAM   [sound of background noise change, similar to reduction of engine power]

13:11:26.5
HOT-2   props are forward.

13:11:38.4
HOT-2   sixty.

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
13:11:39.3 HOT-1	ground idle.		
		13:11:45.5 TWR	Foothills Seventy turn right on foxtrot. turn right on alpha. I'll give you progressive to McClelland from there.
13:11:45.6 CAM	[sound of multiple clicks, similar to after landing flow checks]		
13:11:51.4 HOT	[sound of clacks, similar to trim in motion]		
		13:11:52.3 RDO-2	okay right on foxtrot and alpha. Foothills Seventy.
13:12:04.5 HOT-1	I don't think I'm getting very good brakesss.		
13:12:06.4 HOT-1	I don't have any pressure.		
13:12:08.0 HOT-2	no pressure?		
13:12:08.6 HOT-1	no pressure.		
13:12:10.0 HOT-2	try the steering.		
13:12:12.4 HOT-1	oh you know we have the ah t-bar in.		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
13:12:14.8 **HOT-2**	okay.		
13:12:16.5 **HOT-2**	pull it--[sound of mid-level tone begins, similar to gear warning horn (6.9 seconds in duration, until stall warning horn)]		
13:12:16.6 **CAM**	[sound of click][sound of whining, similar to hydraulic motor on, momentarily decreases then increases back to prior level]		
13:12:17.5 **CAM**	[sound of rumbling and scraping, similar to gear retraction and aircraft impacting ground (4.6 seconds duration)]		
13:12:18.0 **HOT**-(1)	oh #.		
13:12:18.7 **HOT**-(2)	#.		
13:12:22.6 **HOT**-?	#.		
13:12:22.9 **CAM**	[sound of whining stops, similar to hydraulic pump stop]		
13:12:23.2 **CAM**	[sound of whining, similar to landing light retraction]		
13:12:23.6 **CAM**	[sound of high to low cyclic tone, similar to stall warning (75 seconds in duration)]		

TIME and SOURCE	INTRA-AIRCRAFT CONTENT	TIME and SOURCE	AIR-GROUND COMMUNICATION CONTENT
13:12:25.9 HOT-2	[CVR channel 2 volume decreases to extremely low volume for the rest of recording]		
13:12:28.3 CAM	[sound of rustling and voices, similar to exiting the cockpit and aircraft (2 minutes and 25 seconds duration)]		
		13:12:47.3 RDO-(1)	tower. Foothills Seventy....tower. Foothills Seventy.
		13:13:14.6 RDO-(2)	tower. Foothills Seventy....tower. Foothills Seventy.
		13:13:16.2 TWR	Foothills Seventy Springfield tower [low volume].
		13:13:17.8 RDO-(2)	yeah it looks like you're going to have roll the trucks. ah it looks like everybody is okay. and we're going to be exiting on the left of the aircraft.
		13:13:24.8 TWR	Foothills Seventy roger they are on the way.
		13:13:26.8 RADIO-??	** all taxiways and ah runways are closed.
		13:13:31.5 RADIO-??	[unintelligible tower or airport rescue and firefighting transmission]

TIME and SOURCE	**INTRA-AIRCRAFT CONTENT**	**TIME and SOURCE**	**AIR-GROUND COMMUNICATION CONTENT**

13:13:38.7
HOT-1   [CVR channel 1 volume decreases to extremely low volume for the rest of recording]

END OF TRANSCRIPT
END OF FOOTHILLS 70 RECORDING[§]
13:13:39 CST

[§] The CVR contained 4 minutes of content after the end of the Foothills 70 recording.