NATIONAL TRANSPORTATION SAFETY BOARD
Office of Research and Engineering
Vehicle Recorder Division
Washington, DC 20594

GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

DCA11FA084AB

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, DC 20594

July 28, 2011

Cockpit Voice Recorder

Group Chairman's Factual Report
By Bill Tuccio

1. EVENT

Location:	Boston, MA
Date:	July 14, 2011, 1933 Eastern Daylight Time (EDT)[1]
Aircraft:	Delta Airlines Boeing 767 Flight 266 and Atlantic Southeast Airlines Bombardier CRJ-900 Flight 4904
NTSB Number:	DCA11FA084AB

2. GROUP

A separate group for each aircraft was convened on July 26, 2011. The members of the Atlantic Southeast Airlines group were:

Chairman:	Bill Tuccio Aerospace Engineer National Transportation Safety Board
Member:	Eric West Air Safety Investigator Federal Aviation Administration
Member:	Grayson Cash Manager, Flight Safety Atlantic Southeast Airlines
Member:	Bill Meachem Central Air Safety Committee Chairman Air Line Pilots Association Int'l

[1] All times are expressed in local EDT, unless otherwise noted

Members of the Delta Airlines group were:

Chairman:	Bill Tuccio Aerospace Engineer National Transportation Safety Board
Member:	Eric West Air Safety Investigator Federal Aviation Administration
Member:	Randy Troop Captain Delta Airlines
Member:	Steve Jangelis Airport and Ground Environment Chairman Airline Pilots Association Int'l

3. SUMMARY

On July 14, 2011, about 1933 eastern daylight time (EDT), a Delta Air Lines Boeing 767-300ER, N185DN, operating as Delta flight 266, was taxiing on taxiway B for departure on runway 04 at Boston Logan International Airport (BOS), Boston, Massachusetts, when its left winglet struck the horizontal stabilizer of an Atlantic Southeast Airlines (ASA) Bombardier CRJ900, N132EV, operating as ASA flight 4904, which was number three in line on taxiway M waiting for departure on runway 09. As the B767 approached and passed the intersection with taxiway M, the left winglet of the B767 struck the horizontal tail of the CRJ900. The CRJ900 sustained substantial damage, which included damage to the horizontal tail and vertical tail, and the airplane lost fluid in all three hydraulic systems. Parts of the B767 winglet were sheared off and embedded in the tail of the CRJ900. The passengers on the CRJ900 were deplaned on the taxiway, and the B767 taxied back to the terminal. No injuries were reported on either aircraft. A solid-state cockpit voice recorder (CVR) from each aircraft were sent to the National Transportation Safety Board Vehicle Recorder Division's Audio Laboratory for readout. The CVR group meetings convened on July 26, 2011, and a partial transcript was prepared for each recording (see attached).

4. DETAILS OF INVESTIGATION

On July 18, 2011, the NTSB Vehicle Recorder Division's Audio Laboratory received the following CVRs:

Aircraft:	**ASA CRJ900**
Recorder Manufacturer/Model:	**L-3 Communications FA2100-1020**
Recorder Serial Number:	**570763**

Aircraft: **Delta Airlines B767**
Recorder Manufacturer/Model: **L-3 Communications FA2100-1020**
Recorder Serial Number: **1040**

4.1. ASA CRJ900

4.1.1. 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 aircraft operation, depending on the model, of CVR operation. This model CVR, the L-3 Communications FA2100-1020, is a solid-state CVR that records 2 hours of digital cockpit audio. Specifically, it contains a 4-channel recording of the last 2 hours of operation. The recording contains 4 channels of audio data; one channel for each flight crew, one channel for a third crewmember/PA system, and one channel for the CAM audio information.

4.1.2. 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.

4.1.3. CVR Channels

The recording consisted of four channels of audio information. Three of the channels contained excellent quality audio information from the captain's, first officer's, and third crewmember audio panels.[2] One channel contained good quality CAM audio information.

4.1.4. Timing and Correlation

Timing was established by correlating the ASA CRJ-900, N132EV CVR events to common events on the flight data recorder (FDR). Specifically, four radio transmissions that the aircraft made on the recording between 0131:49.940 and 0136:05.980 CVR elapsed time were correlated to the radio transmit microphone key parameter from the FDR between 1156215.438 and 1156471.438 subframe reference number (SRN). Each of the four radio transmissions acted as an anchor point for a linear interpolation between the remaining CVR events. As a result of the correlation, 1156215.438 SRN = 0131:49.900 CVR elapsed time. Further, 1156215.438 SRN=1929:41.438 EDT. Using this correlation,1757:51.538 was added to the recording elapsed time to convert to EDT.

4.1.5. Summary of Recording Contents

The ASA CVR recording began recording the approach and arrival of a prior ASA flight into Boston. At 1912, the crew of ASA flight 4904 called Boston ramp for a clearance to push off the gate. Boston ground subsequently instructed the aircraft to taxi on Kilo taxiway and hold short of Alpha taxiway. While stopped during the taxi, the first officer noted the taxi route to runway nine was typically very confusing. The captain

[2] See Attachment I for the CVR Quality Rating Scale

noted a large aircraft taxiing near them, and hoped the larger aircraft would not hit them. The crew then discussed a recently publicized ground collision in New York between an Air France Airbus 380 and a regional jet.

The transcript began at 1926:56, as the aircraft was holding at the intersection of Kilo and Alpha taxiways. The transcript continued until 1937:12, about 5 minutes after the collision. The transcript is attached.

Following the attached, transcribed portion of the event, the crew continued to work with Boston air traffic control and ground personnel to verify the extent of the damage. At 1939, ground personnel advised ASA 4904 of the extent of their damage, including leaking hydraulic fluid, and suggested the aircraft shut its engines down. The crew discussed turning on the Auxiliary Power Unit (APU), and decided against this because of its location in the damaged tail section of the aircraft. The crew then asked ground personnel to chock the aircraft, as they had lost all hydraulics.

At 1942, the flight attendant advised the crew a passenger was in the aft lavatory. The crew advised the flight attendant to block off the aft lavatory from further use due to the damaged tail section.

During the remainder of the recording, the crew coordinated deplaning of the passengers at the location of the collision, rather than moving the aircraft. During this period of time, the crew discussed the collision, noting they had only ten feet ahead of them to move forward, due to another ASA aircraft ahead of them. They further noted the Delta aircraft was moving fast, and speculated on a speed of 40 knots. The crew discussed the motivation for the fast speed, and supposed it was due to crossing traffic.

At 1955, ground personnel boarded the aircraft and subsequently escorted the first officer outside the aircraft to inspect the damage. At 2000, the first officer returned, briefed the captain on the damage and confirmed the wheels were chocked. The recording ended shortly thereafter as the crew was shutting down the engines.

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 have not responded to the invitation.

4.2. Delta Airlines B767

4.2.1. 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 aircraft operation, depending on the model, of CVR operation. This model CVR, the L-3 Communications FA2100-1020, 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 CAM and one channel that combine 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, one channel for a third crewmember/PA system, and one channel for the CAM audio information.

4.2.2. 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.

4.2.3. CVR Channels

The 2-hour, 2-channel, portion of the recording contained good quality audio. The 4-channel, 30-minute, portion of the recording contained 4 channels of excellent quality audio.

4.2.4. Timing and Correlation

The times used in this report are expressed in local EDT of the accident. A radio transmission recorded on the Delta B767, N185DN's CVR was matched with an identical transmission recorded on the ASA CRJ900, N132EV CVR. Specifically, the transmission recorded at 1935:48.600 EDT on the ASA CRJ900 was matched to the same transmission recorded on the Delta B767 CVR at 0130:03.929 CVR elapsed time. This resulted in an offset of 1805:44.671 being added to the B767 CVR elapsed time to convert to EDT.

4.2.5. Summary of Recording Contents

The Delta CVR recording began at 1806, recording radio communications. The crew was first recorded in the cockpit at about 1825, discussing the flight, programming the international flight plan, and discussing a possible mechanical issue with maintenance. The crew also discussed runway lengths and the operational need to use runway 4R rather than runway 9. At 1906, the crew briefed the departure, received paperwork for departure and shortly thereafter began a pushback off the gate.

At about 1923, Boston Ground instructed Delta 266 to taxi via taxiway Kilo to hold short of the Alpha taxiway, expecting a runway 4R departure.

The transcript began at 1929:09, as the crew was on taxiway Kilo holding short of the Alpha taxiway. The transcript continued until 1938:12, about 5 minutes after the collision. The transcript is attached.

Following the attached, transcribed portion of the event, the crew continued to work with cabin personnel and Boston Port Authority vehicles to assess the extent of the damage to the aircraft. During this time, Boston Airport Rescue and Firefighting (ARFF) was also responding to an additional emergency aircraft landing on runway 4L.

At 1942, the crew decided to shut down the left engine and shortly thereafter the Boston Port Authority advised the left winglet was damaged, there was no leaking, and it appeared safe for the aircraft to taxi under its own power to the gate.

The aircraft was given taxi instructions back to the terminal at about 1950 and arrived at the gate shortly thereafter. After arriving at the gate, the captain called dispatch on his cellular telephone at 2003. At 2010, the crew discussed the need to pull the CVR circuit breaker. The recording ended shortly thereafter at 2010:12, as the first officer located the CVR circuit breaker.

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.

Bill Tuccio
Aerospace Engineer
Vehicle Recorder Division

Attachment I

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 the cockpit voice recorders installed on an Atlantic Sourtheast Airlines CRJ-900 (N132EV) and a Delta Airlines B767 (N185DN), which collided on taxiways at Logan International Airport, Boston, Massachusetts.

LEGEND

CAM	Cockpit area microphone voice or sound source
HOT	Flight crew audio panel voice or sound source
PA	Public Address system sound source
TWR	Radio transmission from Kennedy Tower controller
GND	Radio transmission from the Kennedy Ground controller
ASA904	Radio transmission Atlantic Southeast Airlines Flight 4904
DL266	Radio transmission from Delta Airlines Flight 266
AC-MISC	Radio transmission from miscellaneous aircraft
PORT25	Radio transmission from Boston Port Authority ground vehicle 25
LOGANCMD	Radio transmission from ARFF command
-1	Voice identified as the pilot
-2	Voice identified as the copilot
-3	Voice identified as a flight attendant
-4	Voice identified as a flight attendant
-5	Voice identified as a flight attendant
-A	Voice identified as first controller from identified facility
-B	Voice identified as second controller from identified facility
-C	Voice identified as third controller from identified facility
-D	Voice identified as fourth controller from identified facility
-?	Voice unidentified
*****	Unintelligible word
#	Expletive
@	Non-pertinent word
( )	Questionable insertion
[ ]	Editorial insertion

Note 1: Times are expressed in Eastern Daylight Time.

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.

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
18:05:45.8 **START OF RECORDING**				17:57:51.5 **START OF RECORDING**	
				19:26:56.5 **START OF TRANSCRIPT**	
				19:27:00.9 **HOT-1**	roll 'em
		19:27:07.7 **GND-A**	ACEY ah forty nine zero four it'll be runway niner continue on Bravo and hold short of the runway four left approach.		
		19:27:13.7 **ASA904-2**	bravo hold short of the four left approach ACEY forty nine oh four.		
				19:27:19.0 **HOT-2**	take a right on bravo hold short where that guy is over right there.
				19:27:23.4 **HOT-1**	did you say go that'a way?
				19:27:24.8 **HOT-2**	yep.

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:27:26.2 **HOT-2**	yes-sir...I said to myself...I said...self.
				19:27:29.7 **HOT-2**	[laughter]
				19:27:37.4 **HOT-1**	[clearing throat]
		19:27:53.0 **GND-A**	Delta two sixty six heavy move up on alpha correction move up on kilo there short of alpha.		
		19:27:58.0 **DL266-2**	move up on kilo short of alpha Delta two sixty six heavy.		
		19:28:34.0 **RDO**	[tower assigns 128.8 to another aircraft, other aircraft acknowledges frequency change]		
		19:28:38.6 **ASA904-2**	you want forty nine oh four over there too?		
		19:28:49.0 **GND-A**	ACEY forty nine zero four monitor the tower frequency one two eight point eight.		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
		19:28:52.3 **ASA904-2**	ACEY forty nine oh four good'day.		
		19:28:56.0 **TWR-B**	and um ACEY jet forty nine zero four Boston (Tower) continue taxi (nine) on via bravo and mike cross runway four left approach.		
		19:29:02.5 **ASA904-2**	bravo mike cross ah four left. ACEY forty nine oh four.		
		19:29:05.7 **RDO**	[aircraft reports three mile final 4L. tower clears aircraft to land 4L]		
19:29:09.3 **START OF TRANSCRIPT**					
19:29:10.4 **CAM-1**	he's on bravo right?				
		19:29:11.0 **TWR-B**	Wisconsin thirty six thirty six ** good rate traffic two mile final cross runway four left turn right on mike. United's holding.		
19:29:12.0 **CAM-2**	yes.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:29:12.0 **HOT-2**	bravo mike.
19:29:12.4 **CAM-1**	okay bravo.				
19:29:12.9 **CAM-2**	there's a little tiny circle...little tiny hot spot there.				
19:29:15.4 **CAM-1**	gotchy'a.				
		19:29:16.2 **RDO**	[Wisconsin thirty six thirty six acknowledges taxi instructions]		
19:29:16.6 **CAM-1**	gotchy'a.				
19:29:17.2 **CAM-2**	and that's that four left approach.				
19:29:19.4 **CAM-1**	and then these guys...are comin' up North on uhm mike...ya think? around the horn.				
		19:29:24.4 **TWR-B**	United seven thirty one you need to move a little faster there.		
		19:29:26.2 **AC-MISC**	yes ma'am.		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
		19:29:28.5 **TWR-B**	* make a slight left s-turn to the left reference the crossing traffic there on fourteen.		
19:29:28.9 **CAM-2**	yah.				
19:29:29.8 **CAM-1**	alright.				
				19:29:33.0 **HOT-2**	alright. talk to the folks.
19:29:35.0 **CAM-2**	yah.				
19:29:35.5 **CAM-1**	expecting bravo hold short then around.				
				19:29:36.3 **HOT-1**	okay.
		19:29:37.0 **TWR-B**	ACEY forty nine zero four turn left on mike and monitor tower one three two point two.		
19:29:37.3 **CAM-2**	***				
19:29:40.1 **CAM-1**	in the line over there huh?				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:29:40.9 **HOT-2**	that's what I would guess...but but I think...				
		19:29:41.4 **ASA904-2**	three two twenty two left on mike. ACEY forty nine oh four.		
19:29:41.9 **CAM-1**	okay.				
19:29:42.8 **CAM-2**	...they're in line for nine.				
		19:29:43.2 **GND-A**	Delta two sixty six heavy it'll be four right. turn right on bravo and hold short of the runway four left approach.		
				19:29:44.8 **HOT-2**	okay I'm gone for real this time.
				19:29:47.0 **HOT-1**	okay.
		19:29:48.6 **DL266-2**	right on bravo we'll hold short of the four left approach expecting four right. Delta two sixty six heavy.		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:29:50.3 **PA-2**	ladies and gentlemen from the flight deck once again like to *** aboard flight forty nine oh four service down to Raleigh Durham. looks like we're number five or six for take-off. like to ask @ and @ please prepare the cabin for departure.
19:29:50.7 **CAM-1**	**				
19:29:54.4 **CAM-2**	okay.				
19:29:55.0 **CAM-1**	yep. I gotchy'a. thanks.				
19:29:57.5 **CAM**	[sound of pop, similar to parking brake state change]				
19:29:57.9 **CAM**	[sound of increased noise, similar to engine power increase]				
				19:30:04.8 **HOT**	[sound of hi-lo chime, similar to flight attendant call]
				19:30:06.8 **HOT-2**	hello.

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:30:07.5 **HOT-3**	cabin secure ready for take-off.
				19:30:08.9 **HOT-2**	here we go.
				19:30:12.1 **HOT-2**	they are ready in the back.
				19:30:13.3 **HOT-1**	before take-off checklist.
				19:30:15.7 **HOT-2**	take-off briefing.
				19:30:17.1 **HOT-1**	complete.
				19:30:18.6 **HOT-2**	verified.
				19:30:18.9 **HOT-2**	ah flaps.
				19:30:22.5 **HOT-1**	please say again.
				19:30:24.8 **HOT-2**	huh...where we at...flaps.
19:30:25.3 **CAM-2**	(you know) I'll take first break...**...volunteer for it.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:30:27.5 **HOT-1**	oh.
				19:30:28.1 **HOT-1**	twenty degrees and indicating.
19:30:28.5 **CAM**	[sound of pop, similar to parking brake state change]				
19:30:29.3 **CAM-1**	yeah.				
				19:30:29.6 **HOT-2**	verified. trims.
				19:30:30.8 **HOT-1**	three set.
				19:30:31.4 **HOT-2**	verified. [chuckle]. thrust reversers.
				19:30:32.7 **HOT-1**	armed.
				19:30:33.1 **HOT-2**	flight instruments bugs.
				19:30:34.0 **HOT-1**	checked.
				19:30:34.5 **HOT-2**	verified. brake temp.

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:30:35.4 **HOT-1**	checked.
				19:30:35.9 **HOT-2**	F-M-S.
				19:30:36.6 **HOT-1**	let's go runway nine and CLAWW.
				19:30:38.4 **HOT-2**	verified. flight controls check. radar on. cabin ready. before take-off check complete.
19:30:39.2 **CAM-2**	hey we've...we've left a man behind here.				
				19:30:41.5 **HOT-2**	alright.
19:30:42.4 **CAM-1**	yeah.				
19:30:42.5 **CAM-2**	we didn't order either.				
19:30:44.9 **CAM-1**	yeah. I forgot to give it to 'em. oh well.				
19:30:53.2 **CAM-1**	I do like Boston it's a cool * cool town I think.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:30:56.4 **CAM-2**	super cool town no doubt about it.				
19:31:01.2 **CAM-1**	alright holdin' short here.				
19:31:02.9 **CAM-2**	yeah.				
				19:31:04.5 **HOT-1**	I guess that's about a fifty million dollar...fifty million dollar ah boat out there?
		19:31:05.7 **GND-A**	Delta two sixty six heavy monitor the tower frequency one two eight point eight.		
		19:31:09.3 **DL266-2**	twenty eight eight Delta two sixty six heavy. good ‘day.		
				19:31:09.8 **HOT-2**	yeah. yeah. it ain't cheap. that's for damned sure.
		19:31:12.1 **GND-A**	good ‘day.		
				19:31:12.3 **HOT-1**	three deckers. fifty million I imagine. I'm just guessing. I don't know. I *.

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:31:18.6 **CAM-2**	twenty eight eight. we might get another change frequency change before we get over there.				
19:31:23.2 **CAM-1**	yep.				
19:31:27.4 **HOT-2**	possibly...uh no...doubtful.				
19:31:35.2 **HOT-2**	oh what a great. what a great city look at the sailboats out here.				
19:31:38.5 **CAM-1**	yep.				
19:31:39.3 **CAM-2**	it's a beautiful beautiful day. God look at all the sailboats I wonder. just a typical day out here?				
19:31:45.3 **CAM-1**	Thursday. maybe Thursday...Thursday night is regatta night. who knows.				
		19:31:47.0 **AC-MISC**	Tower Care twenty eight inbound for four left.		
		19:31:49.2 **TWR-B**	Care twenty eight Boston Tower caution wake turbulence from the heavy Airbus landing the parallel runway four left cleared to land.		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:31:49.5 **CAM-2**	I don't know.				
		19:31:53.8 **AC-MISC**	four left cleared to land. Care twenty eight.		
19:31:56.0 **HOT-2**	that's awesome.				
19:32:05.0 **HOT-1**	now United's goin' four right. isn't he?				
19:32:08.8 **HOT-2**	yeah. that's what I think.				
19:32:09.2 **HOT-1**	okay.				
		19:32:10.3 **TWR-B**	Delta two sixty six heavy Boston Tower taxi to four right via bravo traffic's on a four mile final. cross runway four left approach. good rate around the corner please.		
19:32:15.3 **CAM**	[sound of pop, similar to parking brake state change]				
19:32:16.4 **CAM-1**	gotchy'a.				
19:32:16.4 **CAM**	[sound of increased noise, similar to engine power increase]				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:32:17.0 **HOT**	[sound of click]
19:32:17.0 **CAM-2**	oh you sure?				
		19:32:17.9 **DL266-2**	okay good rate around the corner. ah four right via bravo. Delta two sixty six ah heavy.		
19:32:23.7 **HOT-2**	are you sure--that look's awfully close to me.				
19:32:25.9 **HOT-1**	yeah.				
19:32:26.2 **HOT-2**	we're cuttin' in front of him?				
19:32:28.5 **HOT-1**	he's gonna' land over us.				
19:32:33.4 **HOT-2**	I don't know...I'm not sure he's ah---				
19:32:35.3 **HOT-1**	I'm hustling.				
19:32:36.4 **HOT-2**	well.				
19:32:38.3 **HOT-2**	that's her call I guess. but--				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:32:40.2 **HOT-?**	ah.				
19:32:40.9 **HOT-2**	yeah.				
19:32:41.4 **HOT-?**	ah.				
		19:32:41.9 **TWR-B**	Delta two sixty six heavy nice job sir. monitor tower one three two point two two. you should get you right outta' here at this next arrival.		
		19:32:47.6 **DL266-2**	thirty two two see ya later Delta two sixty six.		
				19:32:49.1 **HOT-2**	boy look at him go...move'n kinda fast for a Delta guy isn't he?
19:32:50.0 **HOT-1**	this guys hangin' over though.				
19:32:51.3 **HOT-2**	thirty two two and I'm gonna sit 'em down.				
19:32:53.2 **HOT-1**	okay.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:32:53.4 **HOT-1**	yeah. hope he don't clip us and turn us around.
19:32:56.7 **CAM**	[sound of click, similar to audio selector panel]				
19:32:58.7 **HOT**	[sound of click, similar to microphone key]				
19:33:00.2 **HOT**	[sound of click, similar to microphone key]				
				19:33:00.3 **HOT-2**	damn.
19:33:00.4 **HOT-2**	watch. watch this guy.				
19:33:01.2 **HOT-1**	yep.				
19:33:01.3 **HOT-2**	that's tight.				
		19:33:01.6 **TWR-C**	Delta two sixty six heavy hold short of runway four right.		
				19:33:03.7 **HOT**	[sound of rattle and crumpling, similar to collision]

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:33:03.8 **CAM**	[sound of collision]				
19:33:04.2 **HOT-2**	oh #.				
19:33:04.3 **HOT-1**	* #.				
				19:33:04.5 **HOT-1**	damn.
				19:33:05.0 **HOT-2**	# they did it.
				19:33:05.4 **HOT**	[sound of single chime, similar to master caution]
19:33:06.5 **HOT-2**	oh dammit.				
				19:33:06.6 **HOT**	[sound of single chime, similar to master caution]
19:33:07.7 **HOT-1**	yep I just.				
				19:33:07.9 **HOT-1**	he did it.
19:33:08.5 **HOT-2**	yep.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
		19:33:09.1 **ASA904-2**	tower ACEY forty nine oh four I think we just got clipped by that seven six behind us.		
19:33:10.7 **HOT-2**	yep. well we're just gonna--				
19:33:11.6 **HOT-1**	#.				
19:33:12.3 **HOT**	[sound of click, similar to flight attendant interphone removed from cradle]				
19:33:13.0 **HOT-2**	yep I was gonna say that was definitely tight. talkin' to tower. yep.				
				19:33:13.7 **HOT**	[sound of click]
19:33:14.0 **CAM**	[sound of single chime, similar to flight attendant cockpit call]				
				19:33:15.1 **HOT**	[sound of two single chimes, similar to master caution]
				19:33:16.6 **HOT-3**	everybody okay.
		19:33:18.1 **DL266-2**	tower Delta two sixty six heavy.		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:33:18.1 **CAM-1**	I saw that...*.				
				19:33:18.4 **PA-1**	and ladies and gentlemen uh from the flight deck just keep your seats and uh the aircraft behind us has run into us uh. we'll uh...we'll just stay stationary here until ground control let's us taxi back to the terminal.
19:33:20.1 **CAM**	[sound of single chime, similar to flight attendant cockpit call]				
19:33:22.3 **CAM**	[sound of switch, similar to audio panel selection]				
19:33:23.6 **HOT-2**	is it thirty two twenty two?				
		19:33:23.9 **ASA904-2**	tower do you hear for ACEY forty nine oh four?		
19:33:24.4 **CAM**	[sound of switch, similar to audio panel selection]				
19:33:25.0 **HOT-1**	gotchy'a hang on.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:33:25.9 **HOT-3**	you hit the we hit the wing on left side with our *.				
19:33:28.6 **HOT-1**	yep I got it.				
19:33:31.8 **HOT-2**	yep.				
19:33:32.3 **HOT-1**	#.				
		19:33:32.6 **TWR-C**	Delta two sixty six heavy runway four right line up and wait Boston Tower.		
				19:33:33.8 **HOT-2**	#.
19:33:34.8 **CAM-1**	(nope). tell him to ah. * roll the trucks. just.				
				19:33:35.0 **HOT**	[sound of buzz, similar to interphone channel opened to cabin]
		19:33:35.3 **DL266-2**	ah sir Delta two sixty six heavy we're gonna have to ah wait here for a moment I think we hit the R-J off of our left with our wing		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:33:39.2 **HOT-3**	you guys okay?
				19:33:40.0 **HOT-1**	yeah we're okay up here. you'all okay?
19:33:41.2 **CAM-1**	yep.				
				19:33:41.8 **HOT-4**	yeah I'm going to walk through the cabin. do you think that's okay?
				19:33:44.0 **HOT-1**	yeah that's fine. ah we'll be doing a slow move when they move us okay.
19:33:44.9 **CAM-1**	yeh tell him to roll the trucks.				
19:33:47.0 **CAM-2**	okay.				
				19:33:47.4 **HOT-3**	alright.
19:33:47.7 **CAM**	[sound of click]				
19:33:48.7 **CAM-2**	I will.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:33:49.2 **CAM-1**	yep.				
		19:33:50.0 **TWR-C**	Delta two sixty six heavy roger. ACEY forty nine zero...actually yeah...forty nine oh four that's the one...you're second. Did he hit you with his tail his wing?		
				19:33:51.2 **HOT-2**	stupid *.
		19:33:57.5 **ASA904-2**	absolutely he did ahhh. so ahhh. we'll let you know what we're gonna do right now * we're gonna holdin' sit right here.		
		19:34:03.3 **AC-MISC**	and I can a-testify to that. it's dangling on your side.		
19:34:06.0 **HOT-2**	okay.				
		19:34:06.2 **ASA904-2**	roger.		
		19:34:06.7 **TWR-C**	ah and Delta two sixty six heavy and ACEY forty nine oh four hold your position and change over to frequency one two one point seven five.		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:34:08.1 **CAM-1**	roll the tru--				
		19:34:12.3 **DL266-2**	we'll change over to twenty one seventy five and if you would please go ahead and roll the trucks for just in case Delta two sixty six.		
		19:34:12.3 **ASA904-2**	roger.		
19:34:21.6 **PA-1**	and folks ah this is the ah captain ** just remain seated ** our ah wing clipped the end of the ah regional jet on the ah other (ah) taxiway so ah...we're having ah we're probably going to have to go back to the gate so remain seated at this point.				
		19:34:23.5 **ASA904-2**	ground ACEY forty nine oh four.		
				19:34:25.0 **HOT-2**	what ch'you want me to tell him?
		19:34:25.9 **GND-D**	ACEY forty nine oh four can you taxi?		
				19:34:27.7 **HOT-1**	yeah we can taxi.

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
		19:34:28.6 **ASA904-2**	affirmative.		
		19:34:29.5 **GND-D**	okay...uhmm...let's see here. can you make a one eighty to get out of that area?		
		19:34:33.7 **DL266-2**	say the frequency again for Delta two sixty six heavy.		
		19:34:35.3 **ASA904-2**	standby a second. I'll call you back in just a second.		
		19:34:36.3 **TWR-C**	Delta two sixty six heavy ah do you wanna just taxi back?		
		19:34:37.3 **GND-D**	okay just let me know if you can maneuver otherwise we can take you straight ahead. but it would probably just be a minute but just let me know ahh if you can. it would be quicker to get you out of there going back ah six o'clock. but just let me know.		
		19:34:40.5 **DL266-2**	ah yeh we would we'd prefer the trucks come out here and take a look before we move though.		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:34:40.6 **HOT**	[sound of buzz, similar to interphone channel opened to cabin]
				19:34:42.5 **HOT-3**	yes?
				19:34:43.3 **HOT-1**	hey uhh. you'all are good to taxi right? everybody's okay?
		19:34:44.7 **TWR-C**	Two sixty six heavy hold your position and change to one two one point seven five.		
				19:34:45.1 **HOT-3**	we are. everybody's fine and they are just ready to go back to the gate.
		19:34:46.9 **ASA904-2**	roger we're going to do a systems check and we'll call you right back.		
				19:34:48.6 **HOT-1**	okay. we we'll be doin' that okay. ah we'll we'll call you back in a bit.
		19:34:48.7 **DL266-2**	twenty one seventy five thanks.		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
		19:34:48.9 **GND-D**	take your time.		
				19:34:49.1 **HOT-3**	alright.
				19:34:52.2 **HOT-3**	alright.
19:34:53.1 **CAM-1**	you said it. too late. I-I-I saw it comin' and I was tryin' to scoot it over.				
				19:34:53.9 **HOT-2**	alright quantity on one is down to zero. * want to turn it off before we burn it up?
19:34:54.1 **CAM-2**	yeh.				
				19:34:57.6 **HOT-1**	you know what. yeah. and uhh based on that maybe we shouldn't...maybe we should call the ahh. make sure the trucks roll. yeah.
19:35:00.1 **CAM-2**	well we'll we'll deal with it we'll deal with it later. we'll just make sure that everything is okay....yeh I can especially with us hurrying and stuff its--				
19:35:01.7 **CAM-1**	yeh okay.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:35:04.8 **HOT-2**	alright.
				19:35:05.7 **HOT-1**	cause we have lost ah. we have lost all that fluid ah quantity. so we got a bad leak back there. we need to probably have the the trucks behind us.
19:35:10.1 **CAM-1**	I hit it pretty fast.				
19:35:11.3 **CAM-2**	yep.				
19:35:12.5 **CAM**	[unintelligible utterances captain and first officer]				
		19:35:20.2 **ASA904-2**	ground forty nine oh four.		
		19:35:21.6 **GND-D**	ACEY forty nine zero four.		
		19:35:23.2 **ASA904-2**	yeah we lost hydraulics on ah one of our systems so we're gonna need a tug crew and ah roll the trucks for us.		
19:35:29.2 **PA-3**	ladies and gentlemen please return to your seats and fasten your seatbelts.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
		19:35:30.3 **GND-D**	ACEY forty nine zero four say again.		
		19:35:32.3 **ASA904-2**	we lost hydraulics on one of our systems so limited braking. we're not comfortable taxiing. we're gonna need a tug crew to pull us out of here. and roll the trucks just for safety.		
19:35:41.4 **PA-4**	ladies and gentlemen everybody please take your seats take your seats and fasten your seatbelts thank you.				
		19:35:46.5 **GND-D**	ACEY forty nine zero four roger. just standby there.		
		19:35:48.8 **ASA904-2**	roger.		
				19:35:49.1 **HOT-1**	alright let me go here. messaging.
		19:35:49.7 **DL266-2**	and ground Delta two sixty six with ya on frequency we'de like to hold our position also tell' the trucks have a look.		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
		19:35:54.8 **GND-D**	yep. we've got a couple port authority vehicles coming out for both of you guys. just hold there for Delta two sixty six heavy and for ACEY forty nine zero four.		
		19:36:01.8 **ASA904-2**	roger.		
		19:36:02.7 **DL266-2**	Delta two sixty six heavy roger we'll hold here.		
				19:36:04.8 **HOT-2**	I'de like to slap the # out of that #.
19:36:08.8 **HOT-2**	okay shoot well.				
19:36:10.2 **HOT-1**	we're not goin' to Amsterdam.				
				19:36:11.2 **HOT**	[sound of click]
19:36:11.3 **HOT-2**	no that's for sure. yeh.				
		19:36:12.4 **GND-D**	Port two five?		
19:36:13.5 **HOT-1**	sorry about that I--				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
				19:36:15.0 **HOT**	[sound of click]
19:36:15.1 **HOT-2**	it-it happens yeh.				
				19:36:16.6 **HOT**	[sound of click]
19:36:17.1 **HOT-1**	yeh *.				
				19:36:17.4 **HOT-1**	damn. I was just kiddin' about that.
				19:36:19.1 **HOT-2**	he looked awful close and I. I mean. there wasn't no where *. we couldn't go forward at the time because the ah seven thirteen was ten feet in front of us.
19:36:22.9 **CAM-1**	you know a little fixated on tryin' to get...for this guy here. and you're and you..you.				
19:36:26.5 **CAM-2**	right.				
19:36:27.8 **CAM-2**	and he was landing on four right.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:36:32.6 **CAM-1**	and you're right I should have just said you know we'll hold here we're not gonna hustle.				
		19:36:35.3 **GND-D**	Port two five you on one one two one point seven five?		
19:36:35.6 **CAM-2**	yeh and if that wasn't even the traffic that we were that we were holding for although that's what I thought we were holding for I thought that that was traffic landing on four left but it was traffic landing on runway nine that she was concerned about so we were out of his way quick. I didn't see the traffic coming in for for runway nine that she was talking about.				
19:36:36.4 **CAM-1**	yes.				
				19:36:42.7 **CAM**	[sound of click, similar to pulling quick reference handbook out of holder]
				19:36:43.5 **HOT-2**	let's see what's on here for a ground hydraulic low pressure.
				19:36:45.1 **HOT-1**	yah. yah.

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:36:45.4 **CAM-1**	four left				
19:36:54.6 **CAM-1**	yeh.				
19:37:07.8 **CAM-2**	so I guess right ah everything's safe in the back?				
				19:37:10.0 **HOT-1**	taxiing fast.
19:37:10.7 **CAM-1**	yeh um.				
				19:37:11.4 **HOT-2**	hydraulic one low press message. this is for in-flight obviously but we'll run *...pressure less than eighteen hundred psi. hydraulic pump off. left hydraulic shut-off valve closed.
				19:37:12.0 **END OF TRANSCRIPT**	
19:37:12.7 **CAM-2**	and everybody's sittin' down?				
19:37:14.3 **CAM-1**	yeh.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
		19:37:16.4 **PORT25**	two five's up one ah twenty one seventy five.		
		19:37:19.5 **GND-D**	Port two five thanks.		
19:37:24.4 **HOT-5**	this is @.				
19:37:25.4 **HOT-1**	hey um. is this @?				
19:37:28.0 **HOT-5**	hello?				
19:37:29.1 **HOT-1**	ah yes ah this is ah @ the captain. is there ah. can you can one of the flight attendants take a look out the left wing and see what he or she sees?				
19:37:39.2 **HOT-5**	oh sure. they ah *.				
		19:37:40.6 **LOGANCMD**	fire department is on for the alert two aircraft.		
		19:37:43.1 **GND-D**	Logan Command thanks. they are about one five miles out approximately five minutes.		

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
		19:37:49.3 **LOGANCMD**	okay we're going to move out to our alert two holdoff.		
		19:37:52.6 **GND-D**	Logan Command roger.		
19:37:55.1 **CAM**	I have no idea if they if they.				
		19:37:55.2 **GND-D**	and ah Port two five the ah that aircraft says they have lost ah hydraulics and ah cannot move at this time. do you see any are they leaking on the taxiway?		
		19:38:04.1 **PORT25**	affirmative. ah we got severe severe damage to the tail and hydraulic leaking.		
19:38:06.6 **CAM**	[sound of single chime, similar to flight attendant cockpit call]				
19:38:08.5 **CAM-1**	okay from us or them?				
19:38:10.5 **CAM-2**	no them.				
19:38:11.9 **CAM-1**	okay.				

Delta 266		Over-the-Air Communication		ASA 4904	
Time and Source	**Event**	**Time and Source**	**Event**	**Time and Source**	**Event**
19:38:12.5	**END OF TRANSCRIPT**				
20:10:12.5	**END OF RECORDING**			20:02:05.9	**END OF RECORDING**