

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



GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

ERA12FA056

**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

February 8, 2012

Cockpit Voice Recorder - 12

**Group Chairman's Factual Report
By Bill Tuccio**

A. EVENT

Location: Key West, Florida
Date: October 31, 2011, 1940 Eastern Daylight Time (EDT)*
Aircraft: Israel Aircraft Industries G150, N480JJ
Operator: Private
NTSB Number: ERA12FA056

B. GROUP

A group was convened on November 15, 2011.

Chairman: Bill Tuccio
Aerospace Engineer
National Transportation Safety Board

Member: Arlander "Duff" Barker
Principal Maintenance Inspector
Federal Aviation Administration

Member: David Dudley
Director of Aviation
Hendrick Motorsports

Member: Bruce Barefoot
Senior Production Test Pilot
Gulfstream Aerospace Corporation

C. SUMMARY

On October 31, 2011, at about 1940 eastern daylight time (EDT), an Israel Aircraft Industries G150, N480JJ, went off the end of the runway on landing roll out. The nose landing gear collapsed and the airframe sustained structural damage. Visual

* All times are expressed in EDT, unless otherwise noted.

meteorological conditions prevailed and an instrument flight rules (IFR), flight plan was filed. The certificated airline transport rated pilot-in-command (PIC), airline transport rated co-pilot and one passenger reported minor injuries. One passenger sustained serious injuries. The flight departed from Witham Field Airport (SUA), Stuart, Florida at 1900 enroute to Key West International Airport (EYW), Key West, Florida. The flight was conducted under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. 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 November 15, 2011 and a partial transcript was prepared of the last 13 minutes, 18 seconds for the 2-hour, 6-minute, 33-second digital recording (see attached).

D. DETAILS OF INVESTIGATION

On November 4, 2011 the NTSB Vehicle Recorder Division's Audio Laboratory received the following CVR:

Recorder Manufacturer/Model: **Universal CVR-120**
Recorder Serial Number: **1954**

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 good 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 useable audio information. Each channel's

[†] See attached CVR Quality Rating Scale.

audio quality[‡] is indicated in Table 1. Notably, channel 4 contained an apparent duplicate of channel 1's content.

Table 1: Audio Quality

Channel Number	Content/Source	Quality
1	PIC	Excellent
2	Co-Pilot	Excellent
3	CAM	Good
4	PIC	Excellent

Timing and Correlation

Timing of the transcript was established by correlating the air traffic control recording transmission time to the corresponding CVR event. Specifically, the radio transmission from N480JJ at 0025:53.389 CVR elapsed time was linked to the same transmission recorded by ATC at 2336:53 UTC. All CVR events were offset to reflect local EDT of the accident by adding 1910:59.611 to the 30-minute recording.

Description of Audio Events

The recording began at 1735:52 as the aircraft was enroute to SUA with the same crew as the accident flight. The accident flight departed SUA at about 1904 with the PIC acting as the flying pilot.

At about 1923:27, the crew received the 2253 UTC ATIS information Victor for Key West. The ATIS reported sky clear, visibility 10 miles, and wind from 330 degrees at 8 knots. At 1925:54, the PIC briefed the visual approach runway 27 for Key West.

The transcript began at 1929:07 and continued until the end of recording at 1942:25.1, coincident with a loud thump, similar to impact.

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 December 7, 2011, both the PIC and co-pilot reviewed the transcript, accompanied by group member David Dudley. The crew suggested two corrections to the transcript: the [sigh]s at 1934:12.4 and 1935:42.7, were made by HOT-2. The crew also noted the momentary decrease in sound at 1942:19.7 was likely when the aircraft departed the runway prior to hitting the dirt mound.

Bill Tuccio
Vehicle Recorder Division

[‡] See attached CVR Quality Rating Scale.

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 1954, installed on an Private Gulfstream G150 (N480JJ), which crashed after overrunning the runway at the Key West International Airport, Key West, Florida.

LEGEND

CAM	Cockpit area microphone voice or sound source
HOT	Flight crew audio panel voice or sound source
RDO	Radio transmissions from N480JJ
CTR	Radio transmission from Miami center controller
APR	Radio transmission from the Key West approach controller
TWR	Radio transmission from the Key West airport tower controller
EGPWS	Enhanced Ground Proximity Warning System
-1	Voice identified as the PIC
-2	Voice identified as the co-pilot
-3	Voice identified as a passenger
-?	Voice unidentified
*	Unintelligible word
#	Expletive
@	Non-pertinent word
()	Questionable insertion
[]	Editorial insertion

Note 1: Times are expressed in eastern daylight time (EDT).

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

17:35:52.2

START OF RECORDING

19:29:06.8

START OF TRANSCRIPT

19:29:06.8

HOT-1 what's the altimeter @?

19:29:07.4

HOT-2 two nine nine four.

19:29:10.1

HOT-2 that'll help ya.

19:29:11.9

HOT-2 and one eight oh.

19:29:15.6

HOT-1 okay.

19:29:22.9

HOT-1 see what happened was is...because CORGI in the middle. I did Key West minus thirty...

19:29:28.0

HOT-2 yeah.

19:29:28.3

HOT-1 ...but but it wouldn't accept it because that...

19:29:30.0

HOT-2 CORGI's in the way.

19:29:30.8

HOT-1 ...yeah.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:29:31.0

HOT-2 right.

19:29:32.4

HOT-1 so all I did was I went over to the fix page and I gave myself a thirty mile ring to (find) and I...I'm not that good at math. [laughter]

19:29:45.5

HOT-2 yeah. you'll be fine.

19:30:02.4

HOT-1 I hate to use the speed brakes on this thing. they're just they're terrible.

19:30:05.8

HOT-2 yeah.

19:30:08.6

HOT-2 they are a bit...a bit more rumbly.

19:30:16.9

HOT-2 alright atis we got. field elevation should still be set at fifty.

19:30:21.9

HOT-2 ahhh F-M-S's are--

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:30:23.4

CTR november four eight zero juliet juliet contact Key West approach one two four point zero two.

19:30:28.5

RDO-2 twenty four zero two for juliet juliet. good night.

19:30:38.2

RDO-2 and ah approach good evening ah four eight zero juliet juliet with you descending to cross thirty north of ah Key West at one zero thousand with Victor.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:31:03.8
HOT-1 you tell me.

19:31:11.3
HOT [sound of mid range tone, similar to altitude alert]

19:31:18.0
HOT-1 eight thousand...and I'm gonna' be fast @ but I'm just gonna' let it ride okay.

19:31:22.1
HOT-2 ahh whatever you got plenty of...you're twenty five miles out. you'll be able to get down.

19:31:27.1
HOT-1 yeah.

19:31:32.7
HOT-1 I'm gonna' do the cowl heats again right quick.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:30:53.8
APR four eight zero juliet juliet Key West approach expect a visual approach runway two seven. altimeter two niner niner five. and can ah you make a right base for two seven over the channel or do you need about a five or six mile final?

19:31:04.4
RDO-2 ah we should be able to make a right base no problem.

19:31:08.1
APR and four eight zero juliet juliet roger descend and maintain eight thousand for now due to I-F-R traffic northeast bound at your ah eleven o'clock for ten miles.

19:31:15.7
RDO-2 ah roger down to eight thousand zero juliet juliet thanks.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:31:35.4

HOT-2 okay.

19:31:41.6

HOT-2 okay our ref speeds should be good now since we are...comin' on down.

19:31:45.9

HOT-1 okay.

19:32:08.5

HOT-2 alright I'm going to turn the seat belt sign on.

19:32:24.2

HOT-2 you gonna hop out and unlock the baggage door and.

19:32:27.7

HOT-1 I sure will.

19:32:28.3

HOT-2 okay.

19:32:31.5

HOT-1 yep. I got my key still.

19:32:34.2

HOT-1 nine for eight.

19:32:39.2

HOT [sound of mid range tone, similar to altitude alert]

19:32:41.0

HOT-2 one to go.

19:32:47.9

APR four eight zero juliet juliet continue descent to one thousand six hundred fly heading one nine zero vectors for arrival.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:32:58.4

HOT-1 sixteen hundred and its armed.

19:33:04.2

HOT-1 anyway ah the reason I said whatever you think is 'cause I didn't know which channel and all he was talkin' about that one--

19:33:08.9

HOT-2 comin' over that channel right there.

19:33:10.6

HOT-1 sure thing. so it'll be a tight base is all it is right?

19:33:11.1

HOT-2 so you'll--

19:33:12.8

HOT-2 well its not even that tight really. ah you can be a little bit you know east of it. they just don't want you up over the ah...

19:33:20.0

HOT-1 navy base.

19:33:20.8

HOT-2 ...navy base yeah.

19:33:21.4

HOT-1 sure thing.

19:33:45.6

HOT [sound of popping lips]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:32:53.4

RDO-2 heading one nine zero down to one thousand six hundred juliet juliet. thank you.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:33:58.2

HOT-1 I'll let you extend that centerline if you would please.

19:34:01.9

HOT-2 ahhhh alright hold on a second. uhhm... [chit chit chit chhh]

19:34:09.5

HOT-2 see if I remember how to do that.

19:34:11.0

HOT-1 okay.

19:34:12.4

HOT [sigh]

19:34:15.8

HOT-2 I don't.

19:34:16.6

HOT-1 okay.

19:34:17.8

HOT-2 take ah R-X two seven up tooooo over the top of E-W..E-Y-W.

19:34:24.2

HOT-1 down in the bottom right hand corner. see the course?

19:34:26.4

HOT-2 right.

19:34:26.7

HOT-1 you'll half to put...ah...what's our inbound course...two seventy four.

19:34:28.9

HOT-2 ahhh. two seventy three it looks like.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:34:31.8

HOT-1 alright.

19:34:33.0

HOT-2 ah here it says two seventy four maybe.

19:34:35.0

HOT-1 okay. yep.

19:34:35.6

HOT-2 yeah.

19:34:36.7

HOT-2 I was lookin' right there but...

19:34:37.7

HOT-1 okay.

19:34:37.9

HOT-2 I'll put I'll put two seventy three four in there.

19:34:41.8

HOT-1 and then put that there.

19:34:42.9

HOT-2 and make it big.

19:34:43.8

HOT-1 there you go.

19:34:45.8

HOT-1 see when you're doin' the I-L-S's and stuff that course will already be there for ya'.

19:34:48.6

HOT-2 right...that's what I was lookin' for. I was gonna' wait a minute every time it's already been there.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:34:52.0

HOT-1 that's right [laughter].

19:35:06.8

HOT-2 oh he must be perfectly comfortable right now because I'm not. I'm not.

19:35:10.6

HOT-1 [laughter]

19:35:17.6

HOT-2 well I'm showin' plus seventeen you want the engines off?

19:35:20.3

HOT-1 sure.

19:35:42.7

HOT [sigh]

19:36:15.2

HOT-2 see it's right over there.

19:36:15.8

HOT-1 I see it.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:36:04.7

APR four eight zero juliet juliet do you have international in sight sir?

19:36:07.7

RDO-2 uhmm not quite yet there are just a couple of little puffy clouds in front of us here we'll pick it up here shortly I'm sure uhh I'll tell you what I do have it in sight at this time I got the beacon.

19:36:15.3

APR four eight zero juliet juliet roger you're cleared for the visual approach two seven via right base entry. contact international tower one one eight point two. good night.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:36:29.1

HOT-2 welllll.

19:36:29.8

HOT-1 let's do flaps twelve when you get a chance please.

19:36:30.9

HOT [sound of mid range tone, similar to altitude alert]

19:36:32.8

HOT-2 flaps to twelve.

19:36:33.6

HOT-1 ah huh.

19:36:38.9

HOT-2 eighteen two [low volume].

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:36:21.3

RDO-2 alright cleared for the visual right base and over to the tower. good night.

19:36:40.9

RDO-2 and Key West Tower good evening four eight zero juliet juliet on the visual approach right base for ahh runway two seven.

19:36:47.5

TWR november four eight zero juliet juliet Key West Tower runway two seven cleared to land. wind three six zero at one three. [latter part of this transmission had rapid oscillation background noise, similar to interference]

19:36:55.5

RDO-2 cleared to land two seven zero juliet juliet. thank you.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:36:59.7

HOT-1 okay @ until we get through this clouds I'm going to stop at sixteen hundred. ya think? or would you keep on comin'?

19:37:05.7

HOT-2 awe that yeah you can do that.

19:37:07.4

HOT [sound of increased air flow/hiss, similar to pressure drain valves opening, continues until touchdown]

19:37:11.4

HOT-2 ah you're four miles out.

19:37:13.6

HOT-2 **.

19:37:13.7

HOT-1 let's do ah...

19:37:15.6

HOT-1 ...do flaps twenty please.

19:37:32.8

HOT-1 gear down.

19:37:35.1

HOT-1 and flaps full.

19:37:35.2

CAM [sound of increased noise, similar to gear extension]

19:37:35.2

HOT [sound of click, similar to gear handle]

19:37:37.0

HOT-1 and I gotta' tell ya' I'm doin' this blind right here brother.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:37:38.8

HOT-2 [laughter]

19:37:42.8

HOT-2 you should pop out of here in just a second.

19:37:49.0

HOT-2 okay three green no red. flaps are comin' to full.

19:37:51.5

HOT [sound of click, similar to flap handle]

19:37:54.6

HOT-1 shhhiz.

19:38:09.2

HOT-1 I got the navy base.

19:38:09.8

HOT-2 ah you're gonna. you're gonna have to come on down.

19:38:12.0

HOT-1 okay.

19:38:12.0

HOT [sound of repeating chimes, similar to autopilot disconnect]

19:38:13.3

HOT-2 you're probably gonna miss it.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:38:17.4

RDO-2 and tower juliet juliet.

19:38:20.8

HOT-3 guys if you'll turn these lights off you can see better. [@ , passenger]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:38:25.4
HOT oh.

19:38:33.7
HOT [sound of mid-level tone, similar to altitude alert]

19:38:34.4
HOT-1 damn @ I don't see a thing son.

19:38:38.2
HOT-1 oh there #.

19:38:38.6
HOT-2 ahh you gonna miss it.

19:38:39.9
HOT-1 I can't.

19:39:00.4
HOT-1 I don't think.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:38:25.5
TWR wind three six zero at one eight.

19:38:30.0
RDO-2 juliet juliet roger.

19:38:40.7
RDO-2 yeah we gotta' a little high there. there was a cloud that came right [stammer] between us and the airport. can we just ahhh maybe enter a left...come around and enter a left downwind?

19:38:50.9
TWR just come ah... just continue [stammer] on your head-- your present heading and then when you get past the airport turn northbound and ah come back in on a right downwind.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:39:15.6

HOT-2 you're right over the airport now.

19:39:17.1

HOT-1 alright.

19:39:18.6

HOT-2 you can start a right hand turn.

19:39:20.8

HOT-1 alright.

19:39:23.4

HOT-2 cause you're you're right over the approach end of ah nine right now.

19:39:38.9

HOT-2 I'd go ahead and descend down some @.

19:39:41.0

HOT-1 okay.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:39:00.6

RDO-2 ah we just got a layer of clouds. they weren't here a minute ago. but they're right here and we are at eleven hundred feet and there still the bases are below us.

19:39:27.3

RDO-2 alright we're gonna turn right ahhh right crosswind here and ah comin' down hopefully when we get around we'll be able to see it.

19:39:33.3

TWR yeah just continue comin' down and enter the right downwind and let me know if you can keep it in sight.

19:39:38.1

RDO-2 juliet juliet roger.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:39:41.1

HOT-2 I mean.

19:39:44.4

HOT-2 there is really nothin' out here to hit.

19:39:46.5

HOT-1 okay.

19:39:47.9

HOT-2 okay you're right off the approach end right now.

19:39:52.1

HOT-2 if you can just get juuust a little bit below these clouds...

19:39:54.9

HOT-1 alright.

19:39:55.3

HOT-2 ...the runway is right there.

19:39:56.6

HOT-1 okay.

19:39:57.0

HOT-1 tell ya' what I'm gonna stay inside...

19:39:58.7

HOT-2 okay.

19:39:59.2

HOT-1 ...and cause I'm down to a thousand feet right now.

19:40:02.0

EGPWS one thousand.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:40:07.0

HOT-2 alright just level off right here. okay you're good. you're underneath now.

19:40:10.3

HOT-1 okay.

19:40:13.8

HOT-1 yes.

19:40:28.1

HOT-2 alright so you're--

19:40:28.6

HOT-1 I'm sorry man I had no clue--

19:40:30.2

HOT-1 *.

19:40:30.2

HOT-2 yeah I know I mean it was it was there and I don't where these clouds come from.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:40:11.7

TWR zero juliet juliet I've got you in sight. you have the field still?

19:40:13.9

RDO-2 yep. ahhh we got it in sight. we just had to get down under the clouds. the bases are right here at about...ah eight hundred feet. so we're good to go.

19:40:20.8

TWR okay. runway two seven cleared to land. the wind is three six zero at one two. [latter part of transmission has sound similar to interference]

19:40:26.2

RDO-2 cleared to land two seven juliet juliet thank you.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:40:34.0

HOT-1 you call my base for me will ya?

19:40:37.0

HOT-2 I'd just I'd just turn. ah. well just go ahead and start it now. just it's just like [stammering]. yeah you're it's forty-five degrees behind ya now. so just come on around.

19:40:41.9

HOT [sound of mid-level tone, similar to altitude alert]

19:40:52.4

HOT-2 you just watch your speed and.

19:40:54.0

HOT-1 yep.

19:40:54.5

HOT-2 you're good to go. just keep comin'. keep comin'.

19:40:57.3

HOT-2 just what you got. you're perfect.

19:40:59.6

HOT-2 come around. you'll pick it up here in just a second. just keep on a comin'.

19:41:05.1

HOT-2 and you may. you probably [stammer] gonna have to level off. just keep. do you see it now?

19:41:08.7

HOT-1 not yet I...I would have to turn too steep.

19:41:11.1

HOT-2 right there.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:41:12.3

HOT-2 just keep right on comin'. just keep right on comin'. see it. right there.

19:41:17.4

HOT-1 #.

19:41:18.1

HOT-2 see it?

19:41:18.9

HOT-1 yep. [sigh]

19:41:20.3

HOT-2 you're perfect. you're perfect. just keep your bank just what you got right now. you're perfect.

19:41:25.0

HOT-2 speed looks good.

19:41:28.7

EGPWS five hundred.

19:41:33.1

HOT-1 I don't like this man. I'm too fast.

19:41:34.5

HOT-2 [laughter] naw.

19:41:35.5

HOT-1 or I feel like I'm fast.

19:41:36.6

HOT-2 no you're good. you're right on speed.

19:41:38.3

EGPWS three hundred.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:41:44.5

EGPWS two hundred.

19:41:49.0

HOT-2 I wouldn't want to be doin' in a G-five.

19:41:52.3

EGPWS fifty.

19:41:53.1

EGPWS forty.

19:41:54.0

HOT-2 aaaand. there's ref.

19:41:54.0

EGPWS thirty.

19:41:55.3

EGPWS twenty.

19:41:55.8

HOT-1 and I'm I'm long here.

19:41:57.0

EGPWS ten.

19:42:00.5

CAM [sound of thump, similar to touchdown]

19:42:01.8

CAM [sound of clicks, similar to landing gear handle solenoid weight on wheels]

19:42:02.6

HOT-2 ahh you're one ten.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:42:02.9
CAM [sound of changed background noise, similar to nosewheel on runway]

19:42:04.0
CAM [sound of rattle/thump from external source]

19:42:07.4
HOT-2 you're gonna have to get hard on the brakes.

19:42:08.2
HOT-1 yep. I'm on 'em. they're not goin'.

19:42:10.5
HOT-1 I'm goin' around. I'm goin' around.

19:42:11.3
HOT-2 oh crap. crap.

19:42:12.6
HOT-1 @ #. @ @.

19:42:14.8
HOT-2 no it's too late now. you can't go around now.

19:42:15.9
HOT-1 awe @.

19:42:17.6
HOT-1 no.

19:42:18.0
HOT-2 wo. ho ho ho ho.

19:42:19.7
CAM [momentary decrease in sound, similar to aircraft not touching ground]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:42:19.9
HOT-1 #.

19:42:22.1
HOT-1 @.

19:42:23.9
HOT-1 oh # --

19:42:24.5
CAM [sound of loud thump, similar to some impact]

**END OF TRANSCRIPT
END OF RECORDING**

19:42:25.1

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:42:22.7
TWR * you * off the runway?