

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



GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

ERA14FA045

**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.

The English translations contained in this report are not word for word; rather, they are idiomatic and intended to express the meaning and context of the Spanish source language.

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

August 5, 2014

Cockpit Voice Recorder - 12

Group Chairman's Factual Report

By Bill Tuccio, Ph.D.

A. EVENT

Location: Atlantic Ocean near Fort Lauderdale, Florida
Date: November 19, 2013
Aircraft: Learjet 35, XA-USD
Operator: Aero JL SA de CV
NTSB Number: ERA14FA045

B. GROUP

A group was convened on May 5, 2014.

Chairman: Dr. Bill Tuccio
Aerospace Engineer
National Transportation Safety Board

Member: Carlos Rivera
Management and Program Analyst
Federal Aviation Administration

Member: Oscar Rivera
Air Safety Investigator
Dirección de Investigación de Accidentes e Incidentes de
Aviación

Member: Gary Spears
Senior Test Pilot
Bombardier/Learjet

Member: Jay Eller
Air Safety Investigator
Honeywell

C. SUMMARY

On November 19, 2013, at 1956 eastern standard time (EST), a Learjet 35, Mexican registration XA-USD, operated by Aero JL SA de CV, was destroyed when it collided with the Atlantic Ocean after takeoff from Fort Lauderdale/Hollywood International Airport (FLL), Fort Lauderdale, Florida. The commercial pilot and a physician on board were lost and presumed fatally injured. The copilot and a flight nurse were fatally injured. Night visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed for the positioning flight from FLL to Cozumel, Mexico. A solid-state cockpit voice recorder (CVR) was sent to the National Transportation Safety Board's Audio Laboratory for readout. The CVR group prepared a summary and full transcript of the 2-hour 4-minute recording, as described in "Description of Audio Events."

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: **527949**

Recorder Description

Per federal regulation 14 CFR 91.609(e), aircraft manufactured prior to April 7, 2010, must be equipped with a CVR that records 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 of CVR operation. This model CVR, the L-3/Fairchild FA2100-1020, is a solid-state CVR that records 2 hours of high quality 4-channel digital cockpit audio. The recorded audio data is separated and decompressed by the L-3 download software into four 2-hour electronic files. The resulting files contain one file of audio information from the cockpit area microphone (CAM), another with the captain's audio panel hot microphone information, the third with first officer's audio panel hot microphone information, and a fourth with the observer position audio information.

Recorder Damage

The aircraft crashed into the Atlantic Ocean near Fort Lauderdale on November 19, 2013. The CVR was recovered in 96 feet of water 15 days later on December 4, 2013, and transported in water to the NTSB Vehicle Recorder Laboratory in a cooler, as shown in figure 1. The unit was inspected and the crash survivable memory unit (CSMU) removed, as shown in figure 2. The CSMU lid was removed, exposing the dry silica insulating material, as shown in figure 3. The "memory puck" housing was extracted from the CSMU's dry silica insulating material, as shown in figure 4. The stacked memory boards were removed from the memory puck housing and inspected; revealing no water or impact damage, as shown in figure 5. The stacked memory board was attached to an NTSB surrogate recorder and downloaded.

Figure 1. CVR being removed from transport cooler.



Figure 2. CVR with CSMU removed.



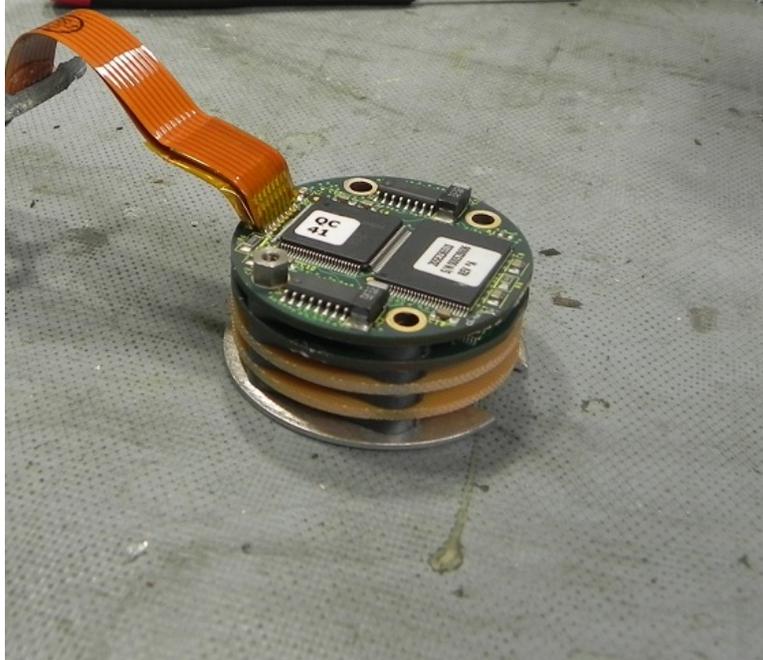
Figure 3. CSMU with lid removed.



Figure 4. Memory puck housing removed from CSMU.



Figure 5. Stacked memory boards removed from memory puck housing.

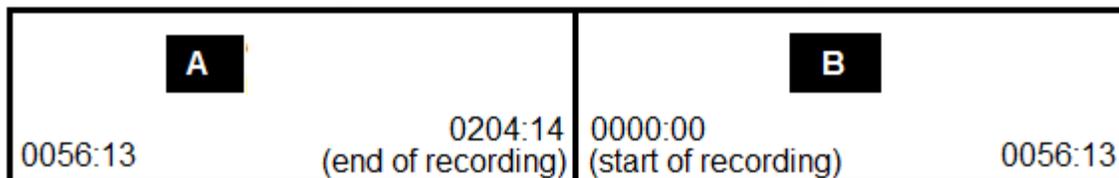


Audio Recording Description

The 2-hour 4-minute recording consisted of four channels of audio information. Notably, Channel 1 did not contain any audio information, nor was it required by law to do so. The content on Channel 2 principally contained good to excellent quality* voice of the Second-in-Command (SIC); with poor to unusable quality recording of the Pilot-in-Command (PIC) and other aircraft occupants. Channel 3 principally contained excellent quality aircraft-to-ground communications. Channel 4 contained the CAM and was of poor to unusable quality.

Usually a digital recording is in temporal order from oldest to most recent content. However, since a surrogate recorder was used for the recovery, the CVR download and decode process could not determine the start of the recording. Figure 6 shows the temporal order of the recovered audio. The oldest content was in area “B,” about 1-hour and 8-minutes past the start of the downloaded recording. When area “B” ended, it wrapped back to area “A” and continued until the end of the most recent content (and the accident).

Figure 6. Order of downloaded recording.



* See attached CVR Quality Rating Scale.

Timing and Correlation

Timing on the transcript was established by correlating the CVR events to common events on the air traffic control (ATC) recording. Specifically, the ATC transmission of “understand you're going back to Fort Lauderdale?” that occurred at 0051:38 Universal Coordinated Time (UTC) corresponded to 0103:38.0 into the downloaded recording (area “A” of figure 6). Subtracting 5 hours from UTC to convert to EST resulted in an offset of 1848:00.0 being added to the content in area “A” of figure 6.

Due to the recorder starting point anomaly discussed in “Audio Recording Description,” 0204:14.6 into the download (in area “B” of figure 6, marked “0056:13”) was continuous with 0000:00 into the download (area “A” of figure 6, marked “0056:13”). An offset of 1643:45.4 was therefore added to the content in area “B” to convert to EST.

Description of Audio Events

The recording began at 1751:50 EST when the aircraft was on the ground at FLL. Most intracockpit communications were in Spanish. The attached transcript uses a plain font to display words as spoken. When translation is necessary, the translation is *italicized* and shown in square brackets below the verbatim transcription. The translation from Spanish to English was not word-for-word; rather, it was idiomatic and considered the context and meaning of the Spanish source language.

The recording began at about 1752 EST as the SIC called Fort Lauderdale Clearance Delivery and requested the IFR flight plan to Cozumel. Fort Lauderdale Clearance Delivery advised the SIC it was too early to issue the flight plan.

The transcript from 1754 EST until 1824 EST summarizes sparse content. From 1824 EST until 1825 EST, the transcript details the receipt of the IFR clearance to Cozumel. The transcript from 1825 EST until 1940 EST also summarizes sparse content.

Content is fully transcribed from 1940:22 EST until the end of the recording at 1955:43 EST. This period covers engine start, taxi, take-off, and the accident.

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 FA2100-1020 solid-state cockpit voice recorder, serial number 527949, installed on an Aero JL SA de CV Learjet (XA-USD), which crashed into the Atlantic Ocean near Fort Lauderdale, Florida.

LEGEND

CAM	Cockpit area microphone voice or sound source
HOT	Flight crew audio panel voice or sound source
RDO	Radio transmissions from XA-USD
DEP	Radio transmission from the Miami departure controller
TWR	Radio transmission from the Fort Lauderdale airport tower controller
GND	Radio transmission from the Fort Lauderdale airport ground controller
CLC	Radio transmission from the Fort Lauderdale airport clearance delivery
AC-MISC	Radio transmission from aircraft other than XA-USD
GPWS	Ground Proximity Warning System
-1	Voice identified as the PIC
-2	Voice identified as the SIC
-3	Voice identified as the female passenger
-4	Voice identified as the male passenger
-?	Voice unidentified
*	Unintelligible word
#	Expletive
@	Non-pertinent word
()	Questionable insertion
[]	Editorial insertion or, <i>when in italics, translation to English</i>

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.

Note 5: Translations to English are shown in italicized text and as an editorial insertion.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

17:51:50.1 EST
START OF RECORDING
START OF TRANSCRIPT[†]

17:56:01.0
HOT-2 [low volume] ah right departure from runway...one zero left...direct DOLPHIN. proceed. nate [may be referring to MNATE]. **.

17:57:01.7
HOT-2 [low volume] ** advise when ready.

17:57:11.3
HOT-2 [low volume] okay and when can I copy my clearance. how much time do I hav--do I have to [exhale].

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

17:52:37.0
RDO-2 [asks for clearance to Cozumel, first calling "Miami" clearance]

17:53:29.0
CLC [ATC explains flight plan was found in system, but too early to issue flight plan.]

[†] See "Description of Audio Events" for an explanation of content that was summarized, content that was transcribed, and translation syntax.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

17:58:07.9
HOT-2

[low volume] Fort Lauderdale Four nate. [exhale]. **. okay I call you later. that means I have to file another? okay I call you later. hijo de su # madre.
*[Fort Lauderdale Four nate. [exhale]. **. okay I call you later. that means I have to file another? okay I call you later. son of his # mother.]*

17:59:07.4
HOT-2

[low volume] we are here just. we have to taxi via papa. taxi via papa. [exhale].

17:59:35.3
HOT-2

[low volume, mumbles in Spanish and English] [yawns and groans] [hums] [exhales].

18:02:38.7
HOT-2

[rythmic breathing in headset until 18:13:15 EST]

18:13:15.6
HOT-2

[low volume] could could I change my estimated time of departure? to. * twenty three. twenty three fifteen. how long. how m how long time? estimate fifteen twenty minutes so. what could I do. no that's why I'm asking you. come on man. don't be an #. Fort Lauderdale. Fort Lauderdale clearance good. after. noon. Fort Lauderdale clearance good afternoon. this is your # captain speaking.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

18:14:14.8
HOT-2

[humming, breathing]

18:15:04.8
HOT-2

[low volume] ** zero. [breathing]. climb * heading. turn left.
[lip smacking]. nate. DOLPHIN.

18:16:00.3
HOT-2

[rhythmic breathing]

18:18:19.3
HOT-2

[rhythmic breathing] Notices to Airmen.

18:21:03.2
HOT-2

[low volume] xray alpha uniform sierra delta ready to copy
clearance Cozumel. so I have one and a half hours for to
departure. okay. I'll call you later. okay I got it.

18:21:33.3
HOT-2

[breathing/mumbling]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:17:01.0

RDO [ATIS Sierra begins]

18:20:46.0

RDO [ATIS stops]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

18:22:29.1
HOT-2

[low volume] what time here. what time is here. ** two. eight minutes. just eight minutes. **. papa. papa y echo. **. papa y echo **. * papa. **. Fort Lauderdale ground xray alpha uniform sierra delta Shelter Air. ready to taxi. **.

18:23:56.2
HOT-2

[mumbling]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:24:34.9
CLC

xray alpha uniform sierra delta Fort Lauderdale clearance. are you on the frequency?

18:24:39.4
RDO-2

uniform sierra delta go ahead.

18:24:41.8
CLC

** flight plan now. I thought you were going to call me earlier. you're cleared to Mike Mike Charlie Zulu via the Fort Lauderdale Three Departure I'm sorry make that Fort Lauderdale Four Departure MNATE transition and then as filed. maintain three thousand. expect flight level four zero zero ten minutes after. departure frequency is one two eight point six. squawk seven four six seven.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

18:25:53.8
HOT [pilot mumbles, some in Spanish, with new information from clearance]

18:27:30.6
HOT [new electronic hum begins in background, consistent with AC inverters turning on]

18:32:07.1
HOT [sound of background sound, consistent with standby gyros spinning up]

18:35:23.8
HOT [speaking in Spanish]

18:41:04.6
HOT [sound of switches]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:25:11.0
RDO-2 uniform sierra delta cleared to Cozumel. Fort Lauderdale Four Departure. Mike November alpha tango echo transition. and rate as filed. three thousand feet restriction. level final four zero zero. frequency departure one two eight point six. squawk seven four six seven.

18:25:31.4
RDO/CLC [Clearance and RDO-2 conclude, noting aircraft parked at SheltAir]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

18:41:05.0
HOT [ATC, ground, other aircraft, similar to unattended radio continues until about 19:12:42 EST]

19:12:42.8
HOT [Spanish, faint, in background, multiple people]

19:19:46.8
HOT [ATC, ground, other aircraft, similar to unattended radio continues until about 19:40:22 EST]

19:40:22.3
HOT [sound of whining, similar to toe brake activation (2.6 seconds)] [sound of click, similar to setting parking brake]
[sound of whining, similar to toe brake activation (2.3 seconds)]

19:40:30.7
HOT-3 mande?
[sorry?]

19:40:33.3
HOT-? va a ser. como una hora con treinta mas o menos...
[it'll be. like an hour and thirty more or less...]

19:40:40.2
HOT [sound of rustling, similar to headset manipulation]

19:40:43.4
HOT [sounds of multiple clicks]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:41:04.5
HOT

[sound of rustling and breathing, similar to headset manipulation]

19:41:11.4
CAM

[sound of two muffled clicking sounds]

19:41:13.1
HOT-?

[sound of multiple loud breaths]

19:41:16.0
HOT

[sound of whining, similar to first engine start]

19:41:25.4
HOT

[change in background sound, similar to first engine light off during engine start]

19:41:34.3
HOT

[sound of whining, similar to second engine start]

19:41:34.7
CAM

[sound of two muffled clicking sounds]

19:41:43.1
HOT-?

*** [low volume]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:41:43.4
HOT

[change in background sound, similar to second engine light off during engine start]

19:41:47.3
HOT-2

[from this point until HOT-2 reports engine failure shortly after departure, low volume breathing is recorded by HOT-2]

19:41:53.1
HOT-2

* (normal).

19:41:56.7
HOT

[reduction in background ambient noise]

19:42:01.0
HOT-3

[unintelligible, low volume (background) female voice]

19:42:08.8
HOT-2

quieres taxi? o...
[do you want to taxi? o...]

19:42:11.2
HOT-?

**.

19:42:11.7
HOT-2

listo a rodar?
[ready to roll?]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:42:12.5
HOT-? ** [low volume].

19:42:13.5
HOT-2 for--

19:42:40.3
HOT-(1) *** (taxi) *** [low volume].

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:42:14.9
RDO-2 Fort Lauderdale. good night. xray alpha uniform sierra delta.
ready to taxi.

19:42:20.3
GND xray alpha uniform sierra delta say position.

19:42:24.6
RDO-2 Shelt Air.

19:42:25.8
GND xray alpha uniform sierra delta runway one zero left. taxi papa
echo and Charlie.

19:42:34.6
RDO-2 one zero left echo and Charlie. ahh uniform sierra delta.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:42:44.3

HOT-2

yo creo que ya nos quitó la planta pero se quedó allá atras.
ujum.
*[I think he [referring to ramp personnel] took out the plant
[ground power unit] but I think he stayed behind. uhum.]*

19:42:51.1

HOT-2

sí.
[yes.]

19:42:52.1

HOT-2

salimos papa la primera a la izquierda es eco.
[we go out papa the first one to the left is echo...]

19:42:55.3

HOT-2

...y la primera a la izquierda es Charlie.
[...and the first one to the left is Charlie.]

19:42:57.1

HOT-?

[unintelligible voice(s), low volume]

19:43:04.2

HOT

[sound of click] [increase in background ambient noise,
similar to pressurization cabin air]

19:43:13.6

HOT-1

** ** [low volume].

19:43:15.2

HOT-2

no.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:43:22.5
HOT-(1) *** [low volume].

19:43:23.6
HOT-2 he recibido [stammer] he si no este he...
[I received [stammer] uhm yes no this uhm...]

19:43:27.7
HOT-2 como dice?
[how do you say?]

19:43:28.3
HOT-1 [unintelligible, low volume]

19:43:33.8
HOT-2 por aquí.
[through here.]

19:43:35.0
HOT-1 *** [low volume].

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:43:15.7
GND xray alpha uniform sierra delta expect radar vectors around weather.

19:43:20.6
RDO-2 roger uniform sierra delta.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:43:35.9

HOT-2

sí. sí por aquí.
[yes. yes through here.]

19:43:47.4

HOT-1

*** [low volume].

19:43:49.7

HOT-2

por acá. nada.
[over here. nothing.]

19:43:52.2

HOT-2

derecha.
[right [as in right turn].]

19:44:00.4

HOT-2

por la derecha y esa sería papa.
[by the right [as in right turn] and that one should be papa.]

19:44:02.7

HOT-?

ahhh.

19:44:02.9

HOT-2

no.

19:44:03.1

HOT-1

*** [low volume].

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:44:03.8
HOT-2

ajá.
[uhum [as in a confirmation].]

19:44:04.3
HOT-2

sería papa.
[should be papa.]

19:44:07.6
HOT-(1)

** [low volume].

19:44:08.8
HOT-(4)

bad weather huh?

19:44:09.7
HOT-2

sí.
[yes.]

19:44:40.1
HOT-1

vas para allí?
[going over there?]

19:44:41.0
HOT-2

por por por eco?
[through through through echo?]

19:44:43.9
HOT-2

y al ul...terminar eco. Charlie.
[and at the en...end echo. Charlie.]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:44:47.2

HOT-2

y nos deja en cabecera.
[and it will leave us at the threshold.]

19:44:53.0

HOT-1

que no tiene lo del GPS?
[what does the GPS not have?]

19:44:54.8

HOT-(4)

está marcando.
[it's indicating.]

19:44:56.1

HOT-1

qué le vamos haciendo?
[what are we doing to it?]

19:44:57.4

HOT-2

no no capi esa no.
[no no cap[tain] not that one.]

19:45:01.1

HOT-1

*** [low volume].

19:45:02.9

HOT-2

sí sí sí es así es el iPad dos o el cuatro. creo.
[yes yes yes that's it. it's an iPad two or four. I think.]

19:45:07.4

HOT-1

*** [low volume].

TIME and SOURCE

INTRA-AIRCRAFT CONTENT

19:45:09.4
HOT-2

sí.
[yes.]

19:45:24.9
HOT-1

* presurísalo * para que esté todo listo.
[* pressurize it * so everything is ready.]

19:45:28.2
HOT-2

okay.

19:45:29.8
HOT-2

está aletas ocho grados.
[it's flaps eight degrees.]

19:45:33.4
HOT-1

como cuantas tenemos en el computador?
[like how many do we have in the computer?]

19:45:35.1
HOT-2

cuatro.
[four.]

19:45:35.8
HOT-1

[unintelligible, Spanish, low volume]

TIME and SOURCE

AIR-GROUND COMMUNICATION CONTENT

19:45:37.0
GND

xray alpha uniform sierra delta new departure frequency one one niner point four five.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:46:26.6

HOT-2

ya ya la que cruza es Charlie.

[yeah yeah the one that crosses is Charlie.]

19:46:28.4

HOT-1

** [low volume].

19:46:29.2

HOT-2

(y ahí) a la izquierda sí.

[(and there) to the left yes.]

19:46:46.2

HOT-1

** [low volume].

19:46:47.8

HOT-2

ya.

[yeah.]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:45:41.6

RDO-2

one one niner point four seven.

19:45:44.7

GND

ah niner point four five.

19:45:46.9

RDO-2

four five. uniform sierra delta.

TIME and
SOURCE

INTRA-AIRCRAFT CONTENT

TIME and
SOURCE

AIR-GROUND COMMUNICATION CONTENT

19:46:48.1
HOT-1

* [low volume].

19:46:48.7
HOT-2

ya es el con--
[yeah it's the con--]

19:46:55.0
HOT-2

libre.
[clear [could also be "free"].]

19:46:60.0
HOT-?

[unintelligible sentence, Spanish, low volume]

19:47:03.7
HOT-2

por allá.
[that way.]

19:47:06.1
HOT-?

hasta la rayita.
[up to the little line.]

19:47:07.2
HOT-2

sí.
[yes.]

19:47:11.5
HOT-?

a la izquierda por esa calle.
[to the left via that way [as in taxiway].]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:47:13.6
HOT-2

allá está.
[there it is.]

19:47:21.3
HOT-?

** [low volume].

19:47:22.5
HOT-2

no. no. no. no. no. [low volume]

19:47:45.8
HOT-2

oh no. no.

19:47:54.2
HOT-3

[unintelligible sentence, Spanish, low volume]

19:48:18.5
HOT-?

las azúles?
[the blue ones?]

19:48:19.5
HOT-2

hasta la cabecera. hasta allá atrás.
[until the threshold. until back there.]

19:48:23.4
HOT-1

qué calle es...?
[what way [as in taxiway] is...?]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:48:26.3
HOT-2

en Charlie y bravo.
[on Charlie and bravo.]

19:48:29.0
HOT-?

***.

19:48:31.5
HOT-2

sí hasta el fondo es Charlie uno.
[yes until the end it's Charlie one.]

19:48:33.3
HOT-?

[unintelligible sentence, Spanish, low volume]

19:48:49.9
HOT-1

cambiate a torre.
[change to tower.]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:48:42.7

RDO-2 uniform sierra delta Charlie before runway one zero left.

19:48:46.6

GND roger contact tower nineteen three sir.

19:48:51.4

RDO-2 roger.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:48:54.7
HOT-2 [mumbles to self]

19:49:07.6
HOT-3 [unintelligible sentence, Spanish, low volume (female)]

19:49:20.7
HOT-2 ohhhh.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:48:55.7
RDO [radio calls to/from Miami Departure begin and continue for the next 12 seconds, similar to frequency change]

19:49:12.3
RDO [radio calls to/from Fort Lauderdale Tower begin, similar to frequency change]

19:49:22.1
RDO-2 Fort Lauderdale Tower goodnight xray alpha uniform sierra delta. at Charlie before runway one zero left.

19:49:28.8
TWR xray alpha uniform sierra delta Fort Lauderdale Tower. traffic on a four mile final. no delay. fly heading zero niner zero runway one zero left. cleared for takeoff.

TIME and SOURCE

INTRA-AIRCRAFT CONTENT

19:49:36.7
HOT-1 ** [low volume].

19:49:43.5
HOT-2 zero nine zero.

19:49:45.6
HOT-2 para acaaaaaá asá.
[over here asa ["asa" is not a known Spanish word].]

19:49:50.2
HOT-2 no delay.

19:49:59.7
HOT [sound of rattling, similar to stick shaker]

TIME and SOURCE

AIR-GROUND COMMUNICATION CONTENT

19:49:38.1
RDO-2 roger cleared to take-off...ini [stammer] (initial right turn).

19:49:51.5
AC-MISC and Lauderdale Tower Cactus seventeen twenty three is with you visualize to ten left.

19:49:56.7
TWR Cactus seventeen twenty three Fort Lauderdale Tower runway one zero left. cleared to land. number two. wind calm.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:50:01.0
HOT-2

chin chin chin chin chin chin.

19:50:01.7
AC-MISC

cleared to land ten left Cactus (fifteen) twenty three.

19:50:05.6
HOT

[sound of increased whining, similar to engines increasing in power]

19:50:08.2
HOT-2

urgh.

19:50:17.0
HOT-2

airspeed alive ochenta cross check.
[airspeed alive eighty cross check.]

19:50:22.0
HOT

[sound of increased whirring, similar to wheels accelerating on runway]

19:50:25.2
HOT-2

v-uno.
[v-one]

19:50:26.7
HOT-(4)

orale.
[giddy up.]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:50:26.9
HOT

[sound of wavering deep tone]

19:50:27.9
HOT-2

sí.
[yes.]

19:50:30.5
HOT-3

[unintelligible sentence, Spanish, low volume, female]

19:50:32.5
HOT-2

positivo
[positive.]

19:50:34.2
HOT-1

tren arriba.
[gear up.]

19:50:34.8
HOT-2

tren arriba
[gear up.]

19:50:35.9
HOT-1

yaw dampner.

19:50:36.1
HOT

[sound of click, similar to gear handle]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:50:36.7
HOT-2 ahora yaw dampner puesto. aletas pendientes.
[now yaw dampner put on. flaps standing by.]

19:50:38.9
HOT-1 arriba aletas.
[up the flaps.]

19:50:39.7
HOT-2 aletas arriba.
[flaps up.]

19:50:40.0
CAM [sound of thump, similar to gear doors closing]

19:50:40.9
HOT-1 dijo que de rumbo cero noventa...
[he said our route was zero ninety...]

19:50:42.7
HOT-2 cero noventa y cinco. sí.
[zero ninety five. yes.]

19:50:43.8
HOT-? [unintelligible sentence, Spanish, low volume]

19:50:48.5
HOT-2 he me habían dado una para--
[uhm [they] had given me for--]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:50:50.0

HOT-1

por qué quitas la salida que te habían dado?
*[why are you taking out the [standard instrument departure]
they had given you?]*

19:50:52.2

HOT-3

[unintelligible sentence, Spanish, low volume, female]

19:50:53.0

HOT-2

le hablo a salidas o...?
[do I speak to departure or?]

19:50:54.4

HOT-3

[unintelligible sentence, Spanish, low volume, female]

19:50:56.9

HOT-2

le hecho un gritito a departure?
[do I make a little shout to departure?]

19:50:58.6

HOT-3

(por eso)
[[because of]]

19:50:60.0

HOT-1

no te ha cambiado torre.
[tower hasn't changed you.]

19:51:00.8

TWR

xray alpha uniform sierra delta contact Miami Departure so long.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:51:01.0
HOT-2 ah uh.

19:51:18.6
HOT-2 pues...
[well...]

19:51:20.5
HOT-2 awwwww uhham.

19:51:21.8
HOT [sound of mid-level tone for .4 seconds, similar to radio "flip-flop" frequency change]

19:51:22.3
HOT-1 apaga la computadora.
[turn off the computer.]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:51:05.1
RDO-2 Miami Departure. uniform sierra delta thank you.

19:51:11.2
RDO-2 Miami Departure good night. xray alpha uniform sierra delta.
runway heading.

19:51:21.6
DEP xray alpha uniform sierra delta radar contact. climb and
maintain ah seven thousand.

TIME and SOURCE

INTRA-AIRCRAFT CONTENT

19:51:23.4
HOT-2

apago la computadora.
[I'll turn off the computer.]

19:51:24.9
HOT-2

esteeee. le pido le pido vectores para regresar?
[uhmm. uhm do I ask do I ask for vectors to return?]

19:51:27.7
HOT

[sound of high pitch tone, similar to altitude alert]

19:51:30.1
HOT--1

*

19:51:37.4
HOT-1

es una falla- [ATC obscures if there is more to this utterance].
[it's a failure-.]

TIME and SOURCE

AIR-GROUND COMMUNICATION CONTENT

19:51:31.4
RDO-2

xray alpha uniform sierra delta. requesting vectors to runway one zero left.

19:51:37.9
DEP

understand you're going back to Fort Lauderdale?

19:51:40.1
RDO-2

we have an engine failure [stressed voice].

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:51:41.5
HOT-2 [volume and frequency of HOT-2 breathing increases until
end of recording]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:51:43.1
AC-MISC American ten eighteen two thousand three hundred climbing
five thousand. ninety heading.

19:51:46.8
DEP xray alpha uniform sierra delta verify you want to return to Fort
Lauderdale.

19:51:51.0
RDO-2 affirmative. engine failure. return one zero left [spoken rapidly].

19:51:54.7
DEP xray alpha uniform sierra delta maintain four thousand. and turn
left heading ah three three zero.

19:51:57.5
CAM-1 not possible.

19:52:00.7
RDO-2 not possible...eh.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:52:02.5
HOT-2

ciento ochenta?
[one hundred and eighty?]

19:52:03.5
HOT-1

sí. por favor. urgente.
[yes. please. urgent.]

19:52:23.0
HOT

[sound of increased whining, similar to increase in engine speed]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:52:04.5
RDO-2

ah one eighty. ahhh-em. we're gonna do a one eighty. and we're gonna land.

19:52:09.9
DEP

alright sir. one eight zero.

19:52:13.0
AC-MISC

American ten eighteen three thousand climbing five thousand. ninety heading.

19:52:21.0
DEP

American ten eighteen departure radar contact. climb and maintain seven thousand.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:52:32.2
HOT-1 dile que Mayday Mayday.
[tell him that Mayday Mayday.]

19:52:43.1
HOT-1 what heading.

19:52:47.1
HOT-1 dos seis cero.
[two six zero.]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:52:25.1
AC-MISC climb to seven thousand. American ten eighteen.

19:52:33.9
RDO-2 Mayday Mayday Mayday xray alpha uniform sierra delta
request vectors runway. to land. *[spoken rapidly]*

19:52:39.8
DEP xray alpha uniform sierra delta roger. turn left heading two six
zero.

19:52:44.4
RDO-2 what heading.

19:52:45.6
DEP two six zero.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:53:06.9
HOT [sound of whistle, similar to airflow generated sound]

19:53:16.2
HOT-2 no not nn.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:52:48.4
RDO-2 two six zero.

19:52:51.7
AC-MISC departure Challenge four five one heavy out of one point five on a zero nine zero heading.

19:52:57.1
DEP xray alpha uniform sierra delta expect runway two seven ah correction two eight right. turn left heading two four zero.

19:53:03.2
RDO-2 roger. uniform sierra delta.

19:53:09.7
DEP American ten ah eighteen proceed direct to JANUS and resume the Valley One Departure.

19:53:15.2
AC-MISC direct to JANUS American ten eighteen.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:53:18.2
HOT-2 esteee.
 [uhhmm.]

19:53:19.1
HOT-1 está mal.
 [it's bad.]

19:53:33.0
HOT-1 not possible [exclaiming].

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:53:20.2
AC-MISC departure Challenge four five one heavy out of two point two ah
 zero nine zero heading.

19:53:24.0
DEP Challenge four fifty one heavy radar contact. climb and
 maintain seven thousand.

19:53:27.5
AC-MISC radar contact. climb seven thousand. Challenge [sound of mid-
 level tone (.2 seconds)] four five one heavy.

19:53:30.6
DEP xray alpha uniform sierra delta heading two four zero. when
 you're able advise the airport in sight. [in background of ATC
 transmission, sound of alternating high-low tone, similar to an
 ATC alarm]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:53:49.4
HOT-1 sí. diz que sí [exclaiming].
[yes. say yes.]

19:53:58.0
GPWS terrain. terrain. pull up. pull up. [note: the GPWS warnings were not observed on the CAM channel]

19:54:02.9
GPWS terrain. terrain. pull up. pull up.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:53:34.9
RDO-2 not possible not possible we're losing altitude we're losing altitude [spoken rapidly].

19:53:45.4
DEP xray alpha uniform sierra delta can you make it to Fort Lauderdale Executive airport?

19:53:52.6
RDO-2 we are losing altitude. seven hundred per menor.
[we are losing altitude. seven hundred for less.]

19:53:59.8
DEP American ten eighteen direct JANUS resume the Valley One Departure (or did I already say that).

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:54:10.1
HOT-1 ayúdame. no no sé lo que está pasando. ayúdame...
[exclaiming]
[help me. I I don't know what is going on. help me...]

19:54:13.1
HOT-1 ...no sé lo que está pasando. [exclaiming]
[...I don't know what is going on.]

19:54:16.2
HOT-2 he le pongo más?
[uhm do I put in more?]

19:54:17.3
HOT-1 sí. por favor.
[yes. please.]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:54:03.8
AC-MISC direct JANUS Valley One American ten eighteen.

19:54:06.8
DEP Challenge four fifty one heavy turn left heading three four zero.

19:54:09.5
AC-MISC left heading three four zero. Challenge four five one heavy.

19:54:13.2
RDO-2 requesting vectors. requesting vectors. [spoken rapidly]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:54:19.4

HOT-1

pero con cuidado. chékale que está pasando. no puedo virar
cabrón. [exclaiming]
*[but with care [as in handle it with care]. check-out what is
happening. I can't turn dude.]*

19:54:22.4

HOT-1

lo que sé es pull up pero no sé lo que está pasando.
[exclaiming]
[all I know is the pull up but I don't know what is happening.]

19:54:23.2

DEP

xray alpha uniform sierra delta turn left heading two niner zero.
[spoken rapidly]

19:54:25.2

HOT-2

heeee tenemos. no.
[uhhhmmm we have. no.]

19:54:26.1

GPWS

five hundred.

19:54:28.6

HOT-1

no vuela el avión. (dice esto). [exclaiming]
[the plane is not flying. (says this).]

19:54:30.3

HOT-1

está el tren arriba? [exclaiming]
[is the gear up?]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:54:32.5
HOT-2

el tren está arriba.
[the gear is up.]

19:54:33.1
GPWS

terrain. terrain. pull up. pull up.

19:54:36.8
HOT-2

la velocidad (V-ref) mas quince.
[the velocity is (V-ref) plus fifteen.]

19:54:38.6
HOT-1

no puedo subir.
[I can not climb.]

19:54:42.1
HOT-2

tenemos los spoilers retractados. están los flaps arriba.
[we have the spoilers retracted. flaps are up.]

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:54:32.9
DEP

Challenger four fifty one heavy turn left heading ah three four zero.

19:54:37.4
AC-MISC

left heading three four zero Challenge four five one heavy.

19:54:40.2
DEP

* three forty three climb to one six thousand. proceed direct
ahhh MEGAN.

TIME and
SOURCE

INTRA-AIRCRAFT CONTENT

TIME and
SOURCE

AIR-GROUND COMMUNICATION CONTENT

19:54:45.8
GPWS caution. terrain. caution. terrain.

19:54:45.8
HOT-? *.

19:54:55.9
GPWS caution. terrain. caution. terrain.

19:54:56.1
HOT-2 no. [grunting]

19:54:58.3
HOT-1 sí cabrón.
[yes dude.]

19:54:59.2
HOT-2 sí.
[yes.]

19:54:59.6
HOT-1 estamos cayendonos. [exclaiming]
[we're falling.]

19:54:44.5
AC-MISC MEGAN sixteen thousand five three forty three.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:55:00.7
HOT-2

sí.
[yes.]

19:55:00.9
HOT-1

estamos cayendo. [exclaiming]
[we're falling.]

19:55:01.7
HOT-2

sí. este.
[yes. uhm.]

19:55:02.6
DEP

Challenge four fifty one heavy contact Miami Approach on one two five point five.

19:55:04.0
GPWS

caution. terrain. caution. terrain.

19:55:04.3
HOT-2

Dios Padre.
[God Father.]

19:55:06.9
GPWS

terrain. terrain. pull up. pull up.

19:55:07.6
HOT-2

a todos los amos mucho...a todos los amos mucho.
[I love you all...I love you all.]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:55:11.0
GPWS terrain. terrain. pull up. pull up.

19:55:15.2
GPWS terrain. terrain. pull up. pull up.

19:55:19.1
GPWS terrain. terrain. pull up. pull up.

19:55:21.9
HOT-1 nos vamos a estrellar. [exclaiming]
[we are going to crash.]

19:55:22.9
HOT-2 sí. sí.
[yes. yes.]

19:55:23.3
GPWS terrain. terrain. pull up. pull up.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:55:09.9
DEP xray alpha uniform sierra delta can you see Fort Lauderdale airport? it's at eleven o'clock--

19:55:13.5
RDO-2 negative. negative. two hundred. two hundred feet over the sea
[exclaiming, speaking rapidly]

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

19:55:27.4
GPWS terrain. terrain. pull up. pull up.

19:55:31.4
GPWS terrain. terrain. pull up. pull up.

19:55:35.3
GPWS terrain. terrain. pull up. pull up.

19:55:39.5
GPWS terrain. terrain. pull up. pull up.

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:55:23.4
DEP xray alpha uniform sierra delta are you planning on landing on the beach? [speaking rapidly]

19:55:27.4
RDO-2 we're we're going to ditching. we're go- we're going to ditching.

19:55:33.2
DEP American seven eighteen proceed direct JANUS resume the Valley One Departure. climb to one six thousand.

19:55:37.8
AC-MISC direct to JANUS ah climb to one six thousand American ten eighteen.

**TIME and
SOURCE**

INTRA-AIRCRAFT CONTENT

**TIME and
SOURCE**

AIR-GROUND COMMUNICATION CONTENT

19:55:39.5

HOT-1

adiós. adiós. [exclaiming]
[goodbye. goodbye.]

19:55:39.6

HOT-2

no no.

19:55:40.9

HOT-?

urgh. [exclaiming]

19:55:42.5

HOT-?

*.

19:55:42.8

CAM

[sound of rustling]

END OF TRANSCRIPT

END OF RECORDING

19:55:43.3 EST