

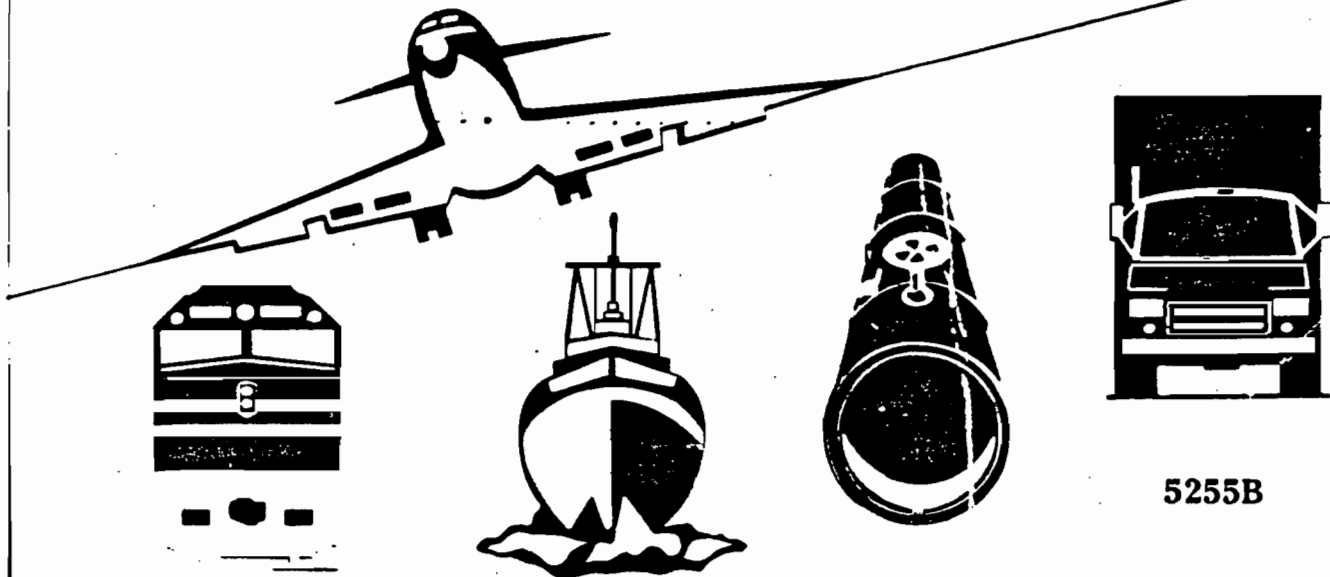
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**NATIONAL
TRANSPORTATION
SAFETY
BOARD**

WASHINGTON, D.C. 20594

AIRCRAFT ACCIDENT REPORT

AVIANCA, THE AIRLINE OF COLUMBIA
BOEING 707-321B, HK 2016
FUEL EXHAUSTION
COVE NECK, NEW YORK
JANUARY 25, 1990



5255B

NATIONAL TRANSPORTATION SAFETY BOARD

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**ADOPTED: APRIL 30, 1991
NOTATION: 5255B**

Abstract: This report explains the crash of an Avianca Airlines Boeing 707-321B in Cove Neck, Long Island, New York, on January 25, 1990. The safety issues discussed in the report are pilot responsibilities and dispatch responsibilities regarding planning, fuel requirements, and flight following during international flights; pilot-to-controller communications; air traffic control flow control procedures; and flightcrew coordination and English language proficiency of foreign crews. Recommendations concerning these issues were addressed to the Federal Aviation Administration and the Departamento Administrativo de Aeronautico Civil (DAAC), Columbia.

ERRATA

THE FOLLOWING CORRECTIONS SHOULD BE MADE TO THE ATTACHED REPORT AS FOLLOWS:

Aircraft Accident Report
Avianca, the Airline of Columbia
Boeing 707-321B, HK 2016
Fuel Exhaustion
Cove Neck, New York
January 25, 1990

Executive Summary, Page v, paragraph 1, line 1

Change

. . . July 19, 1989

To

. . . January 25, 1990

Appendix B, Page 82, paragraph 1, line 3

Change

. . . January 20, 1990

To

. . . January 25, 1990

EXECUTIVE SUMMARY

On July 19, 1989, at approximately 2134 eastern standard time, Avianca Airlines flight 052, a Boeing 707-321B with Colombian registration HK 2016, crashed in a wooded residential area in Cove Neck, Long Island, New York. AVA052 was a scheduled international passenger flight from Bogota, Colombia, to John F. Kennedy International Airport, New York, with an intermediate stop at Jose Maria Cordova Airport, near Medellin, Colombia. Of the 158 persons aboard, 73 were fatally injured.

Because of poor weather conditions in the northeastern part of the United States, the flightcrew was placed in holding three times by air traffic control for a total of about 1 hour and 17 minutes. During the third period of holding, the flightcrew reported that the airplane could not hold longer than 5 minutes, that it was running out of fuel, and that it could not reach its alternate airport, Boston-Logan International. Subsequently, the flightcrew executed a missed approach to John F. Kennedy International Airport. While trying to return to the airport, the airplane experienced a loss of power to all four engines and crashed approximately 16 miles from the airport.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the flightcrew to adequately manage the airplane's fuel load, and their failure to communicate an emergency fuel situation to air traffic control before fuel exhaustion occurred. Contributing to the accident was the flightcrew's failure to use an airline operational control dispatch system to assist them during the international flight into a high-density airport in poor weather. Also contributing to the accident was inadequate traffic flow management by the Federal Aviation Administration and the lack of standardized understandable terminology for pilots and controllers for minimum and emergency fuel states.

The Safety Board also determines that windshear, crew fatigue and stress were factors that led to the unsuccessful completion of the first approach and thus contributed to the accident.

The safety issues raised in this report include:

1. Pilot responsibilities and dispatch responsibilities regarding planning, fuel requirements, and flight following during international flights.
2. Pilot to controller communications regarding the terminology to be used to convey fuel status and the need for special handling.
3. ATC flow control procedures and responsibilities to accommodate aircraft with low fuel state.
4. Flightcrew coordination and English language proficiency of foreign crews.

Recommendations concerning these issues were addressed to the Federal Aviation Administration and the Director, Departamento Administrativo de Aeronautico Civil (DAAC), Columbia.

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BOEING 707-321B, HK 2016
FUEL EXHAUSTION
COVE NECK, NEW YORK
JANUARY 25, 1990**

1. FACTUAL INFORMATION

1.1 History of the Flight

On Thursday, January 25, 1990, at approximately 2134 eastern standard time,¹ Avianca Airlines flight 052 (AVA052), a Boeing 707-321B with Colombian registration HK 2016, crashed in a wooded residential area in Cove Neck, Long Island, New York. AVA052 was a scheduled international passenger flight from Bogota, Colombia, to John F. Kennedy International Airport (JFK), New York, with an intermediate stop at Jose Maria Cordova Airport, near Medellin, Colombia. Of the 158 persons aboard, 73 were fatally injured.

The flight was operating under the regulations of Colombia, and was certified to operate in the United States under the provisions of Title 14 of the Code of Federal Regulations (CFR) Part 129.²

AVA052 departed Bogota International Airport at 1310, 5 minutes ahead of schedule. The flight landed at Medellin at 1404, and was refueled and prepared for departure to JFK. There was no flightcrew change at Medellin. The cockpit crew consisted of a captain, a first officer, and a flight engineer (second officer). AVA052 departed Medellin at 1508.

The flight plan for AVA052 was via an oceanic route over Bimini, Bahama Islands, and then northbound toward the East Coast of the United States. The flight was cleared into U.S. airspace by Air Traffic Control (ATC) via Atlantic route 7 to Dixon, North Carolina, jet airway 174 to Norfolk, Virginia (ORF), direct to Sea Isle, New Jersey, and then via the CAMRN TWO ARRIVAL to JFK, at flight level 370 (FL370).³

¹ Unless otherwise indicated, all times shown are eastern standard time, based upon the 24-hour clock.

² 14 CFR Part 129 governs the operations of foreign air carriers and foreign operators of United States-registered aircraft engaged in common carriage.

³ Flight Level is a level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury. Each is stated in three digits that represent hundreds of feet. For example, flight level 370 represents a barometric altimeter indication of 37,000 feet.

AVA052 entered the airspace of Miami Air Route Traffic Control Center (ARTCC) at approximately 1728 at FL350. While in Miami airspace, the flight was given clearance to climb from FL350 to FL370, in the vicinity of URSUS navigational intersection, and was level at that altitude by the time it reached ADOOR intersection.

As the flight proceeded northward, it was placed in holding three times by ATC. AVA052 was instructed to enter holding first over ORF. This period of holding was from 1904 to 1923 (19 minutes). The flight was placed in holding a second time at BOTON intersection, near Atlantic City, New Jersey. This period of holding was from 1943 to 2012 (29 minutes). The flight was placed in holding a third time at CAMRN intersection. CAMRN intersection is 39 nautical miles south of JFK. This third period of holding was from 2018 to 2047 (29 minutes).

Between the ORF and CAMRN intersections, AVA052 was cleared to descend to several lower altitudes. The flight entered the holding pattern at CAMRN, at 14,000 feet mean sea level (msl). The flight was subsequently descended to 11,000 feet while in the holding pattern. Figure 1 depicts the track of AVA052 beginning at 2042:59.

At 2044:43, while holding at CAMRN, the New York (NY) ARTCC radar controller advised AVA052 to expect further clearance (EFC) at 2105. The flight had previously been issued EFC times of 2030 and 2039. The first officer responded, "...ah well I think we need priority we're passing [unintelligible]." The evidence showed that the first officer was making all AVA052's radio transmissions to U.S. controllers.⁴

The radar controller inquired, "...roger how long can you hold and what is your alternate [airport]?" At 2046:03, the first officer responded, "Yes sir ah we'll be able to hold about five minutes that's all we can do." The controller replied, "...roger what is your alternate." The first officer responded at 2046:13, "ah we said Boston but ah it is ah full of traffic I think." The controller said, "...say again your alternate

⁴ Voice recordings are taken from the U.S. Air Traffic Control tape recordings for New York Center, New York TRACON, and JFK Tower. Where intracockpit conversations of the crewmembers are quoted herein, the transcript was taken from the cockpit voice recorder (CVR) aboard the flight. The CVR-recorded tape covered the period from 2053:09 to 2133:34. The recording revealed that the first officer was the only crewmember who spoke to ATC. The first officer received instructions from the ground controllers in English and repeated the instructions in Spanish in the cockpit. The cockpit crew speakers could not be heard on the area microphone, except when the crew received the Kennedy tower automatic terminal information service (ATIS) broadcast, information Zulu, at 2100:26. The first officer was using a headset instead of the cockpit speakers to receive the radio transmissions. All three of the CVR's radio channels contained identical signals, but it could not be determined whether the captain or the second officer (flight engineer) were wearing headsets.

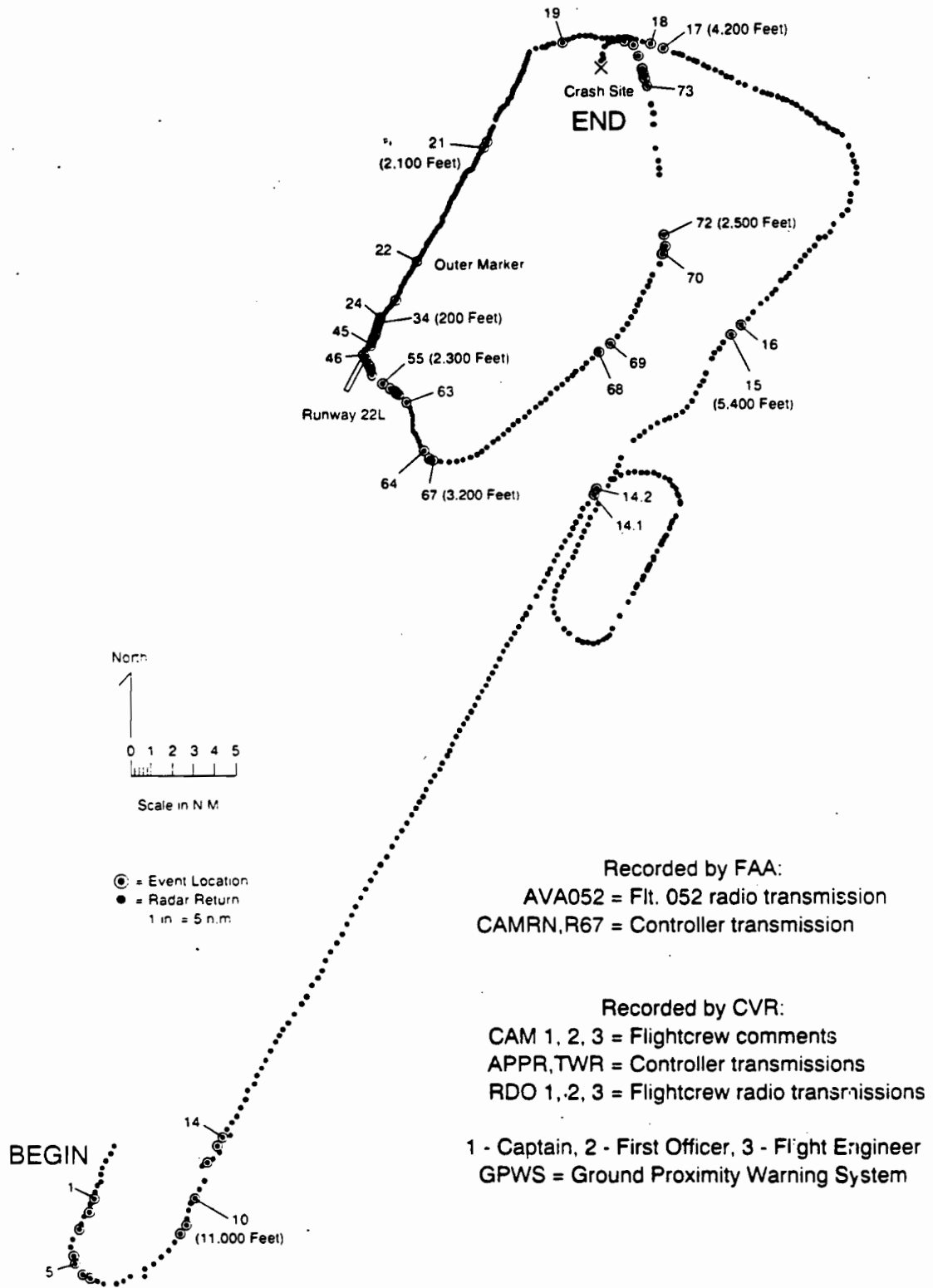


Figure 1.--AVA052 flight reconstruction based on CVR, ATC radar data, and ATC communications.

Time (H,M,S)

Selected Dialogue

- 1) 20.43.59 AVA052 - Thank you sir you have any estimates for us
 2) 20.44.09 R67 - Avianca 052 heavy we just got off the line its indefinite hold at this time . . . hold at CAMRN . . .
 3) 20.44.23 AVA052 - OK Avianca 052 heavy . . .
 4) 20.44.43 R67 - Avianca 052 heavy expect further clearance time . . .
 5) 20.44.50 AVA052 - Zero five two well I think we need priority we're passing (unintelligible)
 6) 20.44.58 R67 - Avianca 052 heavy Roger how long can you hold and what is your alternate
 7) 20.45.03 AVA052 - OK stand by on that
 8) 20.46.03 AVA052 - Yes sir we'll be able to hold about five minutes thats all we can do
 9) 20.46.08 R67 - Avianca 052 heavy Roger what is your alternate
 10) 20.46.24 Note - Now the handoff controller stops monitoring the frequency in order to phone approach control and get a clearance for AVA052
 11) 20.46.24 AVA052 - It is Boston but we can't do it now we will run out of fuel now.
 12) 20.46.47 R67 - Avianca 052 heavy cleared to the Kennedy Airport via . . .
 13) 20.46.57 AVA052 - Cleared to the Kennedy . . . Thank you
 14) 20.47.04 R67 - Avianca 052 heavy contact New York approach . . .
 14.1) 20.54.40 CAMRN - Avianca 052 turn right . . . I'm gonna have to spin you sir
 14.2) 20.54.45 RDO2 - Okay heading two two zero Avianca zero five two
 15) 21.03.46 CAM 3- When we have - with with thousand pounds or less in any tank it is necessary to do --
 16) 21.03.56 CAM3 - Then the go-around procedure is stating that the power be applied slowly and to avoid rapid accelerations and to have a minimum of nose-up attitude
 17) 21.09.29 CAM3 - They already know that we are in bad condition
 18) 21.09.38 CAM2 - They are giving us priority
 19) 21.11.07 APPR - Avianca 052 heavy you are one five miles from outer marker maintain two thousand . . . cleared ILS 22 left
 20.21.15.08 APPR - Avianca 052 heavy contact Kennedy tower . . .
 21.21.15.23 TWR - Avianca 052 heavy Kennedy tower two two left you're number three following seven two seven traffic . . .
 22) 21.19.58 TWR - Avianca 052 . . . cleared to land
 23) 21.21.59 CAM2 - Slightly below glide slope
 24) 21.22.44 CAM2 - Below glide slope
 25) 21.22.52 CAM2 - Glide slope
 26) 21.22.57 CAM2 - This is the wind shear
 27) 21.23.08 CAM3 - Glide slope
 28) 21.23.08 GPWS - Whoop whoop pull up
 29) 21.23.09 CAM2 - Sink rate
 30) 21.23.10 CAM2 - Five hundred feet
 31) 21.23.11 GPWS - Whoop whoop pull up (repeated 3 times)
 32) 21.23.13 CAM1 - Lights
 33) 21.23.14 GPWS - Whoop whoop pull up (repeated 4 times)
 34) 21.23.20 CAM1 - Where is the runway
 35) 21.23.21 GPWS - Whoop whoop pull up (repeated 3 times)
 36) 21.23.23.. CAM1 - The runway where is it
 37) 21.23.25.. GPWS - Glide slope (repeated 2 times)
 38) 21.23.27 CAM2 - I don't see it I don't see it
 39) 21.23.28 CAM1 - Give me the landing gear up . . .
 40) 21.23.29 GPWS - Glide slope (repeated 2 times)
 41) 21.23.33 CAM1 - Request another traffic pattern
 42) 21.23.34 RDO2 - Executing a missed approach . . .

(Continued on next page)

Time (H,M,S)	Selected Dialogue
43) 21.23.37	CAM3 - Smooth with the nose . . .
44) 21.23.39	TWR - Avianca 052 heavy Roger climb and maintain two thousand turn left heading one eight zero
45) 21.23.43	CAM1 - We don't have fue -
46) 21.24.06	CAM1 - Tell them we are in emergency
47) 21.24.08	RDO2 - That's right to one eight zero on the heading and we'll try once again we're running out of fuel
48) 21.24.15	TWR - Okay
49) 21.24.15	Note - Avianca 052's engines began flaming out from fuel starvation less than 9 minutes after this point.
50) 21.24.17	CAM1 - What did he say
51) 21.24.22	CAM1 - Advise him we are emergency
52) 21.24.26	CAM1 - Did you tell him
53) 21.24.28	CAM2 - Yes sir I already advised him
54) 21.24.39	TWR - Avianca 052 heavy contact approach on . . .
55) 21.24.55	RDO2 - Approach Avianca 025 heavy we just missed a missed approach and we're maintaining two thousand . . .
56) 21.25.03	APPR - Avianca 052 heavy . . . Climb and maintain three thousand
57) 21.25.08	CAM1 - Advise him we don't have fuel
58) 21.25.10	RDO2 - . . . Maintain three thousand and we're running out of fuel sir
59) 21.25.12	APPR - Okay fly heading zero eight zero
60) 21.25.15	RDO2 - Flying heading zero eight zero climb to three thousand
61) 21.25.28	CAM1 - Did you already advise that we don't have fuel
62) 21.25.29	CAM2 - Yes sir I already advise him . . .
63) 21.25.29	CAM1 - OKAY
64) 21.26.35	APPR - And Avianca 052 heavy I'm gonna bring you about fifteen miles north east and then turn you back onto the approach is that fine with you and your fuel
65) 21.26.43	RDO2 - I guess so thank you very much
66) 21.26.46	CAM1 - What did he say
67) 21.26.47	CAM2 - He said that 15 miles in order to get back to the localizer
68) 21.29.11	RDO2 - Can you give us a final now Avianca 052 heavy
69) 21.29.20	APPR - Avianca 052 affirmative sir turn left heading . . .
70) 21.30.32	APPR - Avianca 052 climb and maintain three thousand
71) 21.30.36	RDO2 - Negative sir we just running out of fuel we okay three thousand now okay
72) 21.30.44	APPR - Okay turn left heading three one zero sir
73) 21.32.39	CAM3 - Flame out flame out on engine number four
74) 21.32.43	CAM3 - Flame out engine number three essential on number two
75) 21.32.49	CAM1 - Show me the runway
76) 21.32.49	RDO2 - Avianca 052 we just lost two engines and we need priority please
77) 21.32.54	APPR - Avianca 052 turn left heading two five zero . . .
78) 21.33.04	APPR - Avianca 052 heavy you're one five miles from outer marker maintain two thousand until established on the localizer cleared for ILS two two left
79) 21.33.12	RDO - Roger Avianca
80) 21.33.24	**** End of flight 052 CVR and tower communications ****

airport?" The first officer responded at 2046:24, "it was Boston but we can't do it now we, we, don't, we run out of fuel now."

A handoff controller, who was assisting the radar controller at the NY ARTCC, and who was monitoring these radio transmissions, initiated a call on the land-line at 2046:24 to the New York Terminal Radar Approach Control (NY TRACON). At 2046:27, the handoff controller advised the NY TRACON controller, "Avianca zero five two just coming on CAMRN can only do 5 more minutes in the hold think you'll be able to take him or I'll set him up for his alternate." The NY TRACON controller responded, "what's his speed now?" The handoff controller replied, "ah, I'm not too sure to be quite honest with you, holding speed." At 2046:38, the NY TRACON controller said, "slow him to one eight zero knots and I'll take him he's radar three southwest of CAMRN." The handoff controller replied, "one eighty on the speed, radar contact and I'll put him on a forty [040 degree] heading." The New York TRACON controller responded, "that's good." This coordination between the NY ARTCC handoff controller and the NY TRACON controller terminated at 2046:44.

The NY ARTCC handoff controller later stated that he did not hear a portion of the 2046:24 transmission from AVA052 and therefore did not pass the information to NY TRACON that the flight crewmember had stated that AVA052 could no longer reach its alternate airport.

After being advised by the handoff controller that the NY TRACON would be able to accept AVA052, at 2046:47 the NY ARTCC radar controller relayed, "Avianca zero five two heavy cleared to the Kennedy Airport via heading zero four zero maintain one one thousand speed one eight zero." After the first officer acknowledged the clearance, AVA052 was instructed to contact the NY TRACON. Recorded air traffic control radar data indicates that AVA052 departed the holding pattern at CAMRN intersection at 2047:00.

At 2047:21, the first officer contacted the NY TRACON feeder controller, "...we have ATIS information YANKEE with you one one thousand." At 2047:27, the feeder controller replied, "Avianca zero five two heavy New York approach thank you reduce speed to one eight zero if you're not already doing it you can expect an ILS two two left altimeter two niner six niner proceed direct Deer Park."

AVA052 was then provided with routine radar service, including descents to lower altitudes and heading changes, to place it in sequence with other airplanes that were en route to IFR approaches at JFK. At 2054:40, the feeder controller cleared AVA052 to, "...turn right right turn heading two two zero I'm going to have to spin you sir."⁵

At 2056:16, the feeder controller advised, "Avianca zero five two I have a windshear for you ah at fifteen ah increase of ten knots at fifteen hundred feet and then an increase of ten knots at five hundred feet reported by seven twenty seven." At 2056:25, the first officer acknowledged receipt of the windshear advisory.

⁵ "Spin you" is a nonstandard term that refers to making a 360° turn.

At 2102:39, AVA052 was instructed to contact the NY TRACON final controller. The first officer acknowledged the new frequency, "one one eight point four so long" and at 2103:07 contacted the NY TRACON final controller, reporting level at 5,000 feet. During the next 7 minutes, AVA052 received routine radar service, including several heading changes, and further descent clearances to 3,000 feet and finally to 2,000 feet.

At 2103:46, the flightcrew began to discuss the procedure for go-around, with 1,000 pounds or less of fuel in any tank. At 2103:56, the second officer stated, in Spanish, "then the go-around procedure is stating that the power be applied slowly and to avoid rapid accelerations and to have a minimum of nose up attitude."

At 2108:34, AVA052 was instructed to descend to 3,000 feet. The first officer acknowledged and at 2108:51 AVA052 descended out of 5,000 feet for 3,000 feet.

The following intracockpit conversations in Spanish (recorded on the CVR) commenced at 2109:21: The first officer stated, "they accommodate us ahead of an--." At 2109:27, the captain said, "what," and the first officer stated, "they accommodate us." At 2109:29, the second officer said, "they already know that we are in bad condition." At 2109:30, the captain said, "no they are descending us." At 2109:35, the first officer said, "one thousand feet." The captain said, "ah yes." At 2109:38, the second officer said, "they are giving us priority."

At 2111:07, the final controller stated, "...you are one five miles from the outer marker maintain two thousand until established on the localizer cleared ILS two two left." Figure 2 depicts the ILS runway 22L approach chart.

At 2111:16 (CVR), the captain said, "select the ILS on my side." The first officer responded, "the ILS is number one - one hundred ten point nine is set." At 2111:32 (CVR), the captain said, "give me flaps fourteen." At 2111:33 (CVR), the first officer said, "we are thirteen miles from the outer marker." At 2111:55, AVA052 was instructed to maintain an indicated airspeed "...of one six zero if practical." At 2112:05 (CVR), the captain called for "...flaps twenty five." The first officer responded, "flaps twenty five." At 2115:08, the NY TRACON controller instructed, "Avianca zero five two heavy contact Kennedy tower one one niner point one good day." The first officer acknowledged the instructions.

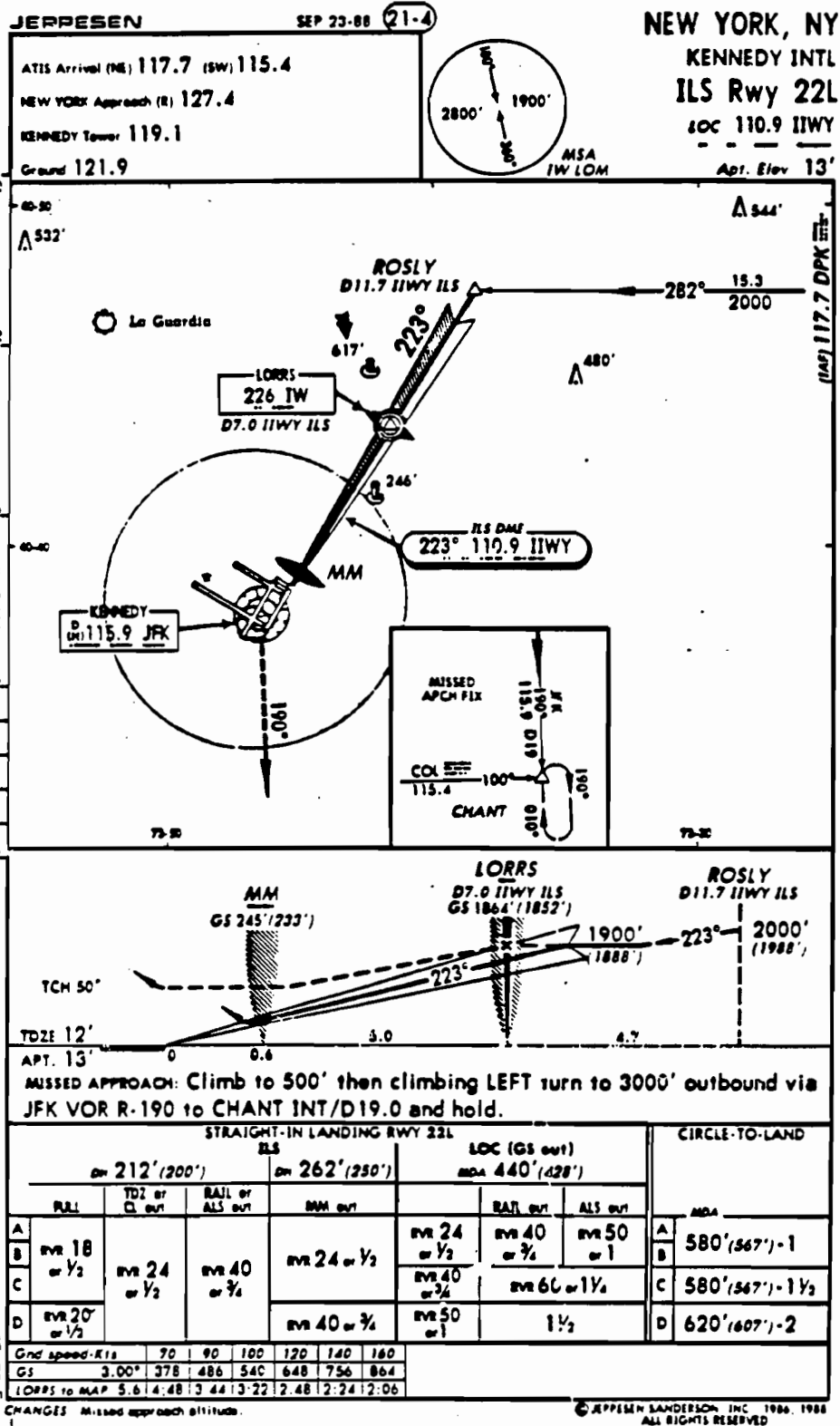


Figure 2.--Jeppesen Approach Plate of ILS to runway 22 left at JFK.

At 2115:19, the first officer contacted JFK Tower, stating that AVA052 was "...established two two left." At 2115:23,⁶ the tower controller responded that AVA052 was number three to land following a Boeing 727 that was on a 9-mile final.

At 2116:19 (CVR), the captain asked, "can I lower the landing gear yet?" The first officer responded, "no I think it is too early now."

At 2117:17, JFK tower controller inquired, "Avianca zero five two what's your airspeed." The first officer responded, "Avianca zero five two one four zero knots." At 2117:30, tower requested, "Avianca zero five two can you increase airspeed one zero knots." At 2117:41, the first officer responded, "okay one zero knots increasing." At 2117:55 (CVR), the captain said, "tell me things louder because--I'm not--hearing it."

At 2118:11 (CVR), the first officer said, "we are three miles to the outer marker now." At 2118:15, the captain said, "resetting the ILS." At 2118:17, the first officer said, "here it is already intercepted." At 2118:32, the first officer said, "glideslope alive."

At 2119:09 (CVR), the captain said, "lower the gear." The first officer responded, "gear down." At 2119:21 (CVR), the captain said, "give me forty." The first officer responded, "forty." At 2119:30 (CVR), the captain said, "mode selector approach landing checklist." The second officer responded at 2119:32, "landing check." At 2119:58, JFK tower called, "Avianca zero five two two two left wind one nine zero at two zero cleared to land." At 2120:10, JFK tower requested, "Avianca zero five two say airspeed." The first officer responded, "zero five two is ah one four five knots."

At 2120:17 (CVR), the captain said, "give me fifty," and at 2120:21, he said, "are we cleared to land no?" The first officer responded at 2120:23, "yes sir we are cleared to land." At 2120:28 (CVR), the first officer said, "localizer to the left slightly below glideslope." At 2120:33 (CVR), the second officer said, "stand by flaps fifty landing checklist complete." At 2120:39, the captain said, "flaps fifty now." At 2020:41, the second officer said, "fifty green light final set." At 2120:48 (CVR), the first officer said, "below glideslope."

At 2121:07, JFK tower requested, "Avianca zero five two heavy can you increase your airspeed one zero knots at all." The first officer responded, "yes we're doing it."

⁶ In some cases, the times recovered from the CVR tape and annotated on the CVR transcript differ by 1 or more seconds from the times annotated on the ATC transcript. The reason for this difference involves the manner in which the FAA records the times from the ATC tape versus the manner of recording the times from the CVR tape. For the sake of consistency, where the times differ, the times transcribed on the CVR transcript are used in this report instead of the ATC times.

At 2121:41 (CVR), the captain said, "localizer glideslope one thousand feet stand by for lights." At 2121:59 (CVR), the first officer said, "slightly below glideslope." At 2122:05, AVA052 was about 3.2 miles from the approach end of runway 22L. At 2122:07 (CVR), the first officer said, "one thousand feet above field."

At 2122:57 (CVR), the first officer said, "this is the windshear." At 2123:08 (CVR), the second officer said, "glideslope." At 2123:08, the first officer said, "glideslope;" at 2123:09, "sink rate; and at 2123:10, "five hundred feet."

Between 2123:08 and 2123:23 (CVR), there were 11 "whoop pull up" voice alerts from the airplane's ground proximity warning system (GPWS).⁷ Between 2123:25 and 2123:29, there were four "glideslope" deviation alerts from the GPWS. At 2123:23 (CVR), the captain asked "the runway where is it?" At this time, AVA052 was 1.3 miles from the approach end of runway 22 left at an altitude of 200 feet. At 2123:27 (CVR), the first officer said, "I don't see it I don't see it." At 2123:28 (CVR), the captain said, "give me the landing gear up landing gear up." Figure 3 depicts the profile view of AVA052's ILS approach path and go-around.

At 2123:34, the first officer radioed, "executing a missed approach Avianca zero five two heavy." The JFK tower controller responded, "Avianca zero five two heavy roger ah climb and maintain two thousand turn left heading one eight zero." The first officer replied, "climb and maintain one ah two thousand one eight zero on the heading."

At 2123:54 (CVR), the captain said, "flaps twenty five." The second officer said, "two thousand feet." The second officer responded at 2123:56, "flaps twenty five." At 2124:00 (CVR), the captain said, "I don't know what happened with the runway I didn't see it." Also at 2124:00, the second officer said, "I didn't see it," and the first officer said, "I didn't see it."

At 2124:04, JFK tower controller stated, "Avianca zero five two you're making the left turn correct sir." At 2124:06 (CVR), the captain said, "tell them we are in emergency." The second officer said, (CVR), "two thousand feet." At 2124:08, the first officer replied to JFK tower, "that's right to one eight zero on the heading and ah we'll try once again we're running out of fuel." At 2124:15, JFK tower stated, "okay." At 2124:22 (CVR), the captain said, "advise him we are emergency." At 2124:26, the captain said, "did you tell him." The first officer replied, "yes sir, I already advised him."

⁷ The GPWS is activated between 50 and 2,450 feet agl radio altitude, and will give advance warning alerts to the flightcrew when one or more of its five thresholds is exceeded: Mode 1 - Excessive descent rate, Mode 2-excessive terrain closure rate, Mode 3 - Altitude loss after takeoff or go-around, Mode 4 - Unsafe terrain clearance while not in the landing configuration, and Mode 5 - Below glideslope deviation alerts.

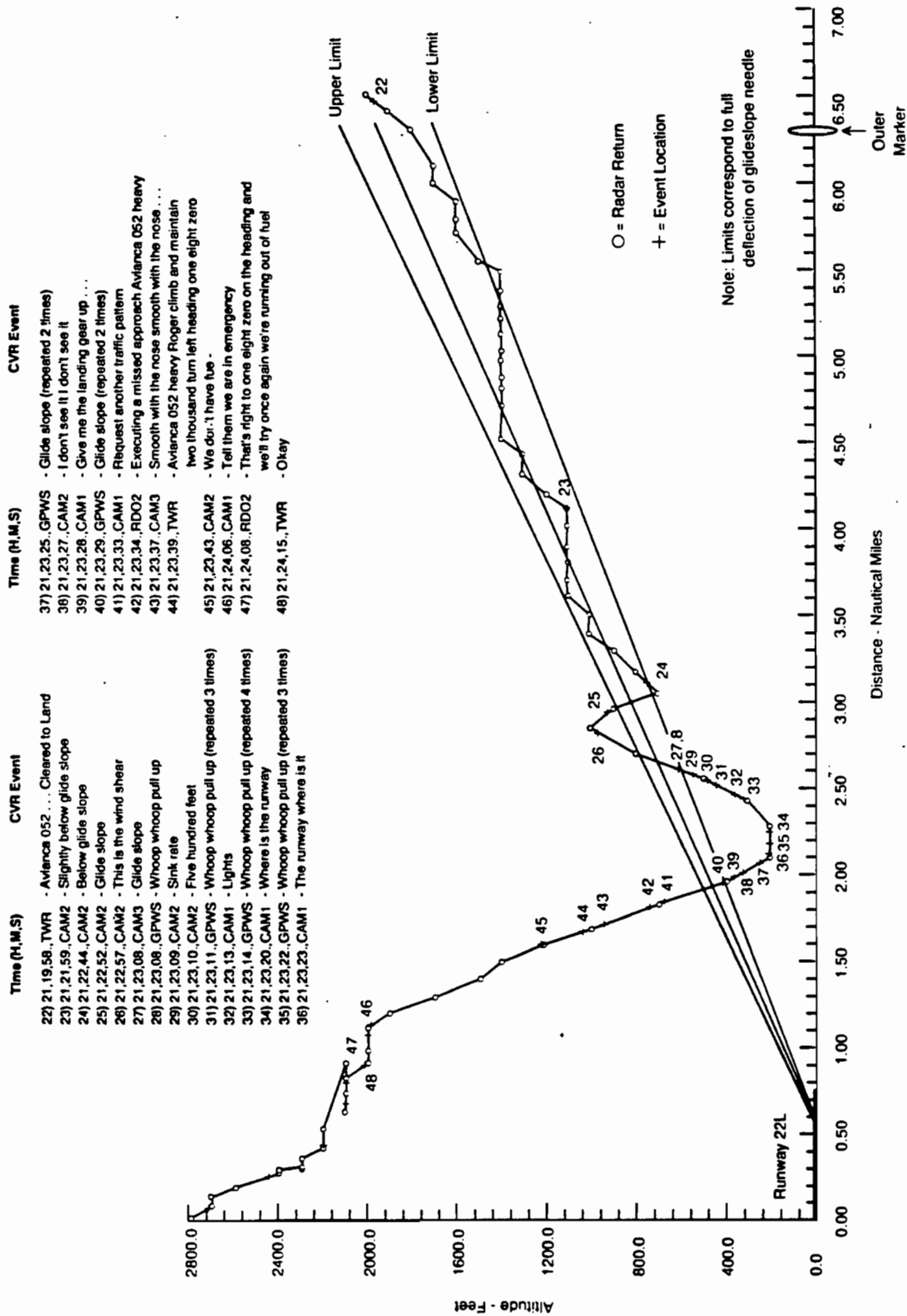


Figure 3.--AVA052 ILS approach--profile view.

At 2124:32, JFK tower instructed, "Avianca zero five two heavy continue the left turn heading one five zero maintain two thousand." The first officer responded, "one five zero maintaining two thousand Avianca zero five two heavy." At 2124:31 (CVR), the captain said, "flaps four--fifteen." At 2124:39, JFK tower radioed, "Avianca zero five two heavy contact approach on one one eight point four."

At 2124:55 (CVR), the captain said, "flaps fifteen." Then, also at 2124:55, the first officer made the radio call, "approach Avianca zero five ah two heavy we just missed a missed approach and ah we're maintaining two thousand and five on the...." At 2124:58 (CVR), the flight engineer replied to the captain, "flaps fourteen." At 2125:07, the NY TRACON controller replied to the radio call, "Avianca zero five two heavy New York good evening climb and maintain three thousand."

At 2125:08 (CVR), the captain said, "advise him we don't have fuel." At 2125:10, the first officer made the radio call, "Climb and maintain three thousand and ah we're running out of fuel sir." At 2125:28 (CVR), the captain said, "did you already advise that we don't have fuel." The first officer replied, "Yes sir. I already advise him hundred and eighty on the heading we are going to maintain three thousand feet and he's going to get us back." The captain replied, "okay."

At 2126:27, the NY TRACON final controller instructed, "Avianca zero five two heavy turn left heading zero seven zero." The flightcrew responded, "heading zero seven zero Avianca zero five two heavy." At 2126:35, the NY TRACON final controller stated, "and Avianca zero five two heavy ah I'm going to bring you about fifteen miles northeast and then turn you back on for the approach. Is that fine with you and your fuel?" The first officer replied, "I guess so thank you very much."

At 2129:11, the first officer asked, "Ah can you give us a final now...?" The NY TRACON final controller responded, "...affirmative sir turn left heading zero four zero." At 2130:32, the final controller stated, "Avianca fifty two climb and maintain three thousand." At 2130:36, the first officer replied, "ah negative sir we just running out of fuel we okay three thousand now okay." The controller responded, "Okay turn left heading three one zero sir."

At 2130:55 (CVR), the captain said, "set flaps fourteen." The first officer responded, "fourteen degrees." At 2130:55, the controller stated, "and Avianca fifty two fly a heading of three six zero please." At 2130:56 (CVR), the first officer replied to the captain, "fourteen degrees." The captain said, "tell me heading what." At 2130:58, the first officer responded to the controller, "okay we'll maintain three six zero now." At 2130:59 (CVR), the second officer stated, "three six zero now."

At 2131:01, the NY TRACON controller stated, "okay and you're number two for the approach I just have to give you enough room so you make it without ah having to come out again."

At 2131:22 (CVR), the captain asked, "three sixty no?" The first officer replied, "three sixty." At 2131:26 (CVR), the captain said, "flaps fourteen." At 2132:07, the flight was instructed to turn left to a heading of 330°.

At 2132:14 (CVR), the first officer said, "three three zero the heading." At 2132:39 (CVR), the second officer said, "flame out flame out on engine number four." At 2132:42 (CVR), the captain said, "flame out on it." The second officer then said, "flame out on engine number three essential on number two or number one." At 2132:49 (CVR), the captain said, "show me the runway."

At 2132:49 the first officer radioed, "...we just ah lost two engines and ah we need priority please." The final controller then instructed AVA052 to turn to a heading of two five zero degrees, advised the flight that it was fifteen miles from the outer marker and cleared for the ILS approach to runway 22 left. At 2132:57 (CVR), the first officer said, "two five zero."

At 2133:04 (CVR), the captain stated, "select the ILS let's see." At 2133:15 (CVR) the captain stated "that no--that," and at 2133:22 he asked, "did you select the ILS?"

At 2133:07, the final controller informed the flight, "...you're one five miles from outer marker maintain two thousand until established on the localizer cleared for ILS two two left."

At 2133:23 (CVR), the first officer replied, "it is ready on two." This radio transmission was the last clearance acknowledged by AVA052.

At 2133:24, the CVR ended.

At 2134:00, the NY TRACON final controller asked AVA052, "You have ah you have enough fuel to make it to the airport?" There was no response from the airplane.

At about this time, AVA052 impacted on a hillside in a wooded residential area on the north shore of Long Island. The starboard side of the forward fuselage impacted and fractured the wooden deck of a residential home. There was no fire.

1.2 Injuries to Persons

	<u>Flight Crew</u>	<u>Cabin Crew</u>	<u>Passengers</u>	<u>Infants</u>	<u>Other</u>	<u>Total</u>
Fatal	3	5	64	1	0	73
Serious	0	1	72	8	0	81
Minor	0	0	2	2	0	4
None	0	0	0	0	0	0
Total	3	6	138	11	0	158

Of the 158 persons aboard, 73 were fatally injured, including the 3 flight crewmembers and 5 of the 6 flight attendants; 81 persons were seriously injured, including the surviving flight attendant and 8 infants; and 4 persons received minor injuries.

There were 149 passengers aboard the flight, consisting of the following: 61 adult males and 61 adult females, whose ages ranged from 19 years to 77 years. There were 16 children, 8 males and 8 females, whose ages ranged from 3 years to 15 years. There were 11 infants, 8 males and 3 females, whose ages ranged from 4 months to 27 months.

An airplane Seating Diagram, showing the placement of occupants (flightcrew, attendants and passengers) and extent of injury of each person (minor, serious or fatal) is provided as figure 4.

1.3 Damage to Airplane

The Boeing 707-321B was destroyed upon impact. The airplane was valued by the airline at approximately \$5 million.

1.4 Other Damage

Several trees were sheared off just prior to and at the time that the airplane impacted with the ground. The starboard side of the forward fuselage fractured the wooden deck of a residence. Property damage is estimated at approximately \$250,000.

1.5 Personnel Information

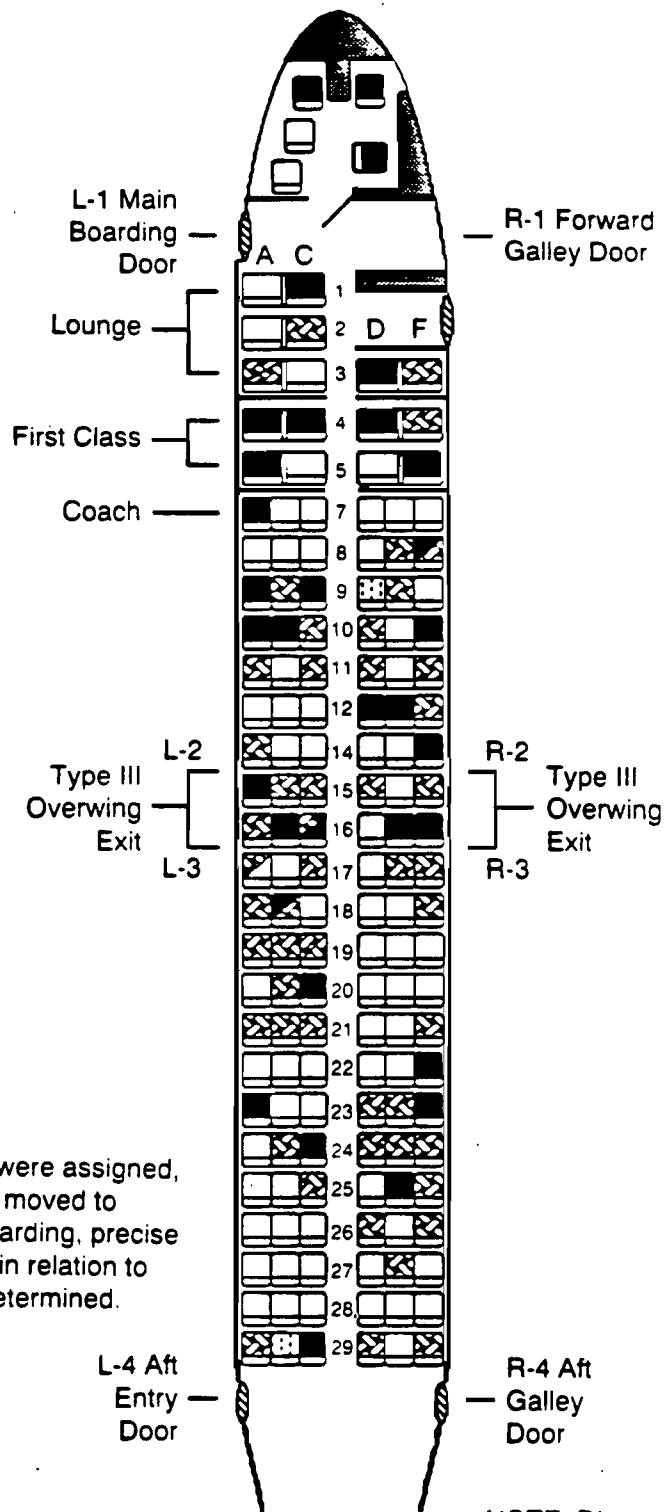
Although the captain had flown previously on international flights with either the copilot or the flight engineer, the accident flight was the first time that all three flight crewmembers had flown together as a crew.




1.5.1 The Captain

The captain, born November 20, 1938, was a citizen of the Republic of Colombia. His date of employment with Avianca Airlines was May 17, 1962.

He possessed a U.S. Airline Transport Pilot Certificate. The most recent date of issuance and rating information for the certificate was November 26, 1976, for a multiengine land, center-line thrust, Boeing 727 (B-727). The captain also possessed a Colombian Air Transport Pilot Rating, issued December 4, 1969, with the privileges and limitations of copilot B-727, B-720, and B-707, and pilot HS-748, B-727, and B-707. He was issued a Colombian class I medical license on December 21, 1989, with no limitations.

The captain's initial transition training in the B-707 for the pilot-in-command position was completed satisfactorily in June 1987. The training included eight simulator training periods totaling 21 hours, a 3-hour check in the simulator and a 1-hour check flight in the airplane with a Colombian civil flight inspector.



 Minor Injury
 Serious Injury
 Fatal Injury

Because not all seats were assigned, and some passengers moved to different seats after boarding, precise seating arrangements in relation to injuries could not be determined.

NOTE: Diagram is not to scale

Figure 4.--AVA052 cabin seating diagram.

The captain completed recurrent ground and simulator training in the B-707 in August 1988. His most recent recurrent training in the B-707 was completed on June 11 and 12, 1989. His record of training reflected that he demonstrated satisfactory performance in various maneuvers and procedures including "Normal Flight Director ILS and Land," "Wind Shear During Approach," and "GPWS Training Procedures." The blocks on his record of training for "Coupled ILS" and "Raw Data ILS" were blank. The captain's record of recurrent training did not indicate whether he had flown instrument approaches into JFK in a flight simulator.

The captain's initial line check into JFK was completed in September 1987. His most recent line check into JFK was completed in September 1989. Items checked as having been satisfactorily demonstrated during his most recent line check included the following:

- Item 4 Flight plan analysis, understanding of fuel required, fuel planning - destination and alternate, weather reports - destination and alternate;
- Item 6 Compliance with FAA regulations;
- Item 13 Use of radio facilities;
- Item 16 Communication, techniques, and terminology in Spanish and English;
- Item 18 Descent procedures, top of descent speeds, altitudes, coordination with air traffic control, and approach techniques;
- Item 19 Deviation to alternates, minimums considering the meteorological conditions and the fuel conditions, and use of navigational charts;
- Item 20 Approaches [the ILS block on the line check form was checked];
- Item 24 Judgement.

In the space on the form for the recording of observations, the inspector pilot wrote, "good work."

From January 1989, to and including the date of the accident flight, the captain made 14 flights to JFK from Colombia in Boeing 707 airplanes.

As of January 25, 1990, the captain had accrued a total flight time of 16,787 hours, 1,534 of which were in the B-707. His total night flying experience was 2,435 hours, 478 of which were in the B-707.

The instrument time that the captain and the other cockpit crewmembers individually accrued is not known. The airline did not record individual pilot instrument time.

The captain's total flight time in B-707 airplanes during November and December 1989, and January 1990, were 37:58 (hours:minutes), 26:40, and 41:54, respectively. The captain did not accrue any flight time during the 24 hours prior to departure from Bogota on the accident flight.

After the captain completed B-707 upgrade training, he did not fly other aircraft for Avianca, in accordance with the airline's policy and procedures.

The captain was also a pilot in the Colombian Air Force Reserve and a member of the Colombian Air Line Pilots Association. He had no record of previous accidents.

1.5.2 The First Officer

The first officer/copilot was born January 2, 1962. He was a citizen of the Republic of Colombia. Employed by Avianca Airlines on October 1, 1986, he possessed a U.S. FAA commercial pilot's license, with a latest date of issuance of April 7, 1983. He possessed FAA license ratings of "airplane, single and multiengine land, and instrument, airplane." The first officer also possessed a Colombian commercial pilot's license, issued originally in August 1983, with the privileges and limitations of single engine land up to 5,670 kilograms (12,500 pounds), and copilot: B-727 and B-707. He was issued an FAA first class medical certificate on January 25, 1989, with no limitations.

During October 1989, the first officer transitioned from the B-727 to the B-707. The transition period included 14 hours of simulated flight and 135 hours of ground instruction. The airline states that, in accordance with the requirements of the Colombian Civil Aviation Administration (Departamento Administrativo de Aeronautica Civil - DAAC), the first officer flew 30 hours as an observer in the jump seat of the B-707.

The first officer's initial line check in a B-707 was on a flight from Bogota to JFK in December 1989, the month prior to the accident. Instructors' comments in the first officer's training records indicated normal progression and performance. After the first officer completed B-707 transition training, he did not fly other aircraft for Avianca Airlines.

From January 1989 until the accident flight on January 25, 1990, the first officer made the following B-727 and B-707 flights from Colombia to New York:

Boeing 727:	January 18, March 17, April 27, May 5, June 3, and 17, and July 4 and 14, 1989
Boeing 707:	December 8, 18, and 25, 1989, and January 5 and 25, 1990

The first officer's total flight time was 1,837 hours. He flew 64 flight hours as copilot in the B-707. His total night flying time was 408 hours, 13 of which were in the B-707.

The first officer's flight times in the B-707 during November and December 1989, and January 1990 were 00:50 (hours:minutes), 35:26, and 28:26, respectively. The first officer flew 06:55 during the 72-hour period prior to the accident.

1.5.3 The Flight Engineer

The flight engineer (second officer), born January 9, 1945, was a citizen of the Republic of Colombia. He was employed by Avianca Airlines on May 9, 1966.

The flight engineer held a Colombian flight engineer's license, issued July 27, 1973. His license privileges and limitations were for the B-727, B-720, and B-707. He was issued a Colombian medical certificate, dated February 6, 1989, with no limitations.

The flight engineer requalified in the B-707, coming from the B-727, in October 1989. His requalification included 60 hours of ground school, and 20 hours of simulator training given over a 5-day period. Upon completion of training, he was given a 2-hour check ride in a B-707 simulator. His training record indicates that he demonstrated satisfactory knowledge of B-707 flight engineer responsibilities in: takeoff, climb, cruise flight, descent, holding and landing.

His initial line check in the B-707, after requalification, was in October 1989, on an out-and-return flight between Bogota and Medellin. The check flight engineer's comments included: "fuel computations satisfactory." After the flight engineer completed B-707 requalification training, he did not perform as a flight engineer on any other aircraft for Avianca Airlines.

From January 1989, up to the accident flight, he performed as the flight engineer on the following B-727 and B-707 flights between Colombia and New York:

Boeing 727: May 1, and June 19, 1989

Boeing 707: November 9, and December 21 and 28, 1989, and January 22 and 25, 1990.

The flight engineer's total flight time was 10,134 hours, of which 3,077 hours were in the B-707. His total night flying experience was 2,986 hours, of which 1,062 hours were in the B-707.

The flight engineer's flight time in the B-707 during November and December 1989, and January 1990 were 62:04 (hours:minutes), 52:48, and 48:40, respectively. He flew 11:37 during the 72 hour period prior to the accident. He had not flown during the 24 hour period prior to AVA052's departure from Bogota.

1.5.4 Cabin Crew

There were six cabin crewmembers. Five sustained fatal injuries in the impact. The lead cabin crewmember, seated in the forwardmost portion of the cabin, survived.

Training records for the cabin crewmembers were requested from the airline but were not received by the Safety Board.

1.5.5 The Flight Dispatcher

Although AVA052 was not issued a dispatch release for the leg of the flight from Medellin to New York, the airline had a flight dispatcher on duty at its facility at Jose Maria Cordova Airport, near Medellin.

The flight dispatcher, born December 30, 1953, was a citizen of the Republic of Colombia. On duty at the time AVA052 departed Medellin, he recorded a runway departure time of 1508 for the flight. The dispatcher's duty period ended at 2030.

The flight dispatcher possessed a Colombian aircraft dispatcher's license, with a latest date of issuance of September 27, 1979. His dispatcher's license was listed for B-707, B-720, B-727, and B-747 airplanes.

His initial dispatch training was completed in November 1977. The training consisted of 110 hours of instruction, given over a 22-day period. The flight dispatcher had received recurrent and familiarization training during May 1982 and May 1985.

Regarding the interpretation of meteorological and navigational information, the dispatcher's training records showed no instruction. The spaces on the training forms that contained the words "meteorology" and "navigation" were not filled out.

1.5.6 Air Traffic Controllers

U.S. air traffic controllers were involved in handling AVA052 from the time that the flight entered into U.S. controlled airspace via the Miami ARTCC. The flight traversed the airspace of the following air traffic control facilities while en route to JFK: Miami ARTCC, Jacksonville ARTCC, Washington ARTCC, New York ARTCC, NY TRACON, and JFK tower.

The backgrounds of controllers involved in more critical portions of the flight are as follows. The New York ARTCC R67 (radar) controller, age 24, was a full performance level air traffic control specialist. He was employed by the FAA on April 9, 1985. He graduated from the ATC School at the FAA Academy in April 1986, and was facility rated in Area E on July 26, 1989. He was medically certified to perform the duties of air traffic control with no waivers or limitations. He was not a pilot, and he had no previous experience as a military air traffic controller.

The New York ARTCC H67 (handoff) controller, age 30, was a full performance level air traffic control specialist. He was employed by the FAA on April 30, 1982. He graduated from the ATC School at the FAA Academy in July 1982, and was facility rated in Area E on January 22, 1986. He was medically certified to perform the duties of air traffic control with no waivers or limitations. He was not a pilot, and he had no previous experience as a military air traffic controller.

The New York TRACON CAMRN/LENDY controller, age 33, was a full performance level ATC specialist. He was employed by the FAA on April 5, 1982, and was facility rated in the Kennedy area on June 11, 1986. He was medically certified to perform the duties of air traffic control with no waivers or limitations. He was not a pilot. He had 8 years experience as a military air traffic controller and had 2 years experience as an air traffic controller while employed by a private corporation.

The New York TRACON Final Vector controller, age 33, was a full performance level ATC specialist. He was employed by the FAA on October 17, 1982. He graduated from the ATC School at the FAA Academy and was assigned to the Philadelphia tower for approximately 4 months before his assignment to the New York TRACON. He was facility rated in the Kennedy area on October 5, 1984. He was medically certified to perform the duties of air traffic control with no waivers or limitations. Although not required for medical certification, he wore glasses to correct distant vision, and he was wearing his glasses while working the Final Vector position at the time of the accident. In addition to being certified in the Kennedy area, he also performed the duties of Traffic Management Coordinator. He was not a pilot, and he had no previous experience as a military air traffic controller.

The New York TRACON, Kennedy Sector, Area Supervisor, age 37, was a full performance level controller and area supervisor. He was employed by the FAA on January 21, 1982. He was first assigned to the Newark sector as an air traffic control specialist and then as a Plans and Procedures Specialist for the Newark sector. In 1987, he was promoted to area supervisor, and in 1989, he was assigned to the Kennedy sector.

The Area Supervisor had been on duty from 0700 until 2045. He was not on duty at the time of the accident. Prior to being off duty, he assigned an air traffic controller from the Kennedy sector to perform the duties of controller-in-charge.

He was medically certified to perform air traffic control duties, with no waivers or limitations. He was a private pilot. He had no previous experience as a military air traffic controller.

The JFK tower local controller, age 32, was a full performance level air traffic control specialist. He was employed by the FAA on July 11, 1982. He was facility rated on February 4, 1986. He was medically certified to perform air traffic control duties and was required to wear glasses to correct for distant vision while performing controller duties. He was wearing his glasses while he was working the local control position. He was

not a pilot, and he had 3 1/2 years experience as a military air traffic controller.

1.6 Airplane Information

1.6.1 General

The Boeing 707 (B-707) type airplane first entered commercial service in September 1958. Currently, about 157 B-707s are registered outside the United States, flown by 61 operators. The B-707 is a transport-category airplane, certificated under Federal Aviation Regulations.

The accident airplane, with Colombian registration HK 2016, was a Boeing 707 series 321B. The 300 series was designed to serve on very long route segments of up to 6,000 miles, at cruising speeds of up to 0.90 Mach, and at cruising altitudes up to 42,000 feet msl.

HK 2016 was manufactured in June 1967. Avianca Airlines purchased the airplane from Pan American World Airways Inc., in February 1977. At the time of the accident, HK 2016 had accrued a total of 61,764 airframe flight hours.

A review of the maintenance records for HK2016 revealed that the airplane had been inspected and maintained in accordance with Avianca's maintenance program that had been approved by the Colombian DAAC. The review showed that all required items had been accomplished within the times specified.

A review of maintenance discrepancies logs for the 3 months before the accident revealed six open items, none of which could be considered related to fuel leaks or similar problems. All other items had been cleared by corrective actions. The last calibration of the fuel indicating system was in June 1989 during the last C-check. The records review indicated several recurring problems with the autopilot, primarily the ability of the autopilot to hold altitude. The records indicated that corrective actions had been taken for these writeups. There had been two previous writeups on the flight data recorder for failure in the test mode. The corrective action stated that the foil had been inspected and found to be "OK."

Avianca Airlines had retrofitted each of its four Boeing 707-321B airplanes with a Tracor/Shannon Engine Quiet Modification, pursuant to a supplemental type certificate. All four Pratt & Whitney JT3D-3B engines on each of the four airplanes had received the modification, also known as a "hush kit." With the modification installed, the noise level produced by the Boeing 707-321B was in compliance with Stage 2 requirements, in accordance with 14 CFR Part 36, appendix C.

The supplemental type certificate for the engine quiet modification required that a supplement be issued to the FAA-approved B-707 airplane flight manual (AFM). A copy of the supplement was carried aboard AVA052. It stated, in part, on page 2, dated February 22, 1985:

The following performance decrements shall be applied to the takeoff performance-limited weights determined from the basic AFM:

- o Takeoff field length - subtract 1,200 lbs.
- o Takeoff climb (including obstacle clearance) subtract 2,800 lbs.

On page 3 of the supplement, with an entry date of December 9, 1986, it notes:

For normal operation, landing must be accomplished at Flaps 25... Use of Flaps 40 or 50 is prohibited except as provided in the Emergency Operating Procedures section of this Airplane Flight Manual Supplement.

and

Use of auto-pilot and/or auto-throttle (if installed) is not permitted for Flaps 25 final approach and landing from a minimum of 500 feet above the destination airport.

Avianca Airlines' personnel stated that, as a result of the engine quiet modification, a fuel overburn of 5 percent was factored into the airplane's performance calculations. An additional 5 percent overburn was factored in for consideration of the airplane's degraded performance because of aging.

1.6.2 Flight Plan and Performance Information

The flight plan for the AVA052 route segment from Medellin to JFK was computer generated by the Society International Telecommunications Association (SITA) headquarters in Paris. SITA forwarded the flight plan to the Avianca dispatcher at 0647, January 25, via teleprinter.

The flight plan was based upon a combination of airplane performance data supplied by the airline and upper level forecast weather conditions that existed at the time of the flight plan request.

The flight plan recovered from the airplane contained the planned routing and fuel required for the flight. It was based upon an airplane zero fuel weight of 182,000 pounds. The weight at the beginning of the takeoff roll and the landing weight were entered as 254,430 and 198,910 pounds, respectively. The flight plan called for AVA052 to depart Medellin via the Alexandria one standard instrument departure (SID) to TENDON. The great circle distance from Medellin to JFK was shown as 2,067 nautical miles (nm) with an air distance of 2,069 nm.

The flight plan indicated that the alternate airport was Boston Logan Airport (BOS), and that BOS was 183 nm from JFK. It showed that the estimated en route altitude to BOS would be FL230, if diversion to the alternate were necessary, and that a wind correction of plus 65 knots had been factored into the fuel required to fly from JFK to BOS.

The flight plan listed the following information regarding the amount of fuel required for the flight correlated with flight time:

Fuel (lbs.)		Time
Destination: JFK	55,520	4 hours 40 minutes
Reserve	4,510	28 "
Alternate	7,600	30 "
Hold	<u>4,800</u>	<u>30</u> "
Total Required	72,430	6 hours 08 minutes
Taxi	1,500	
Total blocks	79,930	

The Avianca Airlines dispatcher at Medellin prepared the Fuel Loading Instructions form for the flight using computations based on the fuel requirements of the flight plan. The original form was given to the flight engineer of AVA052. Copies of the form were forwarded to the airline maintenance personnel responsible for assisting in the refueling operation, as well as the fueling contract facility.

Based upon a fuel density of 6.7 pounds per gallon, the dispatcher ordered a total block fuel load of 78,000 pounds, with the fuel distributed symmetrically into main tanks Nos. 1 and 4, and 2 and 3, respectively. The fuel loading instructions reflected that there was no usable fuel in the center tank or the outboard auxiliary tanks. At Medellin, all fuel was loaded into Nos. 1, 2, 3, and 4 main wing tanks. The fuel requested included 4,070 pounds of "extra/stored" fuel (78,000 minus 73,930 pounds). Avianca personnel stated that the additional "top off" fuel was placed on board to bring the airplane's takeoff weight up to the maximum allowable for runway 18, the planned departure runway.

The Fuel Loading Instructions form indicated that it was necessary to add 11,642 pounds of fuel in order to obtain the 78,000 pounds requested by the dispatcher. The flight log for the airplane recovered from the accident site contained an entry indicating that the flight from Bogota landed at Medellin with 67,200 pounds of fuel remaining. It was not stipulated whether this figure reflected touchdown or block-in fuel; however, Avianca personnel stated that such an entry normally reflects the pretaxi or block fuel. The two figures (fuel aboard and fuel added) yield a total "blocks" fuel load of 78,842 pounds.

Airline personnel also stated that pursuant to standard operating procedure, a drip stick, in addition to the fuel bay and cockpit fuel panel gauges, was used to ensure that the requested fuel was properly loaded into the airplane's fuel tanks.

The dispatcher's initial request for fuel was based upon the flight departing Medellin from runway 18. He completed the Weight and Balance and Load Summary form for the flight based upon the use of that runway. However, because ambient conditions permitted, the captain and dispatcher decided to use runway 36, which would allow a higher takeoff gross weight. The captain subsequently requested that an additional 2,000 pounds of fuel be taken aboard the airplane. Notations on the Weight and Balance and Load Summary form noted that the gross weight of the airplane at takeoff was corrected from 254,799 to 256,799 pounds at 28 percent mean aerodynamic chord (MAC). The limitations' block on the form reflected a takeoff gross weight of 254,800 pounds (for runway 18). The forward and aft center of gravity limits were 16 and 35 percent of MAC, respectively.

A notation on the airplane's flight log found at the accident site indicated that 80,000 pounds of fuel were on board the airplane at Medellin. However, entered on page 1 of the flight plan, in the area below the total planned fuel required for the flight, was the handwritten number "81,000."

Also found at the accident site was the Fuel and Gross Weight Computations (FGC) form for the flight from Medellin to JFK. It is the responsibility of the flight engineer to enter data on this form. The form is used by the flight engineer to track and log the fuel on board an airplane at various stages during a flight. Data, printed by hand on the form, included the following: zero fuel weight - 178,300 lbs., block fuel - 80,500 lbs., and block gross weight - 258,800 lbs. Individual fuel quantity gauge readings noted and recorded before AVA052's departure from Medellin indicated that there was no usable fuel in the airplane's outboard reserve tanks or in the center tank. The No. 1 and No. 4 fuel tank gauge readings were noted as 15,800 pounds. The No. 2 and No. 3 fuel tank gauge readings were noted as 25,000 and 25,400 pounds. The sum of these values is 82,000 pounds. This figure, "82.0," was entered in the block entitled "gauge sum."

Airline personnel stated that the flight engineer would have made a handwritten entry on the form, indicating a fuel total based on the cockpit gauges, just prior to the airplane taking the runway for takeoff. The airline used 1,500 pounds as taxi fuel at Medellin.

The Fuel and Gross Weight Computation form for AVA052 also included notations for the total amount of fuel used and remaining at five points along the route of flight. They were made at the top of the climb (TOC), during cruise, and at the top of the descent (TOD). According to the notations, the TOC to FL350 occurred at 1539 and required 31 minutes, burning 12,600 pounds of fuel, including fuel required for taxi at Medellin. Fuel quantities were recorded at 1640, while the flight was in cruise at FL350. At that point, 27,300 pounds of fuel had been used and 55,000 pounds remained. Another TOC computation was recorded at 1739 at FL370. At that point, fuel used was 40,300 pounds, with 41,200 pounds remaining. At 1839, with the flight in cruise at FL370, another recording was made showing that 53,100 pounds of fuel had been used, with 29,300 pounds remaining. The TOD was recorded as having occurred at 1942, at FL370. The fuel remaining gauge indication and the sum of the individual fuel quantity gauge readings

recorded at this time were both 17,000 pounds. At a later point in the flight, a fuel gauge sum reading of 14,600 pounds remaining was also recorded. The time and altitude at which this observation was made were not recorded.

The Weight and Balance and Load Summary form for AVA052 for the flight from Medellin to New York completed by the Avianca Airlines' aircraft dispatcher in Medellin showed a computed takeoff weight of 256,799 pounds and a center of gravity of 28 percent MAC.

Data entered on the Fuel and Gross Weight Computation (FGC) form by the flight engineer indicated that the weight of the airplane, at the time of its departure from the gate at Medellin, was 258,800 pounds. Based upon a takeoff gross weight of 257,300 pounds (258,800 minus 1,500) the forward and aft C.G. limits would have remained unchanged.⁸

The Avianca flight dispatcher at Medellin stated that at the time of AVA052's departure from runway 36, the runway was dry, and the outside air temperature was 23° C (73° F). The wind was calm. Based upon these conditions, the maximum allowable takeoff gross weight for runways 18 and 36 would have been 254,650 and 257,200 pounds, respectively.

Based on the conditions reported at the time of AVA052's takeoff from Medellin, the following en route climb data factors were computed:

Brake release weight - 257,000 lbs.; International standard atmosphere (ISA) plus 15° C, 4 engines, 3 turbocompressors; Climb speed - 300 knots indicated to FL290; and 0.78 Mach above FL290.⁹

Brake Release to 35,000 feet pressure altitude (PA):

Time: 27 minutes
 Fuel: 9,393 lbs. + 10% overburn = 10,332 lbs.
 Distance: 190 nautical miles
 Average True Airspeed (AVTAS): 422 knots¹⁰

⁸Data derived from the Avianca B-707 Operations Manual, Loading Section-Terminal Airports, p. 24.50.122c, dated October 27, 1986.

⁹Source: ZIP Operations Manual, pp. 19 and 20, dated March 22, 1983. Note: The information presented on pp. 19 and 20 did not contain an adjustment index for a temperature greater than ISA plus 15° C. The average en route climb temperature was ISA plus 22° C.

¹⁰Source: ZIP Operations Manual, pp. 65 and 67, dated March 22, 1983. The following factors were considered: 0.81 Mach indicated, all engines operating, 3 turbos, maximum cruise thrust limits, total air temperature (TAT):

$$FL350 = ISA (-25 C) + 4 C \text{ (temp differential)} = -21 C.$$

Brake Release to 37,000 feet PA:

Time: 32 minutes
 Fuel: 10,492 lbs. + 10% overburn = 11,541 lbs.
 Distance: 229 nautical miles
 AVTAS: 428 knots

Computed fuel burn at cruise was determined for the following conditions, including the meteorological conditions for the flight:

<u>Aircraft</u> <u>Wt. in lbs.</u>	<u>Altitude</u> <u>in feet</u>	<u>Fuel Flow X 4</u> <u>lbs./hr</u>	<u>Plus 10%</u> <u>lbs./hr.</u>
250,000	35,000	11,816	12,998
230,000	35,000	11,080	12,188
220,000	37,000	10,424	11,466
210,000	37,000	10,068	11,075

Holding performance computations were made for the following conditions:

<u>Altitude</u>	<u>Gross Wt.</u>	<u>IAS</u>	<u>Fuel flow</u>	<u>Plus 10%</u>
37,000	200,000	213	8,192	9,011
23,000	195,000	206	8,284	9,112
14,000	190,000	201	8,472	9,319
10,000	185,000	198	8,380	9,218

Long range cruise (inflight diversion) data was examined based upon information obtained from the following sources:

- a) The Fuel and Gross Weight Computations (FGC) form for AVA052.
- b) ATC recorded communications and radar data.
- c) United States high and low altitude IFR en route aeronautical charts.

Pan American World Airways, Inc., via a contractual agreement, provided a dispatch service for Avianca Airlines' southbound flights from New York. The Pan American flight planning computer provides for a 10-percent overburn cushion for all Avianca Airlines' B-707 flights.

$$FL370 = ISA (-28 C) + 3 C \text{ (temp differential)} = -25 C.$$

Note: Temperatures at FL350 and FL370 are based on January 26, 1990, 00Z upper air data in the vicinity of Grand Cayman.

The following data were computed by Pan American dispatch, using the airline's flight planning computer. Distance computed is by airway mileage rather than direct mileage. A zero fuel weight of 178,300 pounds was assumed. The alternate fuel figure provides en route burn from the destination (JFK) to the alternate, plus 30 minutes holding at 1,500 feet, after a computed approach and missed approach at the alternate. En route time to the alternate does not include 30 minutes holding. Again, a zero knot wind is considered:

<u>Alternate Airport</u>	<u>Distance from JFK</u>	<u>Fuel Required in lbs</u>	<u>Time in minutes</u>
Philadelphia	135	12,600	30
Boston	198	14,100	38
Balt/Wash	206	14,300	39
Dulles	256	15,300	44
Syracuse	227	14,700	41

1.6.3 Fuel System

The B-707 uses a capacitance-type fuel quantity gauging system. The system's components include fuel indicators and tank probes. The fuel quantity indicator is a sealed, self-balancing, motor-driven instrument containing a motor, pointer assembly, amplifier, bridge circuit, and adjustment potentiometer. A change in the fuel quantity of a tank causes a change in the capacitance of the tank probe. The tank probe is one arm of a capacitance bridge circuit. The voltage signal resulting from the unbalanced bridge is amplified by a phase winding of a two-phase induction motor in the indicator. The induction motor drives the wiper or a rebalancing potentiometer in the proper direction to balance the bridge and, at the same time, positions an indicator pointer to show the quantity of fuel remaining in the tank.

Fuel is contained in seven tanks located within the wing and wing center section. The reserve tanks and tanks No. 1, No. 2, No. 3, and No. 4 are integral to the wing structure. The center tank consists of seven removable bladder cells within the wing center section, interconnected to two integral wing root section tanks.

Fuel quantity indicators display usable fuel only. Maximum error for each indicator is +/- 3 percent of full-scale reading. The quantity indicators should read zero when all usable fuel has been consumed.

The fuel feed system consists of direct tank-to-engine lines interconnected by crossfeed lines and a crossfeed manifold. Fuel is supplied, under pressure, directly from each tank to its corresponding engine by AC electric-powered fuel boost pumps. Fuel may be supplied to an engine by an alternate method via the crossfeed manifold.

On February 15, 1980, the Boeing Company, as a result of incidents and other flight operations involving low-fuel conditions, issued operations Manual Bulletin No. 80-1. The bulletin, which applied to all B-707

operators, was issued to "...provide information regarding flight operations with low fuel quantity indications." The bulletin stated that the maximum indicator error in the airplane's fuel quantity system "...should not exceed plus or minus 3 percent of tank full scale reading."

The bulletin further stated that the minimum recommended fuel quantity for landing:

...can best be determined by each operator due to the differences in weather conditions, air traffic control, communication, airline policy, etc.... However, to account for a worst case main tank fuel quantity indicator error of 2,700 lbs. (1,200 kgs.) per main fuel tank, operators should consider at least 7,000 lbs. (3,175 kgs.) as the minimum indicated fuel quantity for landing. During any operation with low fuel quantity, priority handling from ATC should be requested.¹¹

On August 1, 1980, the Boeing Company published a revised version of Bulletin No. 80-1. The revision contained much of the original language but also stated the following:

Minimum fuel for landing can best be determined by each operator due to differences in weather conditions, air traffic control delays, airline policy, etc. However, operators should consider the possible fuel quantity indicator error shown... (plus or minus 3 percent of tank full scale reading) when determining the minimum indicated fuel for landing. For example, if the actual total of fuel in the four main tanks for landing is 4,000 lbs. (1,814 kgs.) the total indicated fuel could be as low as 1,300 lbs. (590 kgs.) or as high as 6,700 lbs. (3,039 kgs.). If any delay is anticipated due to extended radar vectoring, etc., or if a go-around is likely, then additional fuel for these contingencies should be added to the planned fuel quantity for landing. During an operation with very low fuel quantity, priority handling from ATC should be requested.

Boeing Company personnel stated that the above bulletins were sent to all B-707 operators.

¹¹ Postaccident testimony revealed that under FAA Air Traffic Control and International Civil Aviation Organization (ICAO) regulations, the word "priority" and the phrase "priority handling" have no prescribed meaning in terms of required ATC controller action. Reference appendix C.

1.7 Meteorological Information

The 0700, January 25, 1990, surface weather map, prepared by the National Weather Service, showed a deep low-pressure area centered over northeastern Illinois, with a wavy stationary front extending eastward through Indiana, and Ohio, and turning northeast in the vicinity of extreme northeastern Maryland through Long Island, New York, eastern Massachusetts and into southern Nova Scotia. Another stationary front extended northeast from west central Georgia to the Virginia Capes, then east-northeast into the Atlantic Ocean. A cold front extended south from the low through western Indiana, Kentucky, and western Alabama into the Gulf of Mexico. Winds north of the more northerly stationary front were north to northeasterly. Between the fronts, winds were east to southeasterly. South of the southern stationary front, winds were southerly. Skies were overcast, with rain over all of the Mid-Atlantic states from southern Virginia to extreme southeastern New York.

The 500-millibar map (about 18,000 feet) for 0700 showed a deep trough extending south from the Manitoba-Ontario border through central Minnesota and Iowa, western Missouri, and central Oklahoma and Texas. There was a strong southeasterly flow over the eastern United States, with the jet stream extending from central Arkansas through West Virginia, Pennsylvania, and New England. Winds at the 500-millibar level in the vicinity of the Mid-Atlantic states were southwesterly at 55 to 70 knots.

On the 2200 surface map (the accident occurred at about 2134), the low was over northern Lake Huron with the occluded front extending east then southeast from the low to the crest of the surface wave over northeastern New York, becoming a cold front and extending south-southwest through eastern Pennsylvania and into western Virginia. The northern stationary front paralleled the cold front south-southwest into central Virginia turning back north through the Chesapeake Bay and western New Jersey, and through southeastern New York, west of New York City, before turning east-northeast into the Atlantic immediately north of Cape Cod. A low was shown on the front over western New Jersey. The southern stationary front was no longer carried on the analysis. Winds in the warm sector south of the stationary front were moderate to strong from the south. Conditions over the coastal Mid-Atlantic states and New England remained overcast with rain.

The surface observation at JFK at 2100, approximately 34 minutes prior to the accident, was as follows:

Type--special; ceiling--indefinite 200 feet obscured; visibility--1/4 mile; weather--light drizzle and fog; wind--190° 21 knots; altimeter--29.69 inches; remarks--Runway 4R visual range 2,200 feet variable 3,500 feet.

At 2135, the surface observation at JFK was as follows:

Type--special; ceiling--partial obscuration measured 300 feet overcast; visibility 3/4 mile; weather--fog; wind--190° 20 knots; altimeter--29.70 inches; remarks--Runway 4R visual

range 5,500 feet variable 6,000 feet plus, fog obscuring 3/10 sky.

Regarding the filed alternate airport for AVA052, Boston-Logan International Airport had the following observation at 1850:

Ceiling indefinite 300 feet obscured, visibility 1/4 mile in light rain and fog, wind 030° at 7 knots. Runway 4R visual range 1,400 feet variable 2,400.

At 2050: ceiling--indefinite, zero feet obscured; visibility--1/8 mile in light drizzle and fog; wind--100° at 9 knots. Runway 4R visual range 1,400 feet variable 1,600 feet.

This observation was issued about the same time (2046:24) that the flightcrew of AVA052 advised NY ARTCC that they could no longer reach their alternate.

The following are excerpts from pertinent International Airdrome Forecasts (IAF's) for JFK and Boston Logan before the departure of AVA052 from Colombia:

IAF for JFK, issued January 25, 1990, at 0545, valid 0700 January 25, 1990, to 0700 January 26, 1990, in part: Intermittently: 1200 to 1900: visibility 1 mile, moderate rain, 8/8 stratus 800 feet. Gradually 1900 to 2000: Wind 170° 20 knots gusting to 30 knots, visibility 1 mile, light rain, 8/8 stratus 800 feet.

IAF for JFK, issued January 25, 1990, at 0649, valid 0700 January 25, 1990, to 0700 January 26, 1990, in part: Wind 160° 6 knots, visibility 1-1/2 miles, light rain, 6/8 stratus 300 feet, 8/8 stratocumulus 2,000 feet.... Intermittently 0900 to 2000: visibility 1 mile, moderate rain, 7/8 stratus 400 feet.

IAF for JFK, issued January 25, 1990, at 1100, valid 1300 January 25, 1990, to 1300 January 26, 1990, in part: Wind 160° 15 knots gusting to 25 knots, visibility 1 mile, light rain, 8/8 stratus 400 feet.

IAF for Boston, issued 0500 January 25, 1990, valid 0700 January 25, 1990, to 0700 January 26, 1990, in part: Intermittently 1200 to 1800: visibility 3/4 mile, moderate rain, 8/8 nimbostratus 500 feet. Gradually 1700 to 1800: wind 180° 15 knots gusting to 25 knots, 8/8 nimbostratus 500 feet.

IAF for Boston, issued 1100 January 25, 1990, valid 1300 January 25, 1990, to 1300 January 26, 1990, in part: Gradually 1300 to 1400: wind 160° 15 knots, visibility 1 mile, light rain, 8/8 nimbostratus 800 feet.

The pertinent surface observations for JFK and Boston during the departure and flight of AVA052 are contained in appendix E.

1.8 Aids to Navigation

There was no evidence that any of the navigational aids used by AVA052 were out of service, or were not operating to specification, during the evening of the accident flight.

1.9 Communications

All transmissions from the flight to U.S. air traffic controllers were, in accordance with FAA regulations, in English. All intracockpit communications during the last 40 minutes and 14 seconds, from 2053:09 to 2133:23, were recorded on the CVR tape in Spanish.

The CVR transcript, with Spanish to English translations, is attached as appendix B.

1.9.1 Flight Following, Dispatching, and En Route Services

The airline did not incorporate flight following in its dispatching procedures on flights to the United States. Although the company's dispatcher and the flightcrew had the capability to communicate between Colombia and the United States, it was normal that once the flight had departed Colombia, no communications transpired between the flight and the airline's dispatcher at Medellin.

Avianca Airlines had a contract with Dispatch Services, Incorporated, a facility at Miami International Airport that provided a dispatch function for numerous foreign flag air carriers operating within the United States. The Dispatch Services dispatcher, on duty on the evening of the flight, stated that he received a TELEXed departure message from Avianca Airlines stating that AVA052 had departed Medellin. No departure time was given. In anticipation of the flight contacting him as it passed the vicinity of Miami en route north, the dispatcher obtained the latest weather and air traffic information for JFK. He did not receive a call from the flight and there was no record of communications between the Dispatch Services dispatcher and AVA052. In addition, there were no records of contacts by AVA052 with other flight services, such as flight service stations VOLMET (transcribed international weather observation and forecasts), EFAS (En Route Flight Advisory Service), or flight watch along the route, to obtain weather or other information.

Avianca Airlines maintained an office at Miami International Airport because Miami was a regular destination, as well as an en route stop for Colombia-to-North America flights by the airline's B-727 airplanes. A

review of the 90-day period prior to the January 25, 1990, accident found a record of 28 Avianca B-727 airplanes making en route stops at Miami International Airport. There was no record of en route refueling stops at Miami International Airport by any of Avianca Airlines' four B-707 airplanes during this same period.

An examination of the airline's records shows that out of an average of four flights per week (three from Bogota and one from Medellin) from January 6, 1989, through February 23, 1990, Avianca Airlines' flights from Colombia to JFK diverted to an alternate airport a total of five times, as follows:

- January 6, 1989, a B-707 diverted to Boston
- January 6, 1989, a B-727 diverted to Baltimore
- September 16, 1989, a B-727 diverted to Washington
- October 17, 1989, a B-727 diverted to Philadelphia
- February 23, 1990, a B-727 diverted to Washington

1.10 Aerodrome Information

John F. Kennedy International Airport (JFK) is located in Jamaica, Queens, New York, approximately 11 miles southeast of Manhattan. The airport is categorized as "high density." Special air traffic rules in 14 CFR Part 93 apply. Prior reservation is required for arrival. In 1989, the airport logged 483,367 operations (takeoffs or landings), of which 292,050 were classified as air carrier.

JFK airport has five runways: 04 right/22 left, 04 left/22 right, 13 left/31 right, 13 right/31 left, and 14/32. Runway 14/32 is reserved for short takeoff and landing (STOL) aircraft. The preferred ILS runways are the 13/31 parallel runways.

On the evening of January 25, 1990, as a result of a wind from the southwest, the active ILS runways were the parallel runways 22 left and 22 right. Runway 04 left/22 right is an 11,351-foot by 150-foot asphalt and concrete runway, with a grooved surface. It had operating high intensity runway lights (HIRL) and centerline lights (CL). Runway visual range (RVR) equipment was located at the threshold and rollout point at each end of the runway. The minimum landing visibility for a straight-in precision ILS approach to runway 22 right is 3/4 mile. The local weather conditions went below 3/4 mile about 1547. For the remainder of the evening, all approaches were made to, and landings were made on, runway 22 left. AVA052 was assigned the ILS for runway 22 left.

Runway 04 right/22 left is an 8,400-foot by 150-foot asphalt runway, with a grooved surface. On the evening of the accident, it had operable HIRL, CL, a medium intensity approach lighting system with sequenced flashing lights (MALSR), and touchdown zone lights (TDZ). RVR equipment was

located at the threshold, mid-length, and rollout point of each end of the runway. The ILS and distance measuring equipment (DME) for the runway were paired on frequency 110.9 megahertz. The minimum visibility for landing on runway 22 left is 1/2 mile, or an RVR of 2,000 feet for category D aircraft.

The "remarks" section of the Airport/Facility Directory (Northeast United States) for JFK stated that temporary localizer needle aberrations may be experienced on ILS approaches to runway 04 right or 22 left because of heavy jet aircraft in the vicinity. Flights were requested to use caution for possible radio interference or false instructions on the tower frequencies.

On January 28, 1990, an inflight evaluation of the runway 22 left ILS/DME approach was conducted by the Federal Aviation Administration. The operation of the equipment was found satisfactory.

1.11 Flight Recorders

The flight data recorder (FDR), a Lockheed model 109, was removed from the airplane wreckage by Safety Board investigators and brought to the Safety Board's laboratory in Washington, D.C. Upon examination, it was found that the recording medium had been expended at some point before the accident flight, and the recording medium foil was taped down so that the recorder was not operable at the time of the accident. No information was recorded by the FDR during the accident flight.

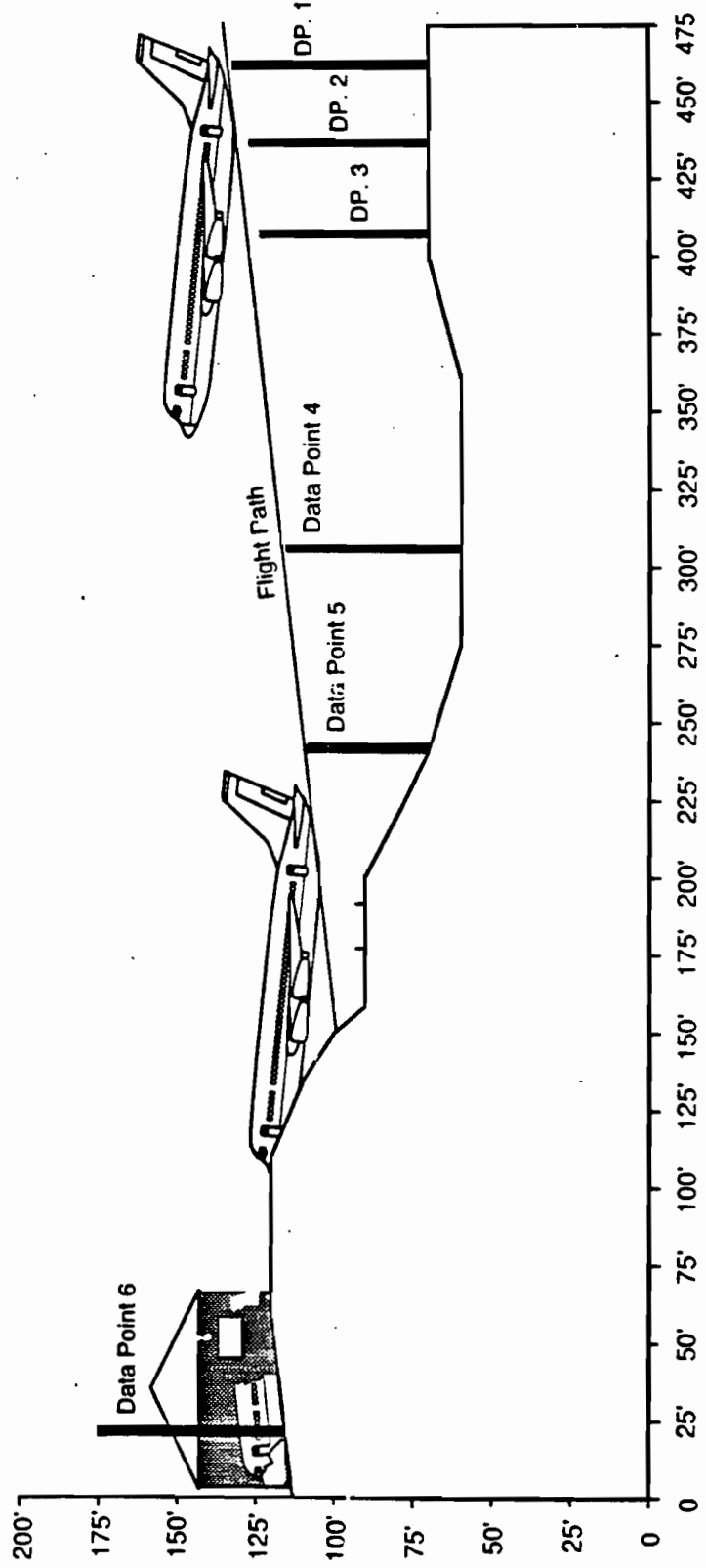
The cockpit voice recorder (CVR) for AVA052 was a Collins model 642C-1. It was removed and brought to the Safety Board's audio laboratory. The entire tape contained 40 minutes and 15 seconds of excellent quality recording. A verbatim transcript (appendix B to this report) was prepared. It is divided into three columns: one for the intracockpit communications, mostly in Spanish; one for the English translation of the Spanish communications; and one for radio transmissions between the flight and air traffic control. Spanish-speaking Safety Board personnel participated in the transcription and translation.

1.12 Wreckage and Impact Information

The airplane impacted on an approximately 24° upsloping hill. (Figure 5 is a sketch showing a profile of the terrain and the airplane's impact angle.) Based on ground scars left by the engines and airframe, the entire fuselage, with the exception of the cockpit and forward cabin, came to a stop within 21 to 25 feet after impact. (Figure 6 contains photographs showing the wreckage site.)

The fuselage was found partially separated into three sections. The cockpit and forward cabin had broken away from the rest of the fuselage at the time of terrain impact and had continued to move over the crest of the slope, coming to rest about 90 feet forward of the main wreckage. This section was significantly damaged, with seats and other cabin components lying on the ground, extending back to the main wreckage.

Data Point	Description	Approx. Base Elev. Measurement	Approx. Top Elev.	Misc. Notes
1	Sheared 17" Hickory Tree	72'	-133'	Measured
2	Sheared 18" Tulip Tree	66'	-127'	
3	Sheared 10" Unk. Tree	79'	-124'	
4	Sheared 8" Maple Tree	72'	-108'	
5	Sheared Telephone Pole	87'	-103'	
6	24" Oak Tree			



SCALE: 1" = 50'

Figure 5.--Terrain impact, AVA052.

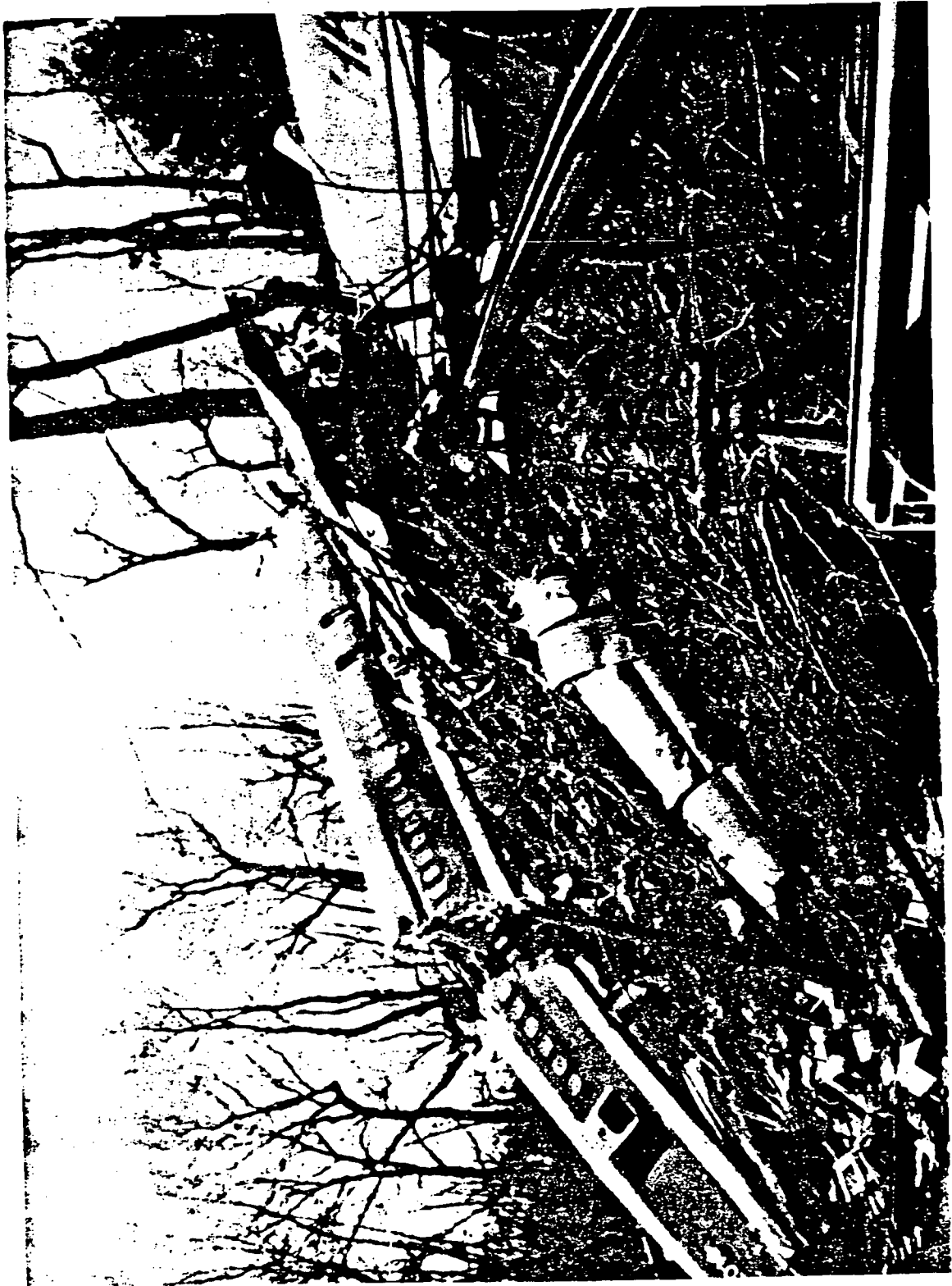


Figure 6.--Wreckage site, AVA052.



Figure 6b.--Wreckage site, AVA052.

The main fuselage had come to rest, upright, on the upslope of the hill, on a heading of about 182°. The forward end of this section extended over the crest of the slope.

The right horizontal stabilizer was found attached to the empennage and was relatively undamaged. The left horizontal stabilizer was found attached to the empennage but had fractured off into two pieces approximately 4 feet outboard of the fuselage. Continuity was established to the controls.

The vertical stabilizer was found intact. The rudder pedal assemblies and all attached cockpit hardware had been bent and fractured, but continuity was established from the cockpit rudder pedals and trim wheel to the rudder assembly.

Both wings were found severely damaged. The port wing was found fractured into three major pieces. The inboard piece extended from the wing root to just inboard of the outboard engine. This piece had sheared off at the root but was lying next to the fuselage and aft of its original attached position. The next outboard wing section extended 2 feet across from the inboard to the outboard fracture. The right wing exhibited the results of several severe impacts on its leading edge. The outboard section of the right wing had fractured away between the two engines. It was found lying beside and aft of the inboard section. The inboard section, still attached to the fuselage at the wing root, came to rest against trees near the top of the slope. All attached leading edge flaps and slats were in the extended position.

The flaps were measured at a 14° setting. All trailing edge surfaces were found either still attached to the wing, in their proper positions, or lying under the wing. There was no evidence of any preimpact failure within the flap system.

Inboard and outboard ailerons, on both the port and starboard wings, were found still intact. Continuity was found from the cockpit to all aileron controls. Inspection of the aileron system found that roll control through outboard aileron operation was available, consistent with deployment of the trailing edge flaps.

The No. 1 engine was found still attached to the fractured section of the left wing. The No. 2 engine was found still attached to the inboard fractured section of the left wing.

The No. 3 engine was found lying at 7 o'clock, relative to its proper position on the starboard wing. It was separated at the engine mounts and the inlet was embedded in the hill. The No. 4 engine was found separated from the pylon at the engine mounts and was lying 25 feet forward of its initial point of impact. Its damaged right side cowling was lying nearby.

There was no evidence of inflight or postimpact scorching or arcing within the electrical system and no evidence of fire or fuel odor anywhere in

the airplane. Examination of all four engines revealed no evidence of rotation or power at impact.

All four of the main fuel tanks had been punctured by trees at impact. Access doors were removed from the fuel tanks in order to inspect for the presence of fuel. A small quantity (less than 5 gallons) was found in the aft portion of the No. 4 tank. A cotton wiping rag, measuring approximately 5 by 8 inches, was found near the aft boost pump, in the No. 4 tank. During removal of the No. 4 main tank boost pump, 1-1/2 to 2 gallons of fuel were drained from the pump cavity. The fuel dump chutes were in the stowed position.

The cockpit fuel gauges were removed for testing. (See details in section 1.16 of this report.)

1.13 Medical and Pathological Information

All three flight crewmembers were fatally injured at impact. The pilot and first officer sustained severe head injuries. The second officer sustained severe chest injuries and multiple fractures.

Toxicological samples of the flightcrew's remains were negative for alcohol and drugs, with the exception of one laboratory which found very low levels of ethanol and 2-butanol in a liver sample. This sample was determined to have been contaminated with external material.

There was no evidence that any of the three flight crewmembers was not rested prior to departure. There was no evidence of recent, unusual stress upon any crewmember.

Toxicological samples were obtained by the FAA on five of the ATC specialists who controlled AVA052 in the latter stages of its flight. Those tested included two controllers from the New York ARTCC, two from the New York TRACON, and the local controller at JFK tower. Under DOT regulations existing at that time, the FAA was not required to provide the results of these tests to the Safety Board. Board investigators requested the results of these tests directly from the controllers but they declined. They also declined to submit to Safety Board requests for separate toxicological testing. No evidence was found to indicate that controller fitness for duty was a factor in the accident.

1.14 Fire

There was no fire.

1.15 Survival Aspects

1.15.1 Rescue

After the crash, a large rescue effort was quickly mobilized. Local residents, who were first on the scene, called police, fire, and emergency telephone numbers. The response came from several neighboring communities and services.

There was a narrow, blacktopped residential road traversing the slope of the hill at the point where the airplane's empennage came to rest. Another branch of the residential road that passed by a residence was struck by the airplane. Both of these narrow roads combined into a single residential road, which continued outbound to the highway and the town of Cove Neck.

Rescuers were restricted by the single residential road upon which to gain access to the crash site. This problem, combined with the number of responding agencies, resulted in a traffic jam on the road between the accident site and the highway. Despite quick and professional efforts to get appropriate vehicles into and out of the site, more rescuers were available than could be used, and a speedy means to move survivors became the priority. Nassau County Police helicopters were brought in and, operating from an improvised landing site in the backyard of a residence located below the accident site, flew out many of the injured.

1.15.2 Location of Crew and Passengers in Relation to Injuries

Interior furnishings, consisting of the galley, seat units, seat belts, overhead bins, decorative panels and floor structure from the cockpit/forward fuselage section, were found scattered along the wreckage path between the separated forward section of the cabin and cockpit, back to and into the fractured opening of the second section of the cabin. This fracture was just forward of the point where the leading edge of the wing mates with the fuselage. Interior furnishings were also scattered along the wreckage path forward of the nose of the airplane, up to a point about 100 feet beyond the final resting point of the cockpit and forward cabin section.

The interior of the cockpit was found substantially damaged. Four of the five cockpit seats (the three seats occupied by the flightcrew, as well as one of the two observer jump seats, both of which were unoccupied) were lying outside the cockpit.

The captain's seat was separated from the lower leg attachments to the base structure of the seat. The seat pan, back and adjustment mechanisms were found generally intact. There were no shoulder straps or inertial reel installed on the pilot's seat. The base of the seat was attached to a 3-by-4-foot section of the cockpit's flight deck. That section of floor was the largest section of the floor from within the cockpit found intact. The floor, although separated in several places, was flat without significant deformation.

The first officer's seat was substantially damaged. The seat back was separated from the seat frame and was not located. The seat adjustment mechanism system was intact. The left and right sides of the lap belt and rotary type release buckle were on the seat and were operational. There were no shoulder straps and no inertial reel for shoulder straps with the seat assembly.

The flight engineer's pedestal-type seat was lying outside the cockpit. The seat was equipped with a four-point restraint system, and the inertia reel for the single shoulder harness was damaged but still attached.

There was substantial damage inside the overwing section of the cabin. Interior furnishings, consisting of passenger seat units, overhead bins and decorative panels, were piled up outside the forward opening. There was a fracture of the longitudinal floor track-beam, evidenced by a downward disruption of floor panels between two lateral floor beams. The remainder of the cabin floor was generally intact but was displaced downward about 3 inches on the right side. The inboard rear legs of 16 seat assemblies remained attached to the floor track in the overwing section. The outboard legs of these assemblies were fractured at the floor track. These seats were found outside the cabin and forward of the overwing section.

The aft cabin section was open at its forward end. Most of the seats in this section were found separated from their floor tracks. The floor panels were displaced, the aft galley and lavatories were displaced, and food from the galley was scattered throughout this section.

Most cabin doors were found opened, including the main boarding door (L-1), the forward galley door (R-1) and the aft galley door (R-4). The left forward overwing emergency exit hatch was found in place and could not be opened because of fuselage distortion.

The emergency evacuation slide packs for doors L-1 and R-1 were in place and relatively undamaged. Evacuation slide inflation bottles remained partially pressurized. The emergency slide pack for the rear cabin entrance (L-4) was in a significantly damaged area of the fuselage. The rear galley slide pack (R-4) was missing from the door and could not be located. There were no girt bars found for any of the slide assemblies.

The left aft overwing emergency exit hatch could not be located. However, it was reported by rescuers that they had removed this hatch, as well as the two overwing hatches on the right side of the cabin. They reported no difficulty in removing these hatches.

The aft section of the fuselage had rolled slightly to the left and came to rest on the lower one-third of the L-4 aft cabin entry door, preventing the door from opening. The damage to the inside of the cabin was extensive in this area.

1.16 Tests and Research

The fuel quantity gauges for tanks No. 2 and No. 3, and the fuel totalizer gauge were removed, at the site, from the flight engineer's panel. Under Safety Board supervision, they were tested at the facility of the gauge manufacturer.

All three of these gauges were manufactured by Honeywell Military Products Division, Minneapolis, Minnesota. The manufacturer's records indicate that none of the three gauges had been returned during the service period. All three of the gauges were of the rotating pointer-type design. The gauges are AC powered, and, unless otherwise affected, retain their indications when electrical power is stopped.

Gauges installed for the No. 2 and No. 3 main fuel tanks had a maximum indicating capacity reading of 29,000 pounds. The larger pointer on the gauge indicates increments of 1,000 pounds. The smaller pointer is graduated in 100 pound increments.

The fuel quantity totalizer gauge has a maximum capacity reading of 170,000 pounds. The larger pointer indicates increments of 10,000 pounds. The small pointer is graduated in 1,000 pound increments. The totalizer gauge sums capacitance inputs from the probes mounted in each fuel tank and indicates total fuel available. It operates independently of the individual fuel tank quantity indicators.

The fuel quantity gauge for the No. 2 main tank was badly damaged from impact forces. The glass covering the face of the gauge was missing. The gauge indicated 2,300 pounds when examined at the accident site. It was found to be connected to its proper electrical connector in the flight engineer's panel. Both of the indicator needles were found intact and appeared undamaged; however, the larger needle on the gauge could easily be rotated, and its reading was considered unreliable.

Resistance measurements were recorded across the balancing potentiometer inside the No. 2 main tank gauge. Calculations show that the gauge read approximately 2.5 percent of total at the time of power interruption. Using 29,000 pounds as the gauge reading with a full No. 2 fuel tank, extrapolation yielded an indication of approximately 725 pounds at the time of loss of electrical power. This estimate was corroborated by a laboratory examination of the position of the gauge's internal gears.

The fuel gauge installed to provide the No. 3 main tank quantity indication was found badly damaged. The glass covering the face of the gauge was missing. The gauge read 2,300 pounds. It was connected to its proper electrical connector in the flight engineer's panel. Both of the needles were intact and appeared undamaged; however the larger needle on the gauge could easily be rotated. On-site readings were considered unreliable.

Internal components of the No. 3 main tank gauge appeared undamaged. Resistance measurements were recorded across the balancing potentiometer inside the gauge. Calculations showed that the gauge read

approximately 1.0 percent of total at the time of electrical power interruption. Extrapolating from a 29,000 pounds gauge indication, with a full No. 3 main fuel tank, 1.0 percent would equate to an indicated fuel quantity on the gauge of approximately 290 pounds. The reliability of the 290 pounds extrapolation was confirmed by examining internal gear positioning in the gauge.

The fuel totalizer gauge, installed in the flight engineer's panel, was relatively undamaged. The glass covering the face was intact, with a crack running across the lower corner. At the accident site, the gauge read 1,300 pounds. There was a small dent in the forward section of the gauge case.

All internal components of the fuel totalizer gauge appeared undamaged. Resistance measurements were recorded across the balancing potentiometer. Calculations show that the gauge read approximately 1.6 percent of total at the time that electrical power was no longer received. With 170,000 pounds as a "total fuel" gauge reading, 1.6 percent equates to approximately 2,700 pounds as the total indicated fuel aboard at the time that electrical power was lost. With negligible fuel found in the tanks after impact, 2,700 pounds indicated, or 1.6 percent, falls within the limits of the plus or minus 3 percent gauge error. As with the No. 2 and No. 3 main fuel tank gauges, this estimate was corroborated by internal gauge gear positions.

1.17 Additional Information

1.17.1 Airline Procedures

Avianca Airlines is owned and controlled by citizens of the Republic of Colombia. The airline has provided regular scheduled services between Colombia and the United States since 1946. At the time of the accident, the airline was conducting four scheduled B-707 flights per week from Colombia to New York City. Three of these flights originated in Bogota and one in Medellin.

As of March 1, 1990, Avianca Airlines was one of 246 airlines granted foreign air carrier authority by the U.S. Department of Transportation (DOT), under section 402 of the Federal Aviation Act of 1958, as amended.

Regarding flight following, Avianca Airlines' flights originating in Colombia and destined for the United States have been required to be conducted under the regulatory provisions of 14 CFR Part 129. This regulation requires that authorized foreign air carriers operating within the United States conduct their operations in accordance with the operations specifications issued by the Federal Aviation Administration and with the standards and recommended practices contained in Annex 6, Part 1, as promulgated by ICAO (International Civil Aviation Organization).

14 CFR Part 129, and the operations specifications issued to Avianca Airlines, do not address flight following. ICAO Annex 6, Part 1, Chapter 4, paragraph 2 (4.2), directed the airline to establish and maintain a method of supervision of flight operations approved by the state of the operator (Colombian Civil Aviation Authority). Chapter 4, paragraph 6.1 states, in part, that:

A flight operations officer, when employed in conjunction with a method of flight supervision in accordance with 4.2, shall:

- c) furnish the pilot-in-command while in flight, by appropriate means, information which may be necessary for the safe conduct of the flight.

Regarding contracted dispatching services, as noted earlier, Dispatch Services Incorporated maintained a facility in Miami, Florida, available on frequency 130.4 megahertz. The contract provided for dispatch services for flights northbound from Colombia to the United States. AVA052 did not make contact with this service.

Under a contractual agreement, Pan American World Airways, Inc., provided dispatch services, including flight following, for Avianca Airlines' flights southbound from New York to Colombia. A Pan American manager told Safety Board investigators that there was nothing to prevent a northbound flight from contacting Pan American World Airways, Inc., dispatch for assistance. He also stated that such contact has rarely occurred. The manager stated that, if requested, Pan American dispatch would have provided AVA052 the same assistance it gives to Pan American flights, including the latest updates on weather for the destination and alternate airports, and diversion fuel figures for the alternates, based upon fuel remaining information provided by the flightcrew.

1.17.2 Air Traffic Control Facilities and Procedures

The Washington ARTCC, located in Leesburg, Virginia, is a level 3 facility (the highest level of traffic intensity for an ATC facility), providing services 24 hours a day. The Washington ARTCC airspace consists of approximately 150,000 square miles in nine states. It is bounded on the north by New York and Cleveland ARTCCs. There are 44 sectors supported by seven en route radar sites. There are four terminals within the Washington ARTCC airspace, which support significant hub activity for one or more major airlines. Traffic flows within the Washington ARTCC are predominantly of a northeast/southwest orientation, with the majority of the aircraft in a transitional mode, climbing or descending. There are 13 approach controls and 8 military bases situated within the airspace.

The NY ARTCC, located at the MacArthur Airport, Ronkonkoma, New York, is a level 3 en route ATC facility, which provides services 24 hours a day. The area of control responsibility extends over seven states, totalling more than 41,000 square miles of domestic airspace and 2.5 million square miles of oceanic airspace. The oceanic area handles all the traffic

over the North Atlantic, from the Caribbean area, South America, Southern Europe, and Africa.

The R67 and H67 operating positions are located in area "E" of the NY ARTCC. The facility was authorized 308 full performance level controllers and traffic management coordinators, at the time of the accident, of which 186 were on board. The NY ARTCC has been identified as a critically staffed facility. Employees have been granted a 20-percent pay differential.

The NY TRACON, located in Westbury, New York, is a level 5 terminal facility (the highest level of traffic intensity for a terminal), providing services 24 hours a day. The NY TRACON controls all air traffic for the three major New York Metropolitan Area airports: JFK, LaGuardia, and Newark. It also controls numerous heliports and about 35 other airports, which are located within an area of New York, extending 55 nmi to the southwest and 100 nmi to the northeast of the World Trade Center in Manhattan.

The NY TRACON controls the above airports with the use of four radar sensors, which are remotely stationed at JFK, Newark, Long Island MacArthur (Islip Airport) and Westchester County airports. Responsibility for the control of air traffic over these areas is divided among five areas: JFK, LaGuardia, Newark, Islip, and Liberty. In addition to the three metropolitan airports, there are more than 37 airports in three states (New York, New Jersey, and Connecticut) under the control of NY TRACON.

The Final Vector and CAMRN/LENDY positions of operation are located in the JFK area of the NY TRACON. The NY TRACON is authorized 214 full performance level controllers and traffic management coordinators, of which 113 were on board. It has been identified as a critically staffed facility. Employees have been granted a 20-percent pay differential.

The JFK tower is a level 4 limited radar tower cab ATC facility, providing services 24 hours a day. The airport is located within the delegated airspace of the NY TRACON, and the tower receives approach control services from the Kennedy sector of the NY TRACON. The JFK tower is at JFK Airport, which is in Jamaica, Queens, New York. The facility is staffed with 15 full performance level controllers and 12 controllers in training.

1.17.3 Traffic Management

The Central Flow Control Facility (CFCF) is located on the sixth floor of FAA headquarters, 800 Independence Avenue, S.W., Washington, D.C. The function of the CFCF is to manage the airspace of the National Airspace System, consistent with demand, to ensure that the number of airplanes that flow throughout the system does not exceed the capacity of the airports and the sectors en route. CFCF operates 24 hours a day.

The CFCF has eight traffic management operating positions, including the watch supervisor's position. Each operating position is equipped with a computerized communications system that links all ATC facilities. The facility is also equipped with the Aircraft Situation

Display (ASD), a computer system that receives radar track data from all ARTCCs, and presents visual situation displays by computer screen. The purpose of the ASD is to monitor the flow control programs initiated by the CFCF and the traffic management specialists. The facility is also staffed with specialists from the National Weather Service. Their duty is to provide weather forecasts, weather sequences, and any weather data that may have a significant impact on the National Airspace System.

The Safety Board was informed that on the evening of January 25, 1990, the CFCF was staffed with seven or eight traffic management specialists. There were 10 traffic management (flow control) programs in effect, a higher number of programs than normal. A traffic management program was in effect for flights scheduled to arrive at the JFK airport after 1400. The evening shift supervisor believed that the program had been implemented between 0900 and 1000. The purpose of the program was to reduce the number of flights arriving at JFK each hour after the start of the program because of the poor weather conditions that were forecast to affect all New York Metropolitan Area airports throughout the day.

Normally, at the end of a shift, a traffic management specialist can retrieve a Verification and Analysis Report from the CFCF computer in order to determine the effectiveness of a given program. However, on January 25, 1990, a report for the JFK program was not retrievable because of computer problems.

FAA order 7210.47A, "Traffic Management System," defines the responsibilities, procedures, and methods of application for the Traffic Management System.

The guidelines for the operation of the Traffic Management System are contained in FAA order 7210.47A, Traffic Management System.

Paragraph 2-51 describes coordination requirements for the CFCF specialists. Paragraph 2-51 states: "CFCF TMC (traffic management coordinators) shall:

1. Work closely with the CFWSU (central flow weather service unit) to insure the receipt of timely weather forecasts, observed terminal weather sequences, and any weather data which may have a significant impact on the NAS (national airspace system).
2. Work directly with the center TMU and terminals in the day-to-day operations. Resolve immediate operational traffic management disagreements between facilities.
3. Initiate telephone conferences with user, as necessary, to obtain user input and to provide operational delay information, as well as other significant events affecting the NAS.

Paragraph 3-2g and Appendix A, paragraph A-7, describe the CFCF specialists' procedures for monitoring a ground delay program. Paragraph 3-2g states "CFCF Monitoring Procedures:"

1. Continue ongoing coordination with affected facilities to determine if capacity and demand have been equalized.
2. Obtain arrival and departure counts from impacted facility(s), as appropriate.
3. Obtain arrival and departure delay information.
4. Utilize the aircraft situation display (ASD) to monitor flow patterns, obtain estimated arrival counts, or airborne delay estimates.
5. Adjust or cancel program, as appropriate, and transmit CFCF advisory.

Appendix A, paragraph A-7, states, in part, "After the implementation of a program, factors affecting the forecasts [of demand and capacity] are monitored for change, as are the actual demand and capacity as the program develops. The program may need to be modified if monitoring reveals that any factor affecting forecast demand or capacity has changed significantly or if the program is not proceeding as forecast."

Paragraph 3-2(3f), requires the tower TMC to "forward the total number of hourly IFR arrivals and departures to CFCF as soon as possible after each hour, in order that timely program adjustments may be made."

A detailed chronology of the events recorded for JFK's FAA Ground Delay Program on January 25, 1990, is attached as appendix C.

1.17.4 Expect Further Clearance (EFC) Times

According to FAA Order 7110.65F, paragraph 4-50, states: "when it is necessary to clear an aircraft to a fix other than the destination airport, issue the following: a clearance limit, holding instructions, and an EFC. An EFC is not required if no delay is expected." The air traffic controller is also instructed: "when additional holding is expected at any other fix in your facility's area, state the fix and your best estimate of the additional delay. When more than one fix is involved, state the total additional en route delay (omit specific fixes)." A note contained in paragraph 4-50 states: "additional delay information is not used to determine pilot action in the event of two-way communications failure. Pilots are expected to predicate their actions on the provisions of FAR 91.127."

Air traffic controllers are expected to determine an accurate estimate of the delay in order to inform the pilot. Controllers determine this information based upon the information that they receive from various sources, traffic management unit personnel, supervisors, other controllers,

other air traffic control facilities and, occasionally airport management personnel. However, a controller usually receives an estimate from the controller responsible for the next sector of airspace into which an aircraft is expected to fly.

If a controller is holding aircraft for the next sector, the controller responsible for the next sector usually informs the controller in whose sector the aircraft are being held the amount of time required before he can accept another aircraft. If the traffic situation allows, he usually informs the controller that he will accept aircraft at specific intervals, preventing the necessity of coordinating each aircraft. If a situation arises that changes the amount of delay for an aircraft, the controller must issue amended EFCs as soon as he or she determines the amount of additional delay.

A second note in paragraph 4-50 further explains to controllers: when holding is necessary, the phrase "delay indefinite" should be used when an accurate estimate of the delay time and the reason for the delay cannot immediately be determined; i.e., disabled aircraft on the runway, terminal or center sector saturation, weather below landing minimums, etc. In any event, every attempt should be made to provide the pilot with the best possible estimate of his delay time and the reason for the delay. Controllers/supervisors should consult, as appropriate, with personnel (other sectors, weather forecasters, the airport management, other facilities, etc.) who can best provide this information.

Although the controller is instructed to inform a pilot that a delay is indefinite, the controller is also responsible for issuing the pilot an EFC.

An EFC issued under an "indefinite delay" situation would provide a pilot with lost communications information but little else, other than a controller's "best possible estimate of his delay time."

1.17.5 Air Traffic Control of Emergencies

FAA order 7110.65F, "Air Traffic Control," Chapter 9, provides guidelines to air traffic controllers on assisting aircraft in an emergency. An emergency can be either a "distress" or an "urgency" condition, as defined in the "Pilot/Controller Glossary." A pilot who encounters a distress condition would declare an emergency by beginning the initial communication with the word "MAYDAY," preferably repeated three times. For an urgency condition, the word "PAN-PAN" should be used in the same manner.

After the controller has determined the extent of the emergency, he is required to obtain enough information to handle the emergency intelligently. The controller is required to base his decisions regarding the type of assistance on the pilot's determination because the pilot is authorized by FAR 91 to determine a course of action. When an emergency has been declared by a pilot, or when an air traffic controller has determined that an emergency exists, the controller is required to provide maximum assistance. The controller is expected to select and pursue a course of

action that appears to be most appropriate under the circumstances and that most nearly conforms to the instructions in the ATC Handbook. It is the responsibility of the controller to forward to pertinent facilities and agencies any information concerning the emergency aircraft.

1.17.6 Regulations and Airline Policies on Weather and Fuel

The 14 CFR 121.625, "Alternate Airport Weather Minimums," notes the minimum weather conditions for filing an airport as an alternate in IFR conditions as:

No person may list an airport as an alternate airport in the flight release unless the appropriate weather reports or forecasts, or any combination thereof, indicate that the weather conditions will be at or above the alternate weather minimums specified in the certificate holder's operations specifications for that airport when the flight arrives.

The Operations Specifications issued to Avianca Airlines by the FAA give the following criteria for the selection of alternate airports:

...the standard weather minima applicable to alternate airports designated for dispatch or flight release purposes are 600-2 [ceiling in feet and visibility in statute miles] at airports served by precision approach procedures. However, when an airport is served by two operative navigational facilities, each providing an approved straight-in approach to a suitable but different runway, alternate minima of 200-1/2 above the lower regular airport landing minima of the two approaches, or 400-1 (whichever is higher), are authorized provided appropriate weather reports, or forecasts, or any combination thereof, indicate that the weather conditions will, at the time the flight arrives at the alternate airport, permit a straight-in instrument approach.

The airline's Policy Manual also states that when an afternoon or evening takeoff with a night landing is scheduled, the requirements for the destination, alternate or supplementary airports are a 1,000-foot ceiling and 10 kilometers (6.2 statute miles) visibility.

The Avianca Route Manual contains the following information relevant to low fuel state:

Pilot

- (1) Advise ATC of your minimum fuel status when your fuel supply has reached a state where, upon reaching destination, you cannot accept any undue delay.
- (2) Be aware this is not an emergency situation but merely an advisory that indicates an emergency situation is possible should any undue delay occur.

- (3) Be aware a minimum fuel advisory does not imply a need for traffic priority.

Foreign and U.S. domestic air carriers, which conduct international operations, are respectively guided regarding flight planning by relevant sections of Annex 6, Part 1, Chapter 4, of the International Civil Aviation Organization (ICAO), and 14 CFR Part 121 - Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft.

Regarding fuel supply, 14 CFR 121.645 states, in part:

...no person may release for flight or takeoff a turbine-engine powered airplane (other than a turbo-propeller powered airplane) unless, considering wind and other weather conditions expected, it has enough fuel:

- (1) To fly to and land at the airport to which it is released;
- (2) After that, to fly for a period of 10 percent of the total time required to fly from the airport of departure to, and land at, the airport to which it was released;
- (3) After that, to fly to and land at the most distant alternate airport specified in the flight release, if an alternate is required; and
- (4) After that, to fly for 30 minutes at holding speed at 1,500 feet above the alternate airport...under standard temperature conditions.

14 CFR 121.621 "Alternate Airport for Destination: Flag Air Carriers," states in part,

- (a) No person may dispatch an airplane under IFR or over-the-top unless he lists at least one alternate airport for each destination airport in the dispatch release, unless...[exceptions not applicable].
- (b) For the purposes of paragraph (a) of this section, the weather conditions at the alternate airport must meet the requirements of the air carrier's operations specifications.
- (c) No person may dispatch a flight unless he lists each required alternate airport in the dispatch release.

Excerpt of Annex 6, Part 1, Chapter 4 (ICAO):

4.3.6.1 All aeroplanes. A flight shall not be commenced unless, taking into account both the meteorological conditions and any delays that are expected in flight, the aeroplane carries sufficient fuel and oil to ensure that it can safely complete the flight. In addition, a reserve shall be carried to provide for contingencies.

4.3.6.3 Aeroplanes equipped with turbo-jet engines. The fuel and oil carried in order to comply with 4.3.6.1 shall, in the case of turbo-jet aeroplanes, be at least the amount sufficient to allow the aeroplanes:
(continued with 4.3.6.3.2)

4.3.6.3.2 When an alternate aerodrome is required:

- (a) to fly to and execute an approach, and a missed approach, at the aerodrome to which the flight is planned, and thereafter:
 - 1) to fly to the alternate aerodrome specified in the flight plan; and then
 - 2) to fly for 30 minutes at holding speed at 450 m (1,500 ft.) above the alternate aerodrome under standard temperature conditions, and approach and land; and
 - 3) to have an additional amount of fuel sufficient to provide for the increased consumption on the occurrence of any of the potential contingencies specified by the operator to the satisfaction of the State of the Operator.
- (b) to fly to the alternate aerodrome via any predetermined point and thereafter for 30 minutes at 450 m (1,500 ft.) above the alternate aerodrome, due provisions having been made for an additional amount of fuel sufficient to provide for the increased consumption on the occurrence of any of the potential contingencies specified by the operator to the satisfaction of the State of the Operator; provided that fuel shall not be less than the amount of fuel required to fly to the aerodrome to which the flight is planned and thereafter for two hours at normal cruise consumption.

4.3.6.4 In computing the fuel and oil required in 4.3.6.1, at least the following shall be considered:

- a) meteorological conditions forecast;
- b) expected air traffic control routings and traffic delays;

- c) one instrument approach at the destination aerodrome, including a missed approach;
- d) the procedures prescribed in the Operations Manual for loss of pressurization, where applicable, or failure of one power unit while en route; and
- e) any other conditions that may delay the landing of the aeroplane or increase fuel and/or oil consumption.

2.0 ANALYSIS

2.1 General

The evidence confirmed that this accident occurred when the airplane's engines lost power from fuel exhaustion while the flight was maneuvering for a second instrument approach to JFK. Significant evidence was information contained on the CVR and examination of the airplane's wreckage. There was an absence of fuel odor at the accident site, and no fire erupted during the impact. The only fuel found in the airplane was residual unusable fuel. There was no rotational damage to any of the four engines from impact forces, indicating that they had ceased operation before ground impact. In addition, the investigation found no engine or fuel system component malfunctions, including any that could have caused a premature exhaustion of fuel or a loss of fuel supply to the engine.

The investigation revealed that the flightcrew had received the appropriate flight and ground training in the B-707 and that they possessed the appropriate flight and medical certification required by the DAAC of Colombia. Further, they had sufficient previous experience in conducting B-707 flights from Colombia to JFK.

The investigation revealed that the airplane departed Medellin, Colombia, with sufficient fuel to fly to its destination. Its scheduled flight time was 4 hours 40 minutes. However, the airplane crashed 6 hours and 26 minutes after takeoff. Its flight plan called for a "required" fuel load of 72,430 pounds of fuel for the flight, which included fuel to JFK, reserve fuel, fuel to the alternate, and holding fuel, for a total of 6 hours and 8 minutes of flight.

The evidence revealed that an additional amount of fuel was loaded aboard AVA052 above the required load. That amount was about 6,070 pounds, bringing the total planned load to about 80,500 pounds for takeoff at Medellin. The Safety Board believes that the actual fuel aboard the flight at takeoff from Medellin was about 80,500 pounds, based on various documents available and the fuel figure notations made by the flight engineer during the flight. Because of differences in the fuel numbers on some of these documents, this value could be in error either way by about 1,000 pounds; nevertheless, AVA052 had sufficient fuel to complete the scheduled flight, as well as to meet other prescribed IFR fuel requirements. For example, there was sufficient fuel to fly the scheduled route to the destination airport

(JFK), execute a missed approach, and fly to the alternate airport (Boston). However, Boston was forecast to be below IFR alternate minimums when AVA052's flight plan was filed, and the actual weather there deteriorated further while the flight was en route.

The investigation revealed inadequacies in the dispatching services of AVA052 from Medellin, as well as deficiencies in the performance of the flightcrew of AVA052 while en route and during the attempted landing approach at JFK. The investigation also revealed deficiencies in the ATC handling of AVA052. Consequently, the analysis of this accident focused on the planning for the flight, the flightcrew's performance during the flight, and the air traffic controllers' performance during the flight. The analysis also included the issues related to occupant survivability.

2.2 Flight Planning

Avianca Airlines had a dispatcher at Bogota and at Medellin, but the Safety Board found inadequacies in the dispatching services of AVA052.

The weather data provided to the flightcrew of AVA052 before departure from Medellin was 9 to 10 hours old. These weather data, as well as weather data that was current at the time of departure, showed that all the planned alternates for the accident flight were forecast to be below the minima specified for an alternate airport at the time of AVA052's arrival near JFK. This forecast included the filed alternate airport--Boston Logan International Airport (BOS). Airports such as Syracuse and Buffalo were forecast to have legal alternate weather; however, these airports were not listed in the documents provided to the flightcrew. Both the outdated and current weather data showed that JFK was forecast to have low ceilings and restricted visibility near or below those authorized for AVA052 to execute an approach.

Evidence provided by Avianca Airlines' personnel and testimony by its management personnel indicated that BOS was listed as an alternate for this flight because it was part of a computer-generated flight plan for all flights to JFK, without regard for forecast weather. Avianca personnel stated that one reason for choosing BOS as an alternate to JFK was that it was a reasonable distance from JFK and therefore "conservative" for fuel planning purposes, allowing the use of closer alternates. The Safety Board believes that the listing of an alternate airport with forecast weather below minima illustrates inadequate dispatching services provided by the airline for AVA052. The flightcrew of AVA052 should also have been aware of the requirements for weather minima for this flight.

The Safety Board was unable to establish whether the dispatcher for AVA052 had received training in meteorology or navigation. The dispatch function in airline operations is an important part of the safety of operations. The dispatcher for an airline flight shares the responsibility for proper flight planning, including fuel loading, weight and balance calculations, and appropriate weather information. The Safety Board is concerned that AVA052 was not provided adequate dispatch services on the day

of its departure from Medellin. It believes that these deficiencies may have affected the performance of the flightcrew during this flight.

The weather information provided by dispatch at Medellin was not the latest weather available. Also, there is no record that the flightcrew used available resources to obtain updated weather and traffic information during the en route phase of the flight. Whatever the reasons for these oversights, these factors prevented the flightcrew from being properly prepared for the flight.

With regard to fuel planning, Avianca personnel stated that the airline elected to follow U.S. requirements (14 CFR 121.645) because they are more stringent than ICAO-recommended procedures. The U.S. regulations and ICAO standards differ primarily in the language used to compute the amount of fuel required for potential contingencies. 14 CFR Part 121.645 requires, in part, "(2) After that, to fly for a period of 10 percent of the total time required to fly from the airport of departure to, and land at, the airport to which it was released." (3) After that, to fly to and land at the most distant alternate airport specified in the flight release, an alternate is required, and (4) After that, to fly for 30 minutes at holding speed at 1,500 feet above the alternate airport...." The ICAO provisions on this point are more general, requiring an "additional amount" of fuel that is satisfactory to the governing agency. The DAAC of Colombia supported the airline's use of the U.S. regulation.

The Safety Board found several deficiencies in the flight plan issued to and used by the flightcrew of AVA052. It did not reflect the most current upper air data, or the actual gross weight of the airplane upon departure from Medellin. The reserve fuel stipulated in the flight plan out of Medellin did not account for the possibility of extensive en route and landing delays at JFK or at the alternate because of weather and air traffic conditions. If a new flight plan or a revision to the existing flight plan had been requested by the dispatcher and the captain before AVA052's departure, the flightcrew might have anticipated more extensive delays in the JFK area and been more prone to fuel state awareness and flight planning en route.

Upon takeoff at Medellin, the gross weight of the airplane was more than 4,000 pounds above that indicated on the flight plan. Considering the actual heavier airplane gross weight, the amount of fuel that would have been required for the flight to JFK, using the airline's standard cruise performance profile, would have increased. Also, the flight plan factored in only 28 minutes of reserve fuel, equating to 10 percent of the planned en route flight time from Medellin to JFK.

U.S. airlines, as well as most international airlines, require the flightcrew and the dispatch function to keep each other informed of conditions and events that may alter the planned conduct of the flight. One of the primary reasons for this requirement is to provide for redundancy in the operational control of the flight.

The dispatch function plays a critical role in the operations planning and conduct of a flight. This is especially true for situations involving deteriorating weather and air traffic delays. During such times, the dispatcher and flightcrew work together to determine the most prudent course of action in ensuring the safety of the flight. The dispatcher who "actively" follows a flight is often better able to bring to these corporate discussions a broader picture of environmental and operational-related factors that the flightcrew might not be fully aware of, or have anticipated.

Recorded air/ground communications between dispatch and numerous air carrier flights (Pan American World Airways, Inc. - Pan Am - Flight Control) that were waiting clearance to land at JFK on the evening of the accident revealed that as the flights arrived in the New York area, they contacted their respective dispatch facilities forwarding information on their fuel status and intentions. The dispatchers, in turn, kept their flights up to date on the dynamic weather and ATC situation at JFK, the availability of alternate landing sites, and the fuel quantity necessary to proceed safely to them. The respective flightcrews and dispatchers confirmed the specific time when the flight would begin its diversion to the agreed upon alternate landing site.

Avianca's General Operations Policy Manual required the captain and the dispatcher to establish communication with each other for "messages related to operational development or occurrences that are different than the original flight plan, such as weather conditions at the terminal or en route, availability of facility or services at the terminal or en route, a significant change of the flight plan, a deviation, or an emergency notification." Communication could have been established through the use of the high frequency (HF) radio on board the airplane or through the Dispatch Services dispatcher in Miami with which Avianca Airlines had a contract.

The Safety Board was unable to determine why the flightcrew and the dispatcher did not communicate with each other when they were clearly able to do so.

The Safety Board believes that Avianca Airlines, the DAAC, and the international aviation community, in general, should review their respective policies, procedures, and training to ensure that adequate emphasis is being placed on the dual responsibility that flight dispatchers and flightcrews have in keeping each other informed of events and situations that differ from those mutually agreed upon in the dispatch release.

While the intracockpit conversations of the flightcrew were only recorded for the last 40 minutes of the flight, there is no record of contacts between AVA052 and FAA flight service stations or flight watch during the flight. The Safety Board was unable to determine why the flightcrew did not use these valuable inflight services during the flight. This failure is especially serious because of the multiple holds that the flight encountered before its fuel state became critical.

Despite the findings about the inadequacy of the flight planning and dispatch aspects of AVA052, the airplane still had sufficient fuel to complete its flight safely. However, air traffic delays because of weather

and traffic at JFK resulted in AVA052 entering holding on three occasions. During the first two holding periods, lasting 19 and 29 minutes respectively, the flightcrew expressed no concerns to ATC and did not make inquiries about the situation at JFK.

2.3 Communications--Flightcrew (CVR)

The first indication that the flightcrew had some concerns about weather, and possibly the fuel state, occurred about 2009. At this time, AVA052 requested information about delays into Boston from the Washington ARTCC controller, after being in holding about 26 minutes at BOSTON intersection. The controller informed the flightcrew that Boston was open and accepting traffic and that the flight could expect as much as 30 additional minutes of holding in the NY ARTCC airspace. There was no further indication from the flightcrew about AVA052's fuel state until after the airplane had been in holding at CAMRN for about 28 minutes. At that point, the flight had been in holding for 1 hour and 6 minutes on three separate occasions.

One possibility for the flightcrew's delay in expressing its concerns may have been a misconception of the significance of the EFC's issued by ATC. The first EFC was for 2030, issued about 8 minutes before the flight entered holding at CAMRN, and the second EFC was for 2039 as the flight entered holding at CAMRN. The flightcrew may have assumed that the previous EFC's were valid times for which they would receive clearance to depart holding and begin the approach to JFK before the fuel state became more critical. In fact, EFC's are merely estimates by the controllers based on a dynamic traffic and weather situation and are issued to provide a time to commence the approach should the flight lose radio contact. When ATC issued a third EFC of 2105, the flightcrew apparently finally realized that they had to commence an approach and therefore requested priority handling.

However, the Safety Board concludes that the flightcrew had already exhausted its reserve fuel to reach its alternate by the time it asked for priority handling. When asked a second time for its alternate, the first officer responded, at 2046:24, "It was Boston, but we can't do it now, we, we, don't, we run out of fuel now." Although the first officer had radioed at 2046:03, "Yes sir, ah, we'll be able to hold about five minutes, that's all we can do," the airplane did not have sufficient fuel to fly to its alternate.

Moreover, AVA052's fuel state at the time it was cleared from holding at CAMRN to commence its approach to JFK was already critical for its destination. To help ensure sufficient fuel to complete a safe landing, an emergency should have been declared in order to receive expedited handling. The airplane exhausted its fuel supply and crashed 47 minutes after the flightcrew stated that there was not sufficient fuel to make it to the alternate. This occurred after the flight was vectored for an ILS approach to the destination, missed the first approach, and was unable to complete a second approach.

When the flight engineer entered 17,000 pounds of fuel remaining upon beginning the descent from FL370, the flightcrew should have estimated the distance and time remaining to destination, approach, alternate, and the reserve fuel required, in order to ensure that there was sufficient fuel for the flight. Included in these calculations should be the fuel quantity that the captain would want on board as he commenced the first approach. This latter fuel figure, commonly referred to as the "minimum approach/landing fuel quantity," should be a part of a flightcrew's calculations as the flight begins descent for landing. There is no indication that the flightcrew of AVA052 had calculated or established such a figure. Again, if a dispatch system had been functioning for AVA052, the dispatcher could have assisted in these calculations and contingencies could have been established jointly by the dispatcher and flightcrew.

The airline's only written procedure for minimum fuel operation was published in its B-707 Operations Manual. The procedure was based upon an indicated fuel quantity in any main tank of 1,000 pounds or less. The procedure did not address a minimum fuel quantity for which a flight should be at the outer marker, inbound to the runway.

The Boeing Company, on February 15, 1980, as a result of some low-fuel operations and incidents, issued Operations Manual Bulletin 80-1 to all B-707 operators. The bulletin provided information regarding flight operations with low fuel indications. Boeing recommended that 7,000 pounds be used as the minimum indicated amount of fuel for landing. Boeing assumed the worst case main tank fuel quantity indicating error of 2,700 pounds, and a minimum of 1,000 pounds in each of the airplane's four main fuel tanks.

The B-707 Airplane Operations Manual states that a minimum fuel condition exists when the indicated amount of fuel in any main tank is 1,000 pounds or less. The procedure calls for the flightcrew to observe proper fuselage attitude and acceleration to prevent momentary fuel starvation. The manufacturer further recommends that if a delay is anticipated due to radar vectoring, or if there is a possibility of a go-around, additional fuel should be added to the minimum amount necessary for a safe landing.

Because the CVR retained only 40 minutes of intracockpit conversations, the Safety Board could not determine whether the crew discussed, prior to their departure from CAMRN, the minimum fuel level that they should have onboard when commencing the approach. However, it is apparent from air-to-ground transmissions while holding at CAMRN (first, the expressed need for "priority" at about 2045 and second, the observations that they could hold only 5 minutes and that they could not reach Boston only minutes later) that the crew were aware of and concerned about the fuel problem. Whether the captain, or first officer, or both, believed that these transmissions to ATC conveyed the urgency for emergency handling is unknown. However, at 2054:40, when AVA052 was given a 360° turn for sequencing and spacing with other arrival traffic, the flightcrew should have known that they were being treated routinely and that this situation should have prompted them to question the clearance and reiterate the criticality of their fuel condition. At that time, they could have declared an emergency,

or at least requested direct routing to the final approach in order to arrive with an acceptable approach minimum fuel level.

Shortly thereafter, however, intracockpit conversations beginning about 2109:21 suggest that the flightcrew assumed that the flight was receiving priority handling.

The second officer had just completed briefing the procedure for less than 1,000 pounds in any tank when, at 2109:29, he said, "they already know we are in bad condition." The captain said, "no, they are descending us," and the first officer said, "one thousand feet." The captain replied, "ah yes," as if to acknowledge that the controller was giving the flight priority. The second officer responded immediately, "they are giving us priority." This conversation suggests that the flightcrew believed that ATC was aware of their critical situation and that ATC was providing "priority" service. However, the events and time involved in the vectoring for the approach should have indicated much earlier to the flightcrew that they were only receiving routine service, and they should have made inquiries to verify the situation.

The intracockpit conversations during the ILS approach concerned configuring the airplane for landing and announcing various flight conditions, including the onset of windshear when the airplane went below the glideslope.

After the flight discontinued its approach to JFK (initiated about 2123:28, when the captain called for the landing gear to be raised), the captain advised the first officer, "tell them we are in emergency." However, the first officer acknowledged an ATC altitude and heading instruction to the JFK tower controller, adding, "...we're running out of fuel." He did not use the word "emergency," as instructed by the captain, and therefore did not communicate the urgency of the situation. Thus, the controller was not alerted to the severity of the problem. When the tower controller advised AVA052 to contact the NY TRACON again for vectors for the second approach, he did not advise the TRACON controller that AVA052 was running out of fuel; however, when AVA052 contacted the TRACON controller, the first officer again stated, "...we're running out of fuel sir," after acknowledging a clearance to climb to 3,000 feet.

The tower controller did not follow up on the radio calls about running out of fuel. However, the TRACON controller turned the flight back onto a downwind leg and asked the flight if it could accept a base leg 15 miles northeast of JFK. The first officer of AVA052 responded, "I guess so."

Shortly thereafter, at 2124:22, the captain again advised the first officer to, "advise him we have an emergency." Four seconds later, the captain said, "did you tell him?" The first officer replied, "yes sir, I already advised him." Further, at 2125:08, the captain said to the first officer, "advise him we don't have fuel." He asked again, at 2125:28, "Did you advise him that we don't have fuel?" The first officer again said, "yes sir, I already advise him...."

These intracockpit conversations indicate a total breakdown in communications by the flightcrew in its attempts to relay the situation to ATC. The accident may have been inevitable at that point, because the engines began to flame out only about 7 minutes later. However, it is obvious that the first officer failed to convey the message that the captain intended. The evidence strongly suggests that the captain was unaware, at times, of the content of the first officer's transmissions and that he did not hear or understand the ATC communications. The captain may have been preoccupied with flying the airplane and paying little attention to the first officer's ATC radio transmissions. However, the Safety Board believes it more likely that his limited command of the English language prevented him from effectively monitoring the content of the transmission. The Safety Board further believes that this deficiency might have been a factor in the accident, particularly if the captain believed that the first officer had adequately expressed the criticality of the fuel situation upon departure from CAMRN.

In summary, the Safety Board believes that the two key factors leading to this accident were the flightcrew's failure to notify ATC of their fuel situation while holding at CAMRN in order to ensure arrival at the approach fix with an adequate approach minimum fuel level and a breakdown in communications between the flightcrew and ATC, and among the flight crewmembers.

As a result of a fatal air carrier accident and an incident in which fuel exhaustion was determined to be causal, the Safety Board issued Safety Recommendation A-81-14 to the FAA on February 24, 1981. It urged the FAA to "amend 14 CFR 121 and 14 CFR 135 to require that all air carrier operators include in their flight operations manuals the minimum operational fuel requirements of their aircraft, including fuel quantities below which a landing should not be delayed....In determining minimum fuel quantities, allowances should be made for fuel quantity measuring system tolerances and for the possibility of a missed approach." The FAA did not act on this recommendation and the Safety Board classified it "Closed--Unacceptable Action."

The Safety Board believes that the circumstances of this accident, as well as other incidents involving low fuel state landings, dictate the need for a review of regulations and airplane flight manual procedures. They should include minimum fuel values for various phases of airline flights in which a landing should not be delayed and in which emergency handling by ATC should be requested. This review and resultant amendments to regulations and procedures should include the establishment of criteria for when pilots must notify ATC that the airplane has reached such a fuel state that it should be en route to its destination or alternate airport without the delay that can occur with routine handling and therefore when emergency handling is required.

Much of the flightcrew's failure to communicate effectively resulted from limitations in their ability to use the English language, and in their knowledge of standard ATC terminology. But the flightcrew also did not communicate effectively among themselves in their native language in

addressing the operational problems they encountered. Specifically, the captain did not make use of dispatch and other resources available to him and he did not demonstrate the leadership decisionmaking and management skills needed under the circumstances. Further, the first officer and flight engineer did not provide the kind of active team support to the captain that was needed under the circumstances.

Air carrier accident investigation experience over the past 20 years has indicated that most of the accidents were attributable not so much to a lack of individual technical proficiency as to shortcomings in resource management and leadership abilities by captains, and active team support by other cockpit crewmembers. This experience has led to much greater emphasis on a team approach to training airline flightcrews by many airlines.

This approach, generally known as Cockpit Resource Management (CRM) training, has gained significant support in the airline industry and among regulatory authorities. CRM training is specifically designed to improve communication and teamwork among members of flightcrews, and to foster the use of all the resources at their disposal. FAA Advisory Circular 120-51 issued on December 1, 1989, provides guidance for the development of CRM training.

A training technique related to CRM, which emerged as a logical and parallel development based on accident experience, is Line Oriented Flight Training (LOFT). LOFT is intended to facilitate the transition from flight simulator training to line flying. LOFT training involves the use of a complete crew in a realistic, real-time, no jeopardy training environment (a simulation) where the results of crewmembers' actions are allowed to occur without instructor intervention. LOFT is a well-proven method of providing practice and feedback in crew coordination and problem solving which also has gained widespread acceptance in the airline community and strong support by the FAA. The Safety Board believes that the AVA052 flightcrew's ability to perform their duties on the accident flight could have been improved significantly if they had received CRM and LOFT training as part of their initial and recurrent qualification for line operations. Therefore, the Safety Board believes that Avianca Airlines should incorporate CRM and LOFT training concepts into the training all of its flightcrews.

2.4 Flight Data Recorder (FDR)

The analysis of the final approach was made more difficult because the FDR was inoperative. The flight data recorder that was on this aircraft was an oscillographic foil flight data recorder. The FAA required that these recorders be replaced by digital flight data recorders on U.S.-registered aircraft as of May 26, 1989, because of a history of mechanical malfunctions and because of their limited recording capacity.

In May 1990, the Safety Board issued two safety recommendations to the FAA because of the Board's concerns about foreign air carriers operating with foil flight data recorders in the United States. Safety Recommendation A-90-73 recommended that the FAA audit U.S.-licensed repair stations to

ensure that the work they perform for the foreign operators is in accordance with established maintenance procedures. The FAA responded that the repair standards for foreign carriers are established by the state of registry and that the FAA has no authority to oversee work conducted for a foreign operator. The Safety Board classified this recommendation as "Closed Reconsidered."

Member states of ICAO have developed international standards for flight data recorders. These standards require that international operators install a flight recorder on the type of aircraft involved in this accident, but the standards only recommend (not require) that the flight data recorder be a digital flight data recorder. Safety Recommendation A-90-75 asked the FAA to require that foreign air carriers operating in the United States upgrade their flight recorders with digital models to adhere to the same flight recorder standards as U.S. air carriers. The FAA responded that it has no authority to require that foreign air carriers meet more than the minimum flight recorder standards as set forth by international agreement through ICAO. The Safety Board has classified this recommendation as "Open Unacceptable Response" and urges the FAA to take a more active role in ensuring upgraded international standards.

2.5 Communications--Controllers

Communications between ATC and AVA052 were routine until the flight requested information about delays into Boston while it was holding at BOSTON intersection. The reason for this inquiry was not determined; however, it is possible that the flightcrew had reviewed the weather information received from dispatch or had become aware of delays and poor weather by another source and were concerned. By this time, the flight had already held twice, for about 45 minutes, and had probably reached a fuel state that prompted the inquiry. The controller's actions regarding informing the flightcrew about delays and holding in the next ARTCC airspace were proper and in accordance with ATC directives and practices. That information should have prompted more concern on the part of the pilots; however, there is no evidence of such concern, and the flight progressed toward its destination.

After each holding of AVA052, the flight was provided with a clearance beyond the holding fix, which included a clearance limit for JFK and an EFC time. However, after holding at ORF and BOSTON, the flight was held at CAMRN. All clearances issued were in compliance with ATC directives; however, it is possible that the flightcrew was misled by the clearances. That is, they may have interpreted the EFC's as actual times that they would be cleared to continue to the destination without further delay and they elected to use the reserve fuel necessary to reach the alternate airport. The Safety Board was unable to determine if the flightcrew made this error of judgment or if there was some other reason the flightcrew continued to hold past the time that they should have requested clearance to the alternate airport.

However, at 2044:09, when the NY ARTCC controller handling AVA052 in holding at CAMRN informed the flight about the indefinite delays and revised the EFC to 2105, the flightcrew advised, "...I think we need priority, we're passing [garbled]...." The NY radar controller then inquired about how long the flight could hold and the identity of the flight's alternate airport.

The NY ARTCC radar controller acted properly by requesting this information, and the handoff controller, who was assisting the radar controller, was monitoring these calls. He heard the transmissions from AVA052 about needing priority and being able to hold for only about 5 minutes; however, he stated that he did not hear the reply to the radar controller's transmission, "...say again your alternate airport." The reply by AVA052 was, "It was Boston, but we can't do it now, we don't, we run out of fuel now."

Consequently, when the handoff controller contacted the NY TRACON about accepting the flight for JFK (or he would set him up for his alternate), he advised that AVA052 could only hold 5 more minutes. The handoff controller had not heard the last part of the flightcrew's transmission and did not mention the flight's request for "priority," or that the flight had radioed that it could not make Boston now and "...we run out of fuel now." When the NY TRACON controller accepted AVA052 for an approach to JFK, he was not aware of any fuel problems or requests for special handling. Therefore, he provided routine vectors, including the 360° turn for spacing.

The Safety Board believes that, at the time AVA052 left the holding pattern at CAMRN, the pilots assumed that they had communicated their critical fuel situation and the controllers assumed that they had accommodated AVA052's request for priority.

None of the controllers involved in the handling of AVA052 considered the request for "priority," or the comments about running out of fuel, to be significant or an emergency request by AVA052. The NY ARTCC radar and handoff controllers believed that the transmission from AVA052 about only being able to hold for 5 more minutes meant that the flight could only hold 5 minutes and would then have to divert to its alternate. Both controllers believed that the intent of the request for priority was to depart the holding pattern within 5 minutes, either for JFK or Boston, the alternate.

The Safety Board believes that the assumptions by the NY ARTCC controllers involved in handling AVA052 in holding at CAMRN were reasonable. The phrase, "...we run out of fuel now," could be interpreted as an emergency situation, and thereby could have prompted immediate actions and/or additional inquiries from the controllers. However, when considered in context, it is reasonable for the controllers to have assumed that the flight had only 5 more minutes of fuel before it needed to go to its alternate and to have assumed that when the flight was cleared from holding and cleared to JFK in the following minutes that the flight's request for "priority" had been handled.

Similarly, the first officer had advised the NY ARTCC radar controller that AVA052 could not make its alternate. However, the radar controller did not verify that the handoff controller had advised the NY TRACON controller of this information. Both of the NY ARTCC controllers believed that they had satisfied the flight's request by facilitating clearance to the destination and had no reason to advise the next facility that the flight had a fuel problem. This action did not violate any ATC requirements or procedures.

If the NY TRACON or JFK tower controllers had inquired further about the flight's fuel state after hearing the comments by the first officer about "running out of fuel," the situation might have been clarified. However, as with the previous communications, the controllers had no reason to believe that the flight was within minutes of actually running out of fuel. The transmission at 2126:36 from the TRACON controller, who was providing vectors for the second ILS approach, was a critical one. He said, "...I'm going to bring you about 15 miles northeast and then turn you back for the approach. Is that fine with you and your fuel?" The first officer replied, "I guess so, thank you very much." This transmission again failed to convey to ATC the critical fuel state of the flight.

At 2129:19, the first officer finally asked, "When can you give us a final...?" and the controller provided a vector. However, shortly thereafter, the controller advised the flight to climb to 3,000 feet, and the first officer said, "Ah, negative sir, we just running out of fuel, we okay three thousand, now we could." Even at this point, the first officer did not convey the situation clearly to ATC. The engines began to flame out less than 3 minutes later.

ATC controllers are required to clarify any confusing transmissions made by pilots that might affect the safe operation of aircraft under their control. In this case, several controllers had indications of nonroutine matters, none of which indicated an emergency situation, although such a situation did exist. Further, the pilots were certainly aware of the critical situation and apparently believed that they had communicated their desires. However, the true state of the situation was not clearly communicated and the airplane ran out of fuel.

In summary, the Safety Board concludes that the communications from ATC personnel and the handling of AVA052 were proper, considering the information that the controllers had received from the flight. Nevertheless, the Safety Board is concerned that the controllers and ATC managers interviewed after the accident did not place significance on the word "priority," as stated by AVA052, because controllers are in fact required to provide priority handling.

ATC controllers share the responsibility for safe flight operations, although the primary responsibility is for separation of aircraft in the ATC system. If the NY ARTCC controllers had inquired of the AVA052 flightcrew about the nature of the problem that prompted the request for priority, or if the priority request had been passed on to the NY TRACON

controller, the confusion that apparently existed within the cockpit might have been alleviated.

2.6 Pilot and ATC Communications--General

In public hearing testimony, one foreign airline captain referred to non-U.S. airline pilots with "200-word vocabularies" flying into the United States. He may have been exaggerating for emphasis, but his point is well taken. If a pilot, or flightcrew, has a limited English language vocabulary, he has to rely heavily on the meaning of the words he does know. If those words have a vague meaning, such as the word "priority," or if a clear set of terms and words are not used by pilots and controllers, confusion can occur as it did in this accident.

The word "priority" was used in procedures' manuals provided by the Boeing Company to the airlines. A captain from Avianca Airlines testified that the use by the first officer of the word "priority," rather than "emergency," may have resulted from training at Boeing. The captain also testified that airline personnel, who provided flight and ground instruction to the first officer of AVA052, were trained by Boeing. He stated that these personnel received the impression from the training that the words priority and emergency conveyed the same meaning to air traffic control. Boeing Bulletins 80-1 and 80-1 (Revised), addressing operations with low fuel quantity indications, state that, "during any operation with very low fuel quantity, priority handling from ATC should be requested."

Also, in its published procedures, Avianca Airlines uses the term "priority" regarding the communication of low fuel status. However, when ATC controllers were asked the phraseology that they would respond to immediately when a flightcrew indicated a low fuel emergency, they replied "MAYDAY," "PAN, PAN, PAN," and "Emergency." The controllers stated that, although they would do their utmost to assist a flight that requested "priority," the word would not require a specific response and that if a pilot is in a low fuel emergency and needs emergency handling, he should use the word "emergency." However, the fact that the NY ARTCC controllers reacted to facilitate the departure of AVA052 from holding at CAMRN, after the request for priority, suggests that some level of urgency or nonroutine status was perceived by the controllers.

The question was also raised during the investigation about whether pilots might use such words as "priority," when they really needed emergency assistance because of concern about receiving a flight violation or having to write a report to the FAA after landing. The FAA officials stated that there may be questions asked of a pilot who declared such an emergency, and a written report of the circumstances is required. However, they also said that there would not be unwarranted actions against any pilot who had declared an emergency and that if a pilot has an emergency, he or she is encouraged to declare it.

Despite controllers statements that the word "priority" does not require them to provide emergency responses, the word does have a definition in the ATC system. "Priority" is defined in the ATC Handbook as

"precedence, established by order of urgency or importance." In this accident, the NY ARTCC radar controller stated that he felt he had complied with the flightcrew's request for "priority," since the crew said they could do only 5 more minutes in holding. Following a land-line call between the handoff controller and NY TRACON, the flight was cleared out of holding, "to the Kennedy Airport," in less than a minute.

Although the flightcrew did not declare an emergency at this point, they did report not having enough fuel to reach their alternate. Further, the next words the flightcrew heard from the controller were, "...just stand by," then "...cleared to the Kennedy Airport..." the perception of the flightcrew would most likely be that the controllers understood their fuel condition. However, the flight received only routine handling from the controllers for the next 30 minutes. At some point, the flightcrew should have raised the issue again. Even on a busy frequency, an inquiry of the subsequent controller, such as, "Did you receive our low fuel call to NY Center, we said that we no longer have enough fuel to make it to our alternate?" or "we are declaring an emergency," would have been more than appropriate for ensuring immediate sequencing to the ILS approach.

Foreign, as well as U.S. pilots can, and often do, routinely ask for clarification of instructions, even when the radio frequencies are busy, as on the night of the accident. It is therefore necessary that the few terms used by pilots and controllers to convey emergency or other critical information be precise and understandable. The Safety Board believes that the FAA should work with the International Civil Aviation Organization (ICAO) to develop a standardized glossary of terms and words with clear definitions to be disseminated to the international airline industry. For example, if "emergency low fuel" were defined to mean that 20 minutes remain until tanks are dry, and pilots and controllers understand that language, there should be less tendency to try to convey the situation with less precise information, such as "we need priority, please," when a true emergency exists.

As a result of the evidence collected by the Safety Board early in the investigation, on February 21, 1990, it issued a letter to the FAA Administrator recommending:

Immediately notify all domestic and foreign air carriers to emphasize that all pilots operating commercial air transport flights in the United States (U.S.) National Airspace System (NAS) must be thoroughly knowledgeable of the flight operating and air traffic control (ATC) rules and procedures, including standard phraseology, for operating in the U.S. NAS. (Class I, Urgent Action) (A-90-9)

This information is included in several publications: Part I of Annex 6 to the Convention on International Civil Aviation, the U.S. Federal Aviation Regulations, the Air Carrier's Operational Specifications issued by the Administrator of the FAA, the U.S. Aeronautical Information Publication, the U.S. Airman's Information Manual, Notices to Airmen, Advisory Circulars, and the U.S. Air Traffic Control Handbook (7110.65F). Pilots must be particularly familiar with their duties and responsibilities affecting flight

operations and safety which include: fuel supply, emergency conditions, requests for assistance, declaring a state of minimum fuel, and declaring an emergency for additional ATC assistance to ensure a safe landing.

Immediately disseminate the contents of this safety recommendation letter (A-90-9 through -11) to all air carrier operators involved in commercial air transport operations in the United States National Airspace System. (Class I, Urgent Action) (A-90-10)

Immediately issue a General Notice (GENOT) directing management of all air traffic control (ATC) facilities to formally brief all air traffic controllers on the circumstances of the January 25, 1990, accident of Avianca Airlines flight 052 and to emphasize the need to request from flightcrews clarification of unclear or ambiguous transmissions that convey a possible emergency situation or the need for additional ATC assistance. (Class I, Urgent Action) (A-90-11)

On April 12, 1990, the FAA Administrator responded to safety recommendations A-90-9 through -11. Regarding recommendations A-90-9 and -10, the FAA issued Action Notice 8430.33, notifying all principal operations inspectors to advise all domestic and foreign carriers to emphasize the need for pilots to be thoroughly knowledgeable of the flight operating procedures and pertinent air traffic rules and procedures. The Action Notice transmitted a copy of the Safety Board's safety recommendation letter to the inspectors. The FAA also incorporated the contents of the action notice in FAA Order 8430.17, Air Carrier Operations Bulletins. As a result of these actions, and based on a review of the actions taken by the FAA, on June 22, 1990, the Safety Board classified A-90-9 and -10 "Closed--Acceptable Action."

Regarding A-90-11, the FAA issued a GENOT requiring all ATC facility managers to ensure that all ATC facility personnel were briefed on the contents of the Safety Board's safety recommendations resulting from the AVA052 accident. The GENOT also emphasized the need for complete and thorough communications between controllers and pilots. Based on those actions, on June 22, 1990, the Safety Board classified A-90-11, "Closed Acceptable Action."

In spite of these corrective actions, the Safety Board believes that there is a need for the FAA to review all official definitions of words and phrases used to describe minimum and emergency fuel. The Safety Board believes that the FAA should also coordinate any review of this subject with ICAO to ensure that the FAA's ATC phraseology is consistent with the Standards and Recommended Practices of ICAO. The evidence gathered by the Safety Board during its investigation of the Avianca accident suggests that the FAA ATC phraseology is not always understood by foreign pilots.

The Safety Board believes that a number of terms that are clearly understood by both pilots and controllers should be developed and disseminated worldwide to help prevent another accident similar to AVA052.

The Safety Board's examination of other "minimum fuel" incidents involving both U.S. and foreign airlines suggests that language confusion and imprecise understanding of critical words exist that could lead to another accident.

2.7 Flightcrew Performance--The ILS Approach

If the flightcrew of AVA052 had been able to complete the first ILS approach and land successfully, the accident would not have occurred. Moreover, the critical fuel state of the airplane at the time of landing would only have been known by the flightcrew and perhaps later by the Avianca flight dispatcher. The Safety Board examined the performance of the flightcrew and the possible factors that affected their ability to complete the approach.

The observations of other pilots, the prevailing meteorological conditions, and the examination of ATC radar data confirm that significant and variable winds were encountered by AVA052 during the ILS approach. The airplane was flying into a headwind that was generally aligned with the runway and approach course; however, the wind speed was 60 knots or more at 1,000 feet, about 50 knots at 500 feet and about 20 knots at the surface. Under such conditions, as the airplane descends, it experiences a decreasing headwind shear that must be recognized and compensated for by the pilot.

The abnormally high headwind at final approach fix altitude results in a lower groundspeed than the pilot normally encounters when intercepting the glideslope. In addition, the airplane's rate of descent to maintain the 3° inertial flightpath will be substantially less than normal. To establish the airplane on the glideslope, the pilot must use greater-than-normal thrust and a higher-than-normal pitch attitude. Once established on the glideslope, continual adjustments in thrust and pitch attitude will be necessary to compensate for the decreasing headwinds as the airplane descends. Ideally, the thrust and pitch attitude at any instant should be that required to accelerate the airplane at a rate equal to the rate of change of the longitudinal wind component while also changing the rate of descent to stay on the glideslope as groundspeed increases. While a successful approach was within the airplane's capability under the existing conditions, as evidenced by the performance of other flightcrews, the approach did present some challenges to the crew of AVA052.

It appears that the pilot of AVA052 failed to recognize the high headwind condition when the airplane approached the glideslope from below. In addition, the captain called for 40° of flaps at 2119:21, as referenced on page 9 of this report; at 2120:17, he called for 50° of flaps, also referenced on page 9. The operations manual prohibits the use of 40° or 50° of flaps with the engine "hush kits" installed. Although the increasingly critical fuel situation is much more important here than noise abatement considerations, compliance with the 40° to 50° flap prohibition would have provided the flight with the benefit of decreasing drag and would therefore have helped to conserve fuel. During interception of the glideslope, the captain adjusted thrust and pitch attitude to establish a rate of descent that would have been normal for a light or no headwind condition. As a result, the airplane immediately descended below the glideslope as indicated

by the radar data and flightcrew comments. It is also apparent that the captain permitted a significant deviation, (nearly a full glideslope deviation indicator deflection) to occur before he initiated a positive response to regain the glideslope. Subsequently, the data show that the pilot was "chasing" the glideslope with progressively greater-than-required changes in pitch attitude and/or thrust; as a result, a stabilized descent was never established.

As AVA052 descended to about 600 feet, about 2 nmi from the runway, it again descended below the glideslope and had a full below glideslope deviation indication. The captain again responded with a rapid climb above the glideslope, at which point he permitted another rapid descent to develop from which he had difficulty recovering. As a result, the airplane was well below the glideslope when the captain initiated the missed approach.

It is also notable that a windshear created by a vertical wind gradient (winds that change as a function of altitude) affects the airplane more severely as the rate of change in altitude is increased. Thus, when the significant rate of descent was permitted to develop, the airplane encountered a greater windshear and recovery became more difficult.

While the windshear conditions are a factor in the poorly flown ILS approach, the reported windshear by itself did not fully explain the poorly flown approach. Other factors, both psychological and physiological help to explain not only the crew's performance on the approach, but their lack of anticipation of the windshear or any discussion of their need to land on the first approach as a result of fuel state.

Aircraft maintenance records indicate recurrent problems with the autopilot, including the altitude hold function. Additionally, the captain who flew the aircraft just prior to the accident had problems with the flight director in the approach mode. These factors, as well as the approach itself, lead the Safety Board to believe that the aircraft might have been flown manually from Medellin to JFK and that the ILS approach was flown using the raw data (deviation from glideslope) without the aid of a flight director.

The hours of manual flying combined with the ever increasing criticality of the crew's situation are consistent with increasing fatigue and adverse stress reactions. This situation is most evident in the captain's decreasing ability to timeshare multiple tasks. The captain, with limited English language skills, was dependent on the nonflying copilot to communicate with ATC. During the initial radar vectoring from CAMRN intersection, the captain followed the copilot's ATC instructions and on occasion responded to ATC instructions without translation to Spanish. However, from the time that the airplane was on the final vector to the localizer until the missed approach, there were nine distinct incidents of the captain asking for instructions to be repeated or for confirmation of the airplane's configuration. Additionally, the captain asked the copilot to speak louder. These events are all signs of fatigue and adverse stress.

Laboratory experiments using flight simulators in which the pilot executes an ILS approach with simultaneous communication tasks exhibit the same type of results. Performance on communication tasks degrades significantly with increasing flight difficulty, and performance on glideslope tracking decreases at high levels of stress.

These stress conditions are evident not only in the flightcrew's performance on the ILS approach but in their failure to consider that they could not allow a missed approach. Moreover, when they did have a missed approach, they did not take control of their situation and request the shortest path back to the airport.

The Safety Board thus concludes that the flightcrew's performance--their inability to maintain a position on the glideslope--was attributable to a combination of the windshear condition, fatigue resulting from a long flight, possibly flown without the benefit of an operable autopilot, and stress aggravated by their concern about the remaining fuel.

2.8 Central Flow Control Facility (CFCF)--Traffic Management

The ground delay program for the JFK airport was negotiated and implemented based upon the assumption that runway 13L would be the arrival runway during the afternoon and evening shift on January 25, 1990. The weather forecast for the time period that the program was needed, 1900Z until 0300Z, indicated that there would be strong southeast winds at the surface requiring the use of runway 13 left as the only arrival runway.

Early in the morning, the day shift supervisor at the CFCF had several discussions with the NY TRACON specialist (N90) at the Traffic Management Unit (TMU). During the discussions in which the airport acceptance rate (AAR) was being negotiated, the N90 TMU specialist believed the AAR should be set at approximately 28 arrivals per hour. The CFCF supervisor asked the specialist if it would be possible to land 30 to 32 airplanes per hour. The N90 specialist then referenced the engineered performance standards (EPS) and advised the CFCF supervisor that the EPS reflected an arrival rate of 26 airplanes per hour for runway 13 left under the forecast weather conditions.

After the program had been developed, the CFCF supervisor called the N90 specialist to inform him that the program rate had been set at 33 arrivals per hour. The N90 specialist who took the call was not the same individual who had the earlier discussion with the supervisor. The supervisor explained to the specialist that the program had been "built" at an arrival rate of 33 arrival airplanes per hour and stated, "figuring in the disruption with the rest of the system and one or two guys quitting, I feel that's a fair ground delay...but I want your blessings also." The supervisor explained that building the program at a lower rate would cause excessively high ground delays and that if the ground delays went as high as three hours, they would not be acceptable. The N90 specialist stated, "well why don't you go with it." The supervisor informed Safety Board investigators that even though the program was set at a 33 computer rate, the objective was to achieve a 28 airport acceptance rate as the N90 specialist had asked for.

The specialist who actually "built" the program informed Safety Board investigators that his understanding was that the computer rate and the airport acceptance rate were to be the same, 33 arrivals per hour, and this is the number he entered onto the program worksheet. He briefed his relief, the afternoon specialist, that the airport acceptance rate was to be 33. He was also under the impression that the program had been computed based upon the use of runways 22 left and 22 right at the JFK airport, and he was never aware that the program was based upon the use of runway 13 left. The JFK ground delay program was transmitted successfully to all domestic ARTCC's at approximately 1525Z.

Copies of the engineered performance standards for the JFK airport were provided to Safety Board investigators. According to the EPS for runway 13 left, the highest number of arrivals that can be accommodated on that runway during instrument meteorological conditions (IFR) is 24 airplanes. The highest number of arrivals that can be accommodated on runway 22 left during IFR conditions is 23 airplanes. The specialists and supervisors from CFCF informed Safety Board investigators that the EPS figures are not necessarily the figures that the CFCF would use when determining the need for or the computing of a ground delay program. They stated that it is the terminal facility that actually determines the airport acceptance rate and that rate is normally higher than the designated EPS number. The Assistant Manager for Traffic Management at the CFCF informed Safety Board investigators that the 33 rate for runway 13 left was a little high in itself but was based upon the assumption that the high number of programs in place and the number of cancelled flights that were expected on January 25 would make the 33 rate acceptable. He also stated that a 33 rate for runway 22 left was an excellent rate.

Although the cause of this accident clearly involved the inadequate actions of the flightcrew of AVA052, the weather and air traffic conditions at JFK during the hours before the accident set the stage for the delays that led to the holding of the flight for more than 1 hour en route. The normal high density of traffic in the New York area was made worse by the prevailing weather during the day. The FAA CFCF had a program in place beginning at 1400 to attempt to prevent problems, including excessive airborne holding. However, this program failed for several reasons.

The investigation revealed that the traffic management program in effect for JFK did allow for the arrival of sufficient numbers of airplanes to accomplish an airport acceptance rate of 33 arrivals per hour (except during the first hour of the program when only 17 airplanes landed) at which the program was set. However, the program was compromised when the weather deteriorated to less than that needed for aircraft to land on runway 22 right, and missed approaches began on runway 22 left.

Although the program was still allowing 33 airplanes per hour into the system for JFK, CFCF personnel did not react appropriately or timely enough to prevent the large numbers of airplanes that ended up in holding patterns waiting for the weather conditions to improve. When CFCF did react by implementing a ground stop for traffic destined for JFK, the action was not sufficient to abate the airborne holding which had already begun.

Many of the flights inbound to the JFK airport had departed from overseas or other long distance airports. When it first became necessary to implement the ground stop for JFK arrivals, most of the long distance traffic was already airborne and a ground stop, therefore, was not effective for those flights. However, a review of the data from CFCF revealed that at 1600, when runway 22 right was already below minimums and the missed approaches had already begun on runway 22 left, there were approximately 38 airplanes from the ZDC and ZNY centers that had not departed for JFK. Nationwide, there were still more than 100 airplanes scheduled to depart for JFK from domestic airports.

A ground stop implemented at 1600 and remaining in effect for a sufficient number of hours would have impacted the overall air traffic system to a considerable degree, but it would not have been effective in alleviating the large inventory of airborne flights waiting to land at JFK. The Safety Board, therefore, believes that CFCF did not implement a ground stop for traffic landing at JFK in time to prevent the excessive airborne holding that occurred on the evening of the accident. After the ground stop was implemented, it was not of sufficient duration nor did it include a sufficient number of centers to be effective in alleviating the airborne holding that was occurring.

The investigation also revealed that National Weather Service (NWS) personnel working in the Weather Service Units at CFCF and ZNY did not inform traffic management personnel of the severe wind conditions that affected the controller's ability to provide appropriate separation in the approach control airspace of the Kennedy sector during the evening shift on January 25. These winds, as well as the deteriorating weather conditions, were causing the missed approaches.

Traffic management personnel informed the Safety Board that if they had known about the wind conditions, the program could have been implemented at a lower airport acceptance rate, thereby reducing the airborne inventory of airplanes arriving at JFK during each hour of the traffic management program. If CFCF had known about the wind conditions, they would have adjusted the number of aircraft. The Safety Board believes that the NWS personnel failed to communicate this information to the CFCF traffic management specialists.

The JFK program was implemented based upon forecast weather conditions that should have permitted the continuous use of the ILS approach to runway 22 left and the use of runway 22 right for arrivals until 2000. The visibility was expected to deteriorate to 1/2 mile. In fact, the visibility was 1/4 mile as early as 1600. The minimum prevailing visibility required for the ILS approach to runway 22 right is 3/4 mile, and for runway 22 left, 1/2 mile. If approaches had continued on both runways until 2000, the airborne inventory of airplanes might have been much smaller.

The Safety Board believes that the forecast was inaccurate and that the traffic management program was implemented based upon a forecast of better weather conditions than those that actually existed. The Safety Board

also believes that if the forecast had been accurate the program would have been implemented at a lower airport acceptance rate and that the inventory of airplanes in holding patterns could have been much lower.

The Safety Board believes that the traffic management efforts of the CFCF personnel were neither accurate nor timely for traffic into and out of JFK. The Safety Board believes that both of these situations contributed to the events that led to this accident; however, these events cannot be linked directly to the cause of the accident. This conclusion is based on the fact that the flightcrew had several opportunities to prevent the accident.

2.9 Survivability

According to the lead flight attendant, seated in 2C, who survived with serious injuries, there was no warning to the cabin from the cockpit crew regarding the low fuel status, loss of engines, or the impending emergency landing. Therefore, passengers were not briefed on brace positions, other than during the pretakeoff briefing, and on evacuation procedures. However, after the failure of all four engines and generators, the ability of the cockpit to communicate with the cabin on the PA system would have terminated. If the cabin crewmembers and passengers had assumed the brace position before the impact, the severity of some of the injuries might have been reduced.

Seventy-two of the 74 passengers who survived sustained serious injuries. These injuries consisted of multiple lower leg fractures and dislocations, head injuries, hip fractures, spinal fractures, and multiple lacerations and contusions. The legs of passengers probably impacted the lower seat back frames of seat units in front of them. Simultaneously, passenger seats most likely collapsed and twisted downward and to the left, resulting in hip and spinal fractures. As the impact sequence progressed, separation of the seat units from their floor attachments probably pushed passengers forward into other passengers, seat units, and other wreckage debris, causing head injuries and lacerations.

Two of the 10 surviving infants sustained minor injuries, consisting of multiple contusions and abrasions and eight sustained serious injuries, consisting of limb fractures and head injuries. The 10 infants were either held by adult passengers or were belted into the same seat with the passengers. Surviving passengers who held infants reported that during the impact the infants were ejected from their grasp and that they were generally unable to locate them in the darkness after the impact.

The Safety Board believes that the problems experienced in this and other accidents illustrate the impossibility of parents holding onto infants during a crash. If the infants had occupied FAA-approved restraint systems, injuries would most likely not have been as severe.

The Safety Board addressed the subject of infant restraints in safety recommendations issued on May 30, 1990. They were:

Revise 14 CFR 91, 121, and 135 to require that all occupants be restrained during takeoff, landing, and turbulent conditions, and that all infants and small children below the weight of 40 pounds and under the height of 40 inches be restrained in an approved child restraint system appropriate to their height and weight. (Class I, Priority Action) (A-90-78)

Conduct research to determine the adequacy of aircraft seatbelts to restrain children too large to use child safety seats and to develop some suitable means of providing adequate restraint for such children. (Class II, Priority Action) (A-90-79)

The FAA Administrator responded to the recommendations on August 6, 1990. Regarding A-90-78, the FAA issued a Notice of Proposed Rulemaking (NPRM) on February 22, 1990, for child restraint system provisions. The Safety Board found the provisions in the NPRM unacceptable because they did not require the use of an approved restraint system. Rather, the provisions would merely prohibit airlines from denying their use. Consequently, the Safety Board has classified A-90-78 as "Open--Unacceptable Action."

The FAA responded to recommendation A-90-79 that it has no research planned to examine adequate restraint systems for children who are too large to use child safety seats. Consequently, the Safety Board has classified this recommendation as "Open--Unacceptable Action."

It could not be determined where all the passengers were seated at the time of impact, because the airline only assigned seats to a small percentage of passengers. Those passengers who had assigned seats stated that many of them had moved freely about the cabin to sit with family and friends. Therefore, passenger seat locations in relation to an individual injury diagram could not be developed with certainty in all cases.

The captain, first officer, and flight engineer died from blunt force head and upper torso trauma. The captain and first officer seats had no shoulder harnesses installed. On March 6, 1980, the FAA required all cockpit seats to be equipped with combined seatbelts and shoulder harnesses; however, ICAO standards do not address these restraint systems.

The right side of the cockpit struck a 42-inch-diameter oak tree that penetrated the space occupied by the first officer and the flight engineer, causing nonsurvivable injuries.

Five of the six flight attendants were fatally injured as a result of blunt force injuries to the head, chest, abdomen, and limbs. Three of the five flight attendants' locations could be established based on the statement of the surviving flight attendant. One was seated in the L-1 jumpseat, the second was in passenger seat 2A, and the third was in passenger seat 3C.

Sixty-four adult passengers and one 4-month old infant died as a result of blunt force injuries. It is possible that some of the injuries could have been reduced, permitting some of these passengers to survive, if they had been instructed to assume the brace position before impact.

Although there was no fire, it should be noted that the cushions on the passenger seats were refurbished in March 1987, 9 months before the FAA regulation became effective requiring seat cushions to have fire-blocking material. ICAO Annex 8 recommends the fire-blocking material.

Cabin floor proximity emergency escape path lights were not installed. These lights were required by the FAA in 1988 and ICAO Annex 8 recommends installation of such lights. These lights might have been useful during the rescue operation. The rescuers remarked that the fractured seats and debris found in the dark cabin made their job more difficult.

The L-1 and R-1 emergency evacuation slides had no girt bars installed and the R-1 door had no girt bar floor fittings installed. No girt bars were found in the wreckage. Such hardware is required by the FAA and recommended by ICAO Annex 8. Although the six inoperable evacuation slides were not required in this accident, these deficiencies would have been a major factor in an emergency where the use of evacuation slides would be necessary.

2.9.1 Emergency Response

Aircraft rescue and fire fighting (ARFF) vehicles from JFK were not dispatched to the accident site in the town of Cove Neck, Long Island, because of the numerous local law enforcement and rescue vehicles available near the accident site. The local response was timely and effective.

During the rescue effort, approximately 91 ambulances, heavy rescue vehicles, off-road vehicles and fire trucks of varying sizes responded. Vehicles came from 37 fire and rescue companies. Access to the impact site created a bottleneck of traffic on a single, narrow blacktopped residential road. Considerable congestion resulted as agencies tried to enter the road to assist and as other agencies tried to exit to transport survivors to local hospitals. The Nassau County Police Department dispatched helicopters, which evacuated many of the injured. This department was of considerable help during the investigation. Such help included an analysis of the department's emergency response to the accident. Overall, the emergency response and rescue was exceptional under the difficult circumstances of darkness and the wreckage location.

3. CONCLUSIONS

3.1 Findings

1. The accident occurred when the airplane's engines lost power as a result of fuel exhaustion while the flight was maneuvering for a second instrument approach to JFK airport.
2. Examination of the airplane revealed no malfunction of the engines or fuel system components that could have caused a premature fuel exhaustion.
3. The flightcrew was not provided with, and they did not request before departure, the most current weather forecast available for the destination and selected alternate airport.
4. The alternate airport selected for the flight at the time of departure did not meet the prescribed weather criteria for an alternate based on weather information provided to the crew at the time of departure. The weather conditions worsened at both the destination and alternate while the flight was en route.
5. The flight plan of AVA052 did not reflect the most current upper air data or the actual gross weight of the airplane upon departure from Medellin.
6. The flightcrew had received appropriate flight and ground training for the flight, and they possessed appropriate flight and medical certification required by the Government of Colombia.
7. The flightcrew was experienced in conducting B-707 flights from Colombia to the United States.
8. There was no flight following or interaction with the Avianca Airlines dispatcher for AVA052 following takeoff from Medellin. None was required by the airline's operations specifications issued by the FAA under 14 CFR 129 to operate into the United States.
9. There is no record that while en route the flightcrew requested updated weather information from any source regarding the destination or alternate airport.
10. The flightcrew did not adequately communicate its increasingly critical fuel situation to the controllers who handled the flight.
11. The first officer, who made all recorded transmissions to U.S. controllers, was sufficiently proficient in English to be understood by air traffic control personnel.

12. The first officer incorrectly assumed that his request for priority handling by air traffic control had been understood as a request for emergency handling. The captain experienced difficulties in monitoring communications between the flight and air traffic control.
13. The controllers' actions in response to AVA052's requests were proper and responsive to a request for priority handling. They did not understand that an emergency situation existed.
14. The first officer, who made all recorded radio transmissions in English, never used the word "Emergency," even when he radioed that two engines had flamed out, and he did not use the appropriate phraseology published in United States aeronautical publications to communicate to air traffic control the flight's minimum fuel status.
15. The weather conditions at the JFK Airport were worse than forecast.
16. The captain did not fly the ILS approach in a stabilized manner, which led to a serious deviation below the glideslope and to his initiation of a go-around.
17. A windshear on the approach path contributed to the captain's poor performance on the ILS approach. Although other flights successfully completed the approach through the same wind conditions, the captain's performance on the approach was probably degraded by fatigue after the long flight and by his reliance on raw glideslope position data rather than on autopilot or flight director guidance.
18. The Federal Aviation Administration traffic management programs failed to manage the traffic volume at JFK effectively, leading to excessive delays and airborne holdings, including more than 1 hour for AVA052.
19. The Federal Aviation Administration's traffic management programs for JFK did not adequately account for overseas arrivals and missed approaches at JFK.
20. Cabin crewmembers and passengers were not warned of the impending crash landing, which may have contributed to the severity of the injuries sustained.
21. The serious and fatal injuries were the result of blunt force trauma because of high vertical and longitudinal deceleration forces during the impact sequence.

22. The emergency evacuation slides were inoperative because of the lack of slide girt bars and associated attachment hardware.
23. There were no shoulder harnesses or inertia reels installed on captain's and first officer's seats.
24. The response of fire and rescue personnel was timely and effective, and the use of helicopters by the Nassau County Police Department probably saved lives.

3.2 Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the flightcrew to adequately manage the airplane's fuel load, and their failure to communicate an emergency fuel situation to air traffic control before fuel exhaustion occurred. Contributing to the accident was the flightcrew's failure to use an airline operational control dispatch system to assist them during the international flight into a high-density airport in poor weather. Also contributing to the accident was inadequate traffic flow management by the FAA and the lack of standardized understandable terminology for pilots and controllers for minimum and emergency fuel states.

The Safety Board also determines that windshear, crew fatigue and stress were factors that led to the unsuccessful completion of the first approach and thus contributed to the accident.

4. RECOMMENDATIONS

As a result of this accident, the National Transportation Safety Board makes the following recommendations:

--to the Federal Aviation Administration:

Develop in cooperation with the International Civil Aviation Organization a standardized glossary of definitions, terms, words, and phrases to be used that are clearly understandable to both pilots and air traffic controllers regarding minimum and emergency fuel communications. (Class II, Priority Action) (A-91-33)

Conduct a comprehensive study of the Central Flow Control Facility and the Traffic Management System, by the Office of Safety/Quality Assurance, to determine the effectiveness and appropriateness of training, responsibilities, procedures, and methods of application for the Traffic Management System. (Class II, Priority Action) (A-91-34)

Require that transport category airplane flight manuals include procedures specifying minimum fuel values for various phases of airline flights at which a landing should not be delayed and when emergency handling by ATC should be requested. The manual requirement and associated amendments to regulations and procedures should include criteria for when ATC must be notified that the airplane must be en route to its destination or alternate airport via routine handling, and when emergency handling is required. (Class II, Priority Action) (A-91-35)

Incorporate into air route traffic control centers equipment to provide a recorded broadcast of traffic management information that can be monitored by all aircraft within each center's boundaries to provide pilots with early indications of potential delays enroute. (Class II, Priority Action) (A-91-36)

--to the Director, Administration Aviation Civil (DAAC), Colombia:

Review policies, procedures, training, and oversight activity to ensure that adequate emphasis is being placed on the dual responsibility that flight dispatchers and flightcrews have in keeping each other informed of events and situations that differ from those mutually agreed upon in the dispatch release. (Class II, Priority Action) (A-91-37)

Require that Avianca Airlines incorporate Cockpit Resource Management and Line Oriented Flight Training concepts into its flightcrew training program. (Class II, Priority Action) (A-91-38)

On February 21, 1990, the following Safety Recommendations were issued to the Federal Aviation Administration:

A-90-9

Immediately notify all domestic and foreign air carriers to emphasize that all pilots operating commercial air transport flights in the U.S. National Airspace System must be thoroughly knowledgeable of the flight operating and air traffic control rules and procedures, including standard phraseology, for operating in the U.S. NAS.

A-90-10

Immediately disseminate the contents of the recommendation to all air carrier operators involved in commercial air transport operations in the U.S. NAS.

A-90-11

Immediately issue a General Notice directing management of all air traffic control facilities to formally brief all air traffic controllers on the circumstances of the accident, and emphasize the need to request from flightcrews clarification of unclear or ambiguous transmissions that convey a possible emergency situation or need for additional ATC assistance.

On June 22, 1990, the Safety Board Classified Safety Recommendations A-90-9 through -11 as "Closed--Acceptable Action."

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ James L. Kolstad
Chairman

/s/ Susan Coughlin
Vice Chairman

/s/ Jim Burnett
Member

/s/ John K. Lauber
Member

/s/ Christopher A. Hart
Member

Jim Burnett, Member, filed the following dissenting statement:

Although I support the probable cause and recommendations as adopted, I have voted against the adoption of this report because it fails to adequately deal with the role of the air traffic control (ATC) services in this accident scenario.

Air traffic control services were inadequate in four respects.

1. The Washington ARTCC R50 controller failed to inform the flightcrew of AVA052 of additional holding in the Washington ARTCC area.
2. The JFK tower local controller failed to transmit the RVR and the latest windshear report to the flightcrew of AVA052.
3. The JFK tower local controller failed to forward to the N90 FV controller the remark by the flightcrew concerning their fuel situation.

4. The Controller-in-Charge in the JFK tower failed to ensure that the ATIS contained the pilot reports of windshear as required.

While I can accept the argument that such unsatisfactory service was not causal to this accident, this pattern of substandard service reflects poorly on the ATC system and raises serious safety concerns.

Although the reasons for this pattern of substandard service have not been developed in the report, I suspect that it has little to do, in this case, with the experience level of the controllers and a great deal to do with controller workload under the weather conditions and with the fact that the Federal Aviation Administration flow control intentionally allowed a greater flow of traffic, bound for JFK, into the system than could be safely and efficiently accommodated by the system.

/s/ Jim Burnett
Member.

Christopher Hart, Member, filed the following partial concurring/dissenting statement:

I concur in part with the probable cause as adopted, but I dissent in part because I do not agree that a contributing factor is "the lack of standardized understandable terminology for pilots and controllers for minimum and emergency fuel states." We do have standardized understandable terminology -- "Mayday" internationally, and "Emergency" in English -- that would have adequately communicated the existence of a dangerous situation, and the problem was that the pilots failed to use this terminology with the controllers.

/s/ Christopher Hart
Member

The DAAC of the Government of Colombia provided comments on the report and probable cause in accordance with the provisions of Annex 13 to the International Convention on Civil Aviation. These comments in both English and Spanish are attached as appendix F.

April 30, 1991

5. APPENDIXES**APPENDIX A****INVESTIGATION AND HEARING****1. Investigation**

The National Transportation Safety Board was notified of the accident involving Avianca Airlines flight 052 at about 2230, January 25, 1990. The "Go Team" assembled immediately at Federal Aviation Administration jet transport at National Airport, near Washington, D.C., and launched for New York's LaGuardia Airport. The team arrived at the site of the accident at 0900, January 26, 1990. Investigative groups were formed, each headed by an investigator from the Safety Board. The following groups were formed: Operations, Air Traffic Control, Weather, Survival Factors, Airplane Structures, Powerplants, Airplane Systems, Maintenance Records, and Airplane Performance. In addition, a group was formed at Safety Board Headquarters, in Washington, D.C., to examine and read out any information on the cockpit voice recorder and flight data recorder.

The following were made parties to the investigation: Federal Aviation Administration, Avianca Airlines, International Air Line Pilots Association, the Boeing Commercial Airplane Company, NATCA, and Pratt & Whitney. The DAAC of Colombia appointed an Accredited Representative to participate in the investigation.

APPENDIX B
CVR TRANSCRIPT

TRANSCRIPT OF A COLLINS MODEL 642C-1 COCKPIT VOICE RECORDER S/N 808 REMOVED FROM A AVIANCA INTERNATIONAL AIRLINES BOEING 707-321B, HK2016 WHICH WAS INVOLVED IN A ACCIDENT ON JANUARY 20, 1990 AT COVE NECK, NEW YORK.

CAM Cockpit area microphone voice or sound source
RDO Radio transmission from accident aircraft
-1 Voice identified as Captain
-2 Voice identified as First Officer
-3 Voice identified as Second Officer
-? Voice unidentified
* Unintelligible word
@ Nonpertinent word
Expletive deleted
% Break in continuity
() Questionable text
(()) Editorial insertion
- Pause
GPWS Ground Proximity Warning System
APP New York Camrn Approach Controller
APP1 New York Kennedy Final Vector Controller
TWR New York Kennedy Local Controller (Tower)

(cont.)

PAA1812 Pan American flight 1812
PAA11 Pan American flight 11
PAA474 Pan American flight 474
AAL40 American Airlines flight 40
AAL692 American Airlines flight 692
AVE520 Avensa Airlines flight 520
USA117 USAir flight 117
TWA801 Trans World Airlines flight 801
TWA542 Trans World Airlines flight 542
ELA102 Evergreen International Airlines flight 102

NOTE: All times are expressed in Eastern Standard Time. From time 2053:09 to 2115:19 only those radio transmissions to or from the accident aircraft were transcribed. After 2115:19 until the end of the recording all radio transmissions are included.

INTRA-COCKPIT ENGLISH

TIME & SOURCE CONTENT

2053:09
((start of recording))

INTRA-COCKPIT SPANISH

TIME & SOURCE CONTENT

2054:32
CAM-2 zero nine zero on the heading CAM-2 cero nueve cero en el rumbo

AIR-GROUND COMMUNICATIONS

TIME & SOURCE CONTENT

2054:23
APP Avianca zero five two turn right heading zero nine zero

2054:25
RD0-2 turning right heading zero nine zero Avianca zero five two

2054:40
APP Avianca zero five two turn right right turn heading two two zero I'm gonna have to spin you sir

2054:45
RD0-2 okay heading two two zero avianca zero five two

2054:49
CAM-1 two twenty CAM-1 dos veinte

2054:50
CAM-2 two twenty CAM-2 dos veinte

2055:07
CAM-1 how much CAM-1 cuanto

CAM-2 two twenty CAM-2 dos veinte

2055:08
CAM-1 two twenty CAM-1 dos veinte

2055:09
CAM-2 two twenty sir CAM-2 dos veinte si senior

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2055:59

CAM-1 no contact--okay we have it

2056:05

CAM-3 *

2056:07

CAM-1 six thousand

2056:13

CAM-1 two twenty no

2056:14

CAM-2 two twenty

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

CAM-1 no contact--ah si ahi esta

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2055:54

APP Avianca zero five two traffic in your turn twelve thirty five miles eastbound at six thousand

2056:00

R00-2 Avianca we have the traffic in sight thank you

2056:16

APP Avianca zero five two I have a wind shear for you ah at fifteen a increase of ten knots at fifteen hundred feet and then an increase of ten knots at five hundred feet reported by seven twenty seven

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2056:28

CAM-1 what is he saying wind shear

2056:30

CAM-2 he is advising us that a seven
twenty seven reported a wind
shear condition during
approach at five hundred
feet-exceeding the speed
in ten knots

2057:00

CAM-1 it has been all time in this
way, but

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

CAM-1 que dice wind shear

CAM-2 que un 727 reporto wind shear en
aproximacion--500 pies excediendo la
velocidad 10 nudos

CAM-1 es que ha estado todo el tiempo
asi sobado, pero

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2056:25

RDO-2 thank you very much Avianca zero five two

2058:43

APP Avianca zero five two turn right heading zero six zero

2058:46

RDO-2 turning right heading zero six zero Avianca zero five two heavy

2058:49

CAM-1 right

2058:50

CAM-2 right zero six zero
CAM-2 right zero seis cero

INTRA-COCKPIT ENGLISH

TIME & SOURCE CONTENT

2058:58
CAM-2 estimate

2059:04
CAM-1 huh?

2059:05
CAM-3 what a problem with this

2059:57
CAM-1 zero seventy

INTRA-COCKPIT SPANISH

TIME & SOURCE CONTENT

CAM-2 estimado

CAM-1 ah

CAM-3 Que problema con esta vaina

CAM-1 setenta

AIR-GROUND COMMUNICATIONS

TIME & SOURCE CONTENT

2100:04

APP Avianca zero five two stop turn heading zero four zero

2100:07

R00-2 at zero four zero Avianca zero five two

2100:10

CAM-2 ah zero four zero it is better CAM-2 ah cero cuatro cero mas bien

2100:13

CAM-1 okay

INTRA-COCKPIT ENGLISH

TIME & SOURCE	CONTENT
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2100:26

((atis information zulu starts))

-- Kennedy airport information zulu zero one five zero zulu weather indefinite ceiling two hundred sky obscured visibility one quarter light drizzle fog temperature four eight dew point four seven wind one nine zero at one seven altimeter two nine six nine approach in use ILS runway two two left departure runway two two right notices to airman stop * control system is out of service replaced by the amber hold bar system center weather advisory from Allentown to two zero miles south west of Kenton a solid line of heavy showers and thunderstorms moving north east four zero knots should reach Philadelphia airport before zero one three zero zulu radar tops to flight level two eight zero New York Center advisory three from zero one four zero zulu to zero three zero zero zulu to two zero miles north east of Houghnot to one five east of Philadelphia a solid line of thunderstorms one five miles wide moving north east at four zero knots radar tops to flight level two five zero moderate to severe turbulence and hail reported at one one thousand between Soberg and Yonkers line should move through New York metro between zero two one five zulu and zero three zero zulu for additional information contact New York flight service station use caution for possible radio interference or false transmissions on air traffic control frequencies in the interest of noise abatement please use the assigned runway advise you have zulu --

2100:39

CAM ((sound of altitude alert chime))

INTRA-COCKPIT SPANISH

TIME & SOURCE	CONTENT
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AIR-GROUND COMMUNICATIONS

TIME & SOURCE	CONTENT
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2101:15

APP Avianca zero five two descend and maintain five thousand

2101:17

R00-2 descend and maintain five thousand Avianca zero five two

2101:31

CAM-2 *

2101:44

APP Avianca zero five two turn right heading zero nine zero

2101:46

R00-2 right heading zero nine zero Avianca zero five two

INTRA-COCKPIT ENGLISH

<u>TIME & SOURCE</u>	<u>CONTENT</u>
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2101:51	
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CAM-2	zero nine zero on the heading
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INTRA-COCKPIT SPANISH

<u>TIME & SOURCE</u>	<u>CONTENT</u>
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CAM-2	cero nueve cero en el rumbo
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AIR-GROUND COMMUNICATIONS

<u>TIME & SOURCE</u>	<u>CONTENT</u>
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2102:24	
---------	--

APP	Avianca zero five two turn left heading zero four zero
-----	--

2102:27	
---------	--

RDO-2	left heading zero four zero Avianca zero five two
-------	---

2102:29	
---------	--

CAM-1	eh Ave Maria pues
-------	-------------------

CAM-1	eh Ave Maria pues
-------	-------------------

2102:31	
---------	--

	((stop of atis transmission))
--	-------------------------------

2102:32	
---------	--

CAM-2	but now it is completed, isn't
-------	--------------------------------

CAM-2	pero ya es completa cierto
-------	----------------------------

2102:34	
---------	--

CAM-1	((sound of laugh))
-------	--------------------

CAM-2	complete
-------	----------

CAM-2	completa
-------	----------

2102:36	
---------	--

CAM-1	one thousand feet
-------	-------------------

CAM-1	mil pies
-------	----------

2102:37	
---------	--

CAM-2	one thousand feet for five thousand feet
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CAM-2	mil pies para cinco mil
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INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2102:59

APP Avianca zero five two heavy approach one one eight point four
me zero forty

2102:42

R00-2 one one eight point four so long

2102:44

APP Avianca zero five two and before you go there's a wind shear on final at fifteen hundred feet it's an increase in ten knots then again at five hundred feet of ten knots by seven twenty seven New York now on one one eight point four good night

2102:56

R00-2 one one eight point four so long

2102:59

CAM-1 what heading did you say to me
que rumbo me dijo cero cuarenta

2103:00

CAM-2 yes sir
si senor

2103:07

R00-2 New York Approach Avianca zero five ah two leveling five thousand

2103:11

APP1 Avianca zero five two heavy New York approach good evening fly heading zero six zero

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2103:18					
CAM-2	zero six zero on the heading	CAM-2	cero seis cero en el rumbo		
2103:26					
CAM-3	what a beautiful	CAM-3	que belleza		
CAM-3	cleared	CAM-3	autorizado		
2103:33					
CAM-1	it may be	CAM-1	puede ser		
2103:35					
CAM-3	yes	CAM-3	si		
2103:37					
CAM-1	sure	CAM-1	claro		
2103:46					
CAM-3	when we have--with thousand pounds or less in any tank it is necessary to do	CAM-3	es cuando hay uno--con con mil libras o menos en cualquier tanque se debe hacer un		
2103:53					
CAM-2	yes sir	CAM-2	si senor		

2103:15

R00-2 heading zero six zero Avianca zero five two heavy

INTRA-COCKPIT ENGLISHINTRA-COCKPIT SPANISHATR-GROUND COMMUNICATIONS

<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
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2103:56

CAM-3 then the go around procedure is stating that the power be applied slowly and to avoid rapid accelerations and to have a minimum of nose up attitude

CAM-3 entonces el go around procedure dice aplique la potencia suavemente y evite las rapidas alteraciones del avion mantenga el minimo de nose up attitude

2104:09

CAM-1 to maintain what

CAM-1 mantenga que

2104:10

CAM-2 minimum minimum nose up attitude that means the less nose up attitude that one can hold

CAM-2 minimum minimum nose up attitude o sea lo menos nariz arriba que uno pueda

CAM-3 this thing is going okay

CAM-3 esto si que anda bien

2104:27

CAM-3 then flaps to twenty five position and maintain Vee ref plus twenty--the highest go around procedure is starting

CAM-3 entonces los flaps a veinticinco y mantenga Vee ref mas veinte lo mas alto que de el go around

INTRA-COCKPIT ENGLISH

INTRA-COCKPIT SPANISH

AIR-GROUND COMMUNICATIONS

<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
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2104:34

CAM-3 the flaps sorry retract the landing gear with positive rate of climb--if any low pressure light comes on do not select the switch in the off position--the low pressure lights of the pumps comes on reduce the nose up altitude the nose up attitude

CAM-3 retracte los flaps perdon retracte el tren when positive rate of climb si cualquier luz de baja presion se prende no ponga el switche en offs he las bombas de baja he las luces de baja precision de las bombas se prenden reduzca la altitud se nariz la actitud de nariz arriba

2104:57

CAM-3 the forward pumps--

CAM-3 las bombas delanteras

2104:59

CAM-1 what heading do you have over there

CAM-1 que grados tienes ahi

2105:01

CAM-1 select Kennedy on my side

CAM-1 pongase Kennedy en el mio

2105:04

CAM-2 Kennedy is on the number two but if you want commander I can perform the radio setup right now that we are now being vectored we are like on down wind position now

CAM-2 Kennedy esta en el numero dos pero si quiere comander le hago ya el radio set up--que ya nos estan vectoriando estamos como con un--con el viento ya

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2105:11					
CAM-1	we passed already no	CAM-1	ya ya pasamos no		
2105:12					
CAM-2	yes sir	CAM-2	si senor		
				2105:13	
				APP1	Avianca zero five two heavy turn left heading three six zero
				2105:17	
				R00-2	left heading three six zero Avianca zero five two heavy
2105:22					
CAM-3	three six zero	CAM-3	tres seis cero		
2105:24					
CAM-2	yes commander that's what he say	CAM-2	si comander eso dice		
2105:26					
CAM-1	perform the radio setup but leave to me the VOR the in Kennedy then select here tell me what	CAM-1	haga el radio set up pero dejeme a mi el el vor en Kennedy entonces pongame aqui me dicen que		
2105:34					
CAM-1	two what	CAM-1	dos que		
CAM-2	two twenty three	CAM-2	dos veintitres		

INTRA-COCKPIT ENGLISH

INTRA-COCKPIT SPANISH

AIR-GROUND COMMUNICATIONS

TIME & SOURCE CONTENT

TIME & SOURCE CONTENT

TIME & SOURCE CONTENT

2105:35
CAM ((sound of altitude alert tone))

2105:38
CAM-1 two twenty three CAM-1 dos veintitres

2105:39
CAM-1 what heading he provide us CAM-1 que rumbo nos dio ahorita

2105:42
CAM-2 now he give us three six zero CAM-2 ahorita nos dio tres seis cero

CAM-1 okay

CAM-2 I am I am going to perform the radio setup on number two CAM-2 voy a voy a hacer el radio set up en el dos

CAM-1 perform the radio setup CAM-1 hagase el radio set up

2105:49
CAM ((sound of landing gear warning horn))

2105:52
CAM-1 hey understand that nose must be maintained as low as possible yes CAM-1 diga entiendo que entonces la nariz lo menos posible arriba si possible yes

CAM-3 that's correct it says that the forward pumps CAM-3 es correcto dice que las bombas delanteras

INTRA-COCKPIT ENGLISH

INTRA-COCKPIT SPANISH

AIR-GROUND COMMUNICATIONS

TIME & SOURCE

TIME & SOURCE

TIME & SOURCE

CONTENT

CONTENT

CONTENT

2106:02
APP1 Avianca zero five two heavy turn left heading of three zero zero zero

2106:04
R00-2 left heading three zero zero Avianca zero five two heavy

2106:09

CAM-2 three zero zero on the heading

CAM-2 tres cero cero en el rumbo

2106:10

CAM-3 the forward boost pumps could be uncovered of fuel during the go around

CAM-3 las bombas delanteras pueden quedar descubiertas de combustible en el go around

2106:15

CAM-3 what it means it doesn't contain fuel for feeding itself and a flameout can occur-and it is necessary to lower the nose again

CAM-3 es decir que no tienen combustible para para alimentarse y puede ocurrir un flame out entonces hay que bajar la nariz nuevamente

2106:44

CAM-1 heading three hundred

CAM-1 rumbo trescientos

2106:45

CAM-2 three hundred

CAM-2 trescientos

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2106:51					
CAM-2	right now we are proceeding to the airport inbound and we have (twenty seven/seventeen) miles	CAM-2	ya es como si nos estan metiendo hacia el aeropuerto ya estamos a veintisiete millas		
2106:58					
CAM-3	roger	CAM-3	recibido		
2107:04					
CAM-2	this means that we'll have hamburger tonight	CAM-2	eso indica hamburguesa esta noche		
2107:17				2107:17	
				APP1	Avianca zero five two heavy turn left heading two niner
2107:20				2107:20	
				RDD-2	left heading two niner zero Avianca zero five two heavy
2107:24					
CAM-2	two niner zero on the heading please	CAM-2	dos nueve cero en el rumbo por favor		
2107:29					
CAM-1	two twenty three course counter standby the frequency no-	CAM-1	dos veintitres el course counter pendiente la la frecuencia no		
2107:32					
CAM-2	standby for the frequency	CAM-2	pendiente la frecuencia		

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2107:34					
CAM-1	leave the ILS frequency in Kennedy until I advise you select your own there	CAM-1	deje el ILS en Kennedy hasta que yo le diga ponga lo suyo alla		
2107:36					
CAM-2	it is ready	CAM-2	esta listo		
2107:37					
CAM-1	well	CAM-1	bueno		
2107:42					
CAM-2	markers are set	CAM-2	los marcadores estan puestos		
2107:45					
CAM-1	set symmetric thrust here Don Matri at the minimum	CAM-1	pongame simetrico aqui Don Matri en el minimo		
2107:50					
CAM-3	in the minimum I'm going to set sixty sixty five percent	CAM-3	en el minimo le pongo sesenta--sesenta y cinco por ciento		
2107:56					
CAM-1	well do you want set it symmetrically	CAM-1	bueno quieres emparejarlos ahi		
2108:10					
CAM-3	sixty five	CAM-3	sesenta y cinco		

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
				2108:34	APP1 Avianca zero five two heavy descend and maintain ah descend and maintain three thousand
				2108:40	RDO-2 descend and maintain three thousand Avianca zero five two heavy
CAM-2	three thousand feet	CAM-2	tres mil pies		
2109:01					
CAM-1	the localizer are we going to intercept it with two thousand	CAM-1	el localizador lo interceptamos con dos mil		
2109:06					
CAM-2	yes the initial approach altitude is two thousand or according to the ATC	CAM-2	yes, dice que la altura inicial de aproximacion son dos mil pies o de acuerdo a lo que diga el ATC		
2109:11					
CAM-3	they got us they are already vectoring us	CAM-3	ya nos tienen ya nos estan vectoriando		
2109:21					
CAM-2	they accomodate us ahead of an--	CAM-2	nos han metido por delante de un --		
2109:27					
CAM-1	what	CAM-1	que		
CAM-2	they accomodate us	CAM-2	nos han metido		

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2109:29					
CAM-3	they already know that we are in CAM-3 es que ellos saben que ya estamos mal bad condition				
2109:30					
CAM-1	no they are descending us	CAM-1	no a nosotros nos estan bajando		
2109:35					
CAM-2	one thousand feet	CAM-2	mil pies		
2109:36					
CAM-1	ah yes	CAM-1	ah si		
2109:38					
CAM-2	they are giving us priority	CAM-2	nos estan dando prioridad	2109:44	APPI Avianca zero five two heavy turn left heading two seven zero
2109:50				2109:47	RDO-2 left heading two seven zero
CAM-2	two seven zero on the heading	CAM-2	dos siete cero en el rumbo		
2109:54					
CAM-1	two seventy	CAM-1	dos setenta		
2110:03					
CAM-2	it is ahead of us	CAM-2	ese va adelante de nosotros		

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2110:05 CAM-3	yes	CAM-3	si		
2110:16 CAM-1	standby for the localizer there	CAM-1	pendiente el localizador ahi		
2110:18 CAM-2	yes sir	CAM-2	si senor		
2110:21 CAM-2	outer marker is seven miles	CAM-2	el outer marker esta a siete millas	2110:21 APP	Avianca zero five two heavy turn left heading two five zero intercept the localizer
2110:37 CAM-2	two fifty is the heading to intercept the localizer	CAM-2	dos cincuenta es el rumbo para interceptar el localizador	2110:31 RDO-2	heading two five zero intercept the localizer Avianca zero five two heavy
2110:50 CAM	((sound of altitude alert chime))				

INTRA-COCKPIT ENGLISH INTRA-COCKPIT SPANISH AIR-GROUND COMMUNICATIONS

<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2110:56					
CAM-1	seventy five again Mati	CAM-1	sesenta y cinco nuevamente Mati		
2111:00					
CAM-3	sixty five	CAM-3	sesenta y cinco		
2111:01					
CAM-1	six five	CAM-1	seis cinco		
2111:04					
CAM-2	this is final vector do you want the ILS commander	CAM-2	este es el vector final quiere el ILS commander	2111:07	APP Avianca zero five two heavy you are one five miles from outer marker maintain two thousand until established on the localizer cleared ILS two two left
				2111:14	RDO-2 cleared ILS two two left maintain two thousand until established Avianca zero five three heavy
CAM-3	two thousand				
2111:16					
CAM-1	select the ILS on my side	CAM-1	pongame ILS en el mio		
2111:20					
CAM-2	the ILS in number one - one hundred ten point nine is set	CAM-2	el ILS en el numero uno ciento diez nueve nueve esta set		

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2111:29					
CAM-2	for two thousand feet	CAM-2	para dos mil pies		
CAM-3	localizer alive				
2111:32					
CAM-1	give me flaps fourteen	CAM-1	deme flaps catorce		
2111:33					
CAM-2	we are thirteen miles from the outer marker	CAM-2	estamos trece millas del outer marker		
CAM-2	flaps fourteen	CAM-2	flaps catorce		
2111:44					
CAM	((sound of trim in motion horn))				
2111:47					
CAM-1	navigation number one				
2111:49					
CAM-1	did you already select flaps fourteen no	CAM-1	ya le pusistes catorces de flaps no		
2111:51					
CAM-2	yes sir are set	CAM-2	si senor estan set		
2111:53					
CAM-2	navigation number one				

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME &</u>	<u>CONTENT</u>	<u>TIME &</u>	<u>SOURCE</u>	<u>TIME &</u>	<u>SOURCE</u>
<u>SOURCE</u>	<u>CONTENT</u>	<u>SOURCE</u>	<u>CONTENT</u>	<u>SOURCE</u>	<u>CONTENT</u>
2111:57				2111:55	
CAM-3	fourteen			APP1	Avianca zero five two heavy speed one six zero if practical
2112:05				2111:59	
CAM-1	give me flaps twenty five	CAM-1	deme veinticinco de flaps	R00-2	one six zero Avianca zero five two heavy
2112:06					
CAM-2	flaps twenty five				
2112:07					
CAM	((sound of trim in motion horn))				
2112:09					
CAM-2	reduce to a minimum	CAM-2	reduccion al minimo		
2112:11					
CAM	((sound of trim in motion horn))				
2112:15					
CAM-2	we have a traffic ahead of us	CAM-2	tenemos un trafico adelante		

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2112:18					
CAM	((sound of trim in motion horn))				
2112:28					
CAM-1	we can maintain one hundred and forty with this flap setting	CAM-1	podemos mantener ciento cuarenta con estos flaps		
2112:41					
CAM	((sound of trim in motion horn))				
2112:42					
CAM	((sound of altitude alert chime))				
2112:47					
CAM	((sound of trim in motion horn))				
2112:51					
CAM	((sound of altitude alert chime))				
2112:52					
CAM-1	how many miles is that thing located	CAM-1	cuantas millas esta la vaina esa		
2112:53					
CAM-2	it is at seven miles commander and we are at ten miles at the moment from the outer marker	CAM-2	esta a siete millas commander estamos a diez millas en el momento--del outer marker		

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME &</u>	<u>CONTENT</u>	<u>TIME &</u>	<u>SOURCE</u>	<u>TIME &</u>	<u>SOURCE</u>
<u>SOURCE</u>	<u>CONTENT</u>	<u>SOURCE</u>	<u>CONTENT</u>	<u>SOURCE</u>	<u>CONTENT</u>
2113:03					
CAM	((sound of altitude alert chime))				
2113:25					
CAM-1	reset frequency the ILS please	CAM-1	resetieme frecuentemente el ILS por favor		
2113:29					
CAM-2	okay				
2113:36					
CAM-1	do it	CAM-1	hagamele		
2113:34					
CAM-1	thank you				
2113:47					
CAM-2	now the course is going to be intercepted at the outer marker this means that problem	CAM-2	ya el course intercepta en el outer marker o sea que no hay problema comander		
2114:00					
CAM-2	localizer to the left				
2114:17					
CAM	((sound of trim in motion horn))				

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2115:08
APP1 Avianca zero five two heavy contact Kennedy tower one one niner
point one good day

2115:12
R00-2 one one niner point one so long

2115:19
R00-2 Kennedy tower Avianca zero five two heavy established two two
left

2115:23
TMR Avianca zero five two heavy Kennedy tower two two left you're
number three following seven two seven traffic on a ah niner mile
final

2115:32
R00-2 Avianca zero five two roger

2115:34
TMR Clipper four seventy four what's you're airspeed now

2115:37
PAA474 one forty five

2115:38
TMR American six ninety two traffic ahead four miles is one forty
five knots airspeed

INTRA-COCKPIT ENGLISH

TIME & SOURCE

CONTENT

2115:44
CAM ((sound of trim in motion horn))

INTRA-COCKPIT SPANISH

TIME & SOURCE

CONTENT

AIR-GROUND COMMUNICATIONS

TIME & SOURCE

CONTENT

2115:44
AAL692 thank you

2115:48
AVES20 Avenza five two zero on

2115:49
TWR Avenza five twenty correction mike juliet hold short two two right

2115:49
CAM-1 approaching at one hundred and forty CAM-1 aproximadose a ciento cuarenta

2115:52
CAM-2 it is one hundred and forty five CAM-2 esta a ciento cuarenta y cinco el that who is in front of us que va delante de nosotros

2115:54
AVES20 okay

2115:58
US117 US Air one seventeen holding short of two two right at golf

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2116:07	CAM ((sound of trim in motion horn))			2116:01	TWR US Air hold short of two two right
2116:19	CAM-1 can I lower the landing gear yet	CAM-1 no le puedo bajar las ruedas todavia		2116:03	USA117 holding
2116:21	CAM-2 no I think it is too early now	CAM-2 no todavia yo creo que es muy apre surado			
2116:26	CAM-1 it is at the minimum in order to fly twenty five	CAM-1 es muy en el minimo para volar veinticinco			
2116:33	CAM-2 yes	CAM-2 si			
2116:37	CAM ((sound of trim in motion horn))			2116:41	TWR USAir one seventeen cross two two right taxi right on the outer ground on one two one point eight on the other side

INTRA-COCKPIT ENGLISH

INTRA-COCKPIT SPANISH

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

TIME &
SOURCE CONTENT

TIME &
SOURCE CONTENT

2116:53

CAM-2 if we lower the landing gear we
have to hold very high nose
attitude

CAM-2 si bajamos las ruedas nos toca
subir mucho la nariz

CAM-3 and it is not very---

CAM-3 y no es muy--

2116:46

USA117 cleared to cross one eight nine you say

2116:49

TWR no one two one point niner

2116:52

USA117 gunna say is that a new one thanks alot cleared to cross USAir
one seventeen

2116:56

TWR American six ninty two runway two two left wind one niner zero at
two one cleared to land

2117:01

AAL692 cleared to land American six ninty two

2117:17

TWR Avianca zero five two what's your airspeed

2117:20

RDO-2 Avianca zero five two one four zero knots

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2117:25
CAM-1 they was asking for the
American

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

CAM-1 a) American es que le preguntaban

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2117:30
TWR Avianca zero five two can you increase airspeed one zero knots

2117:36
R00-2 ah say again the speed

2117:37
TWR can you increase you airspeed one zero knots

2117:40
CAM-1 one zero

2117:41
R00-1 okay one zero knots increasing

2117:42
TWR increase increase

2117:42
CAM-1 what

CAM-1 que

2117:44
R00-2 increasing

INTRA-COXPIT ENGLISH

INTRA-COXPIT SPANISH

AIR-GROUND COMMUNICATIONS

TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT	TIME & SOURCE	CONTENT
2117:45	CAM-1 what	CAM-1	que	2117:46	TWR okay
CAM-3	ten knots more	CAM-3	diez nudos mas		
2117:48	CAM-2 ten little knots more	CAM-2	diez nuditos mas		
CAM-3	ten little knots more	CAM-3	diez nuditos mas		
CAM-1	one hundred and fifty	CAM-1	ciento cincuenta		
2117:52	CAM ((sound of trim motion horn))				
CAM-1	here we go	CAM-1	ahi estamos bien		
2117:55	CAM-1 tell me things louder because... I'm not--hearing it	CAM-1	digame un poquito mas duro las vainas-- porque es que no--no las estoy oyendo		
2118:11	CAM-2 we are three miles to the outer marker now	CAM-2	estamos tres millas del outer marker ahora		
2118:13	CAM 1 right				

INTRA-COCKPIT ENGLISH

TIME & SOURCE

CONTENT

2118:15

CAM-1 resetting the ILS

2118:17

CAM-2 here it is already intercepted

2118:24

CAM ((sound of trim in motion horn))

2118:27

CAM-2 glide slope alive

2118:37

CAM ((sound of trim in motion horn))

2118:38

CAM-1 I'm going to approach at one hundred and forty it is what he wants or what is the value he wants

CAM-1 voy a aproximar en ciento cuarenta es que quiere o cuanto es que quiere

INTRA-COCKPIT SPANISH

TIME & SOURCE

CONTENT

CAM-1 resetiando el ILS

CAM-2 aqui ya lo intercepto

AIR-GROUND COMMUNICATIONS

TIME & SOURCE

CONTENT

2118:16

TWR Clipper four seventy four turn right taxi via Juliet hold short of two two right remain on frequency

2118:27

PAA474 Clipper four seventy four roger

INTRA-COCKPIT ENGLISH

TIME & SOURCE CONTENT

2118:41

CAM-2 one hundred and fifty we had one CAM-2 ciento cincuenta ibamos a ciento cuarenta
 hundred and forty and he y el quiera diez nuditos mas
 required ten little knots more

2118:54

CAM ((sound of trim in motion horn))

INTRA-COCKPIT SPANISH

TIME & SOURCE CONTENT

AIR-GROUND COMMUNICATIONS

TIME & SOURCE CONTENT

2118:57

TWA801 Kennedy tower TWA eight zero one heavy is twelve point two on the
DME

2119:00

TWR TWA eight oh one heavy Kennedy tower roger number three on the
 approach following heavy seven oh seven traffic ah four and a
 half miles ahead he's indicating ten knots less on the ground
 speed there's a wind shear reported loss * gain and loss of ten
 knots seven hundred feet to the surface by a DC-9 runway two two
 left RVR more than six thousand

2119:09

CAM-1 lower the gear

CAM-1 bajeme las ruedas

2119:10

CAM-2 gear down

2119:18

TWA801 ah thank you sir

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2119:21 CAM-1	give me forty	CAM-1	deme cuarenta		
2119:22 CAM-2	forty	CAM-2	cuarenta		
2119:23 CAM-1	ah symmetric please	CAM-1	ah simetrico por favor		
2119:25 CAM-1	sixty five percent or whatever you have close to it	CAM-1	sesenta y cinco o lo que tenga ahi cerca		
2119:28 CAM	((sound of trim in motion horn))				
2119:30 CAM-1	mode selector approach landing checklist				
2119:32 CAM-3	landing check				
2119:38 CAM	((sound of trim in motion horn))				
2119:40 CAM	((sound of trim in motion horn))				

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2119:41 CAM-3	speed brake lever				
2119:42 CAM-1	full forward				
2119:43 CAM-3	spoiler switches				
2119:45 CAM-2	on				
CAM-3	on				
2119:46 CAM-3	engine start control selectors on				
2119:50 CAM	((engine igniter sound starts and continues until end of tape))				
2119:56 CAM-3	no smoking switch on				
2119:57 CAM-2	on				

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2120:00
CAM-3 gear

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

2120:08
CAM-2 one hundred and ninety with
twenty is in the wind

2120:10
CAM-1 with what

CAM-2 ciento noventa con veinte esta
el viento

CAM-1 con que

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2119:58
TWR Avianca zero five two two two left wind one niner zero at two
zero cleared to land

2120:01
RDO-2 cleared to land Avianca zero five two heavy

2120:03
RDO-2 wind check please

2120:05
TWR one niner zero at two zero

2120:07
RDO-2 thank you

2120:10
TWR Avianca zero five two say airtspeed

INTRA-COCKPIT ENGLISH

TIME &

SOURCE CONTENT

CAM-2 with twenty

INTRA-COCKPIT SPANISH

TIME &

SOURCE CONTENT

CAM-2 con veinte

AIR-GROUND COMMUNICATIONS

TIME &

SOURCE CONTENT

2120:12
RDO-2 zero five two is ah one four five knots

2120:15
TWR TWA eight oh one heavy if feasible reduce airspeed one four five

2120:17
CAM-1 give me fifty

CAM-1 deme fifty

2120:19
CAM ((sound of trim in motion horn))

2120:21
CAM-1 are we cleared to land no CAM-1 ya nos dio libre aterrizar no

2120:23
CAM-2 yes sir we are cleared to land CAM-2 si senor estamos autorizados a aterrizar

2120:25
CAM-3 hydraulic pressure quantities
normal

2120:19
TWA801 okay we'll do our best

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME &</u>	<u>SOURCE</u>	<u>TIME &</u>	<u>SOURCE</u>	<u>TIME &</u>	<u>SOURCE</u>
	<u>CONTENT</u>		<u>CONTENT</u>		<u>CONTENT</u>
2120:28					
CAM-2	localizer to the left slightly below glide slope				
2120:33					
CAM-3	stand by flaps fifty landing checklist complete				
2120:36					
CAM-2	stand by flaps fifty				
2120:39					
CAM-1	give me fifty		CAM-1	deme cincuenta	
2120:40					
CAM-2	flaps fifty now				
2120:41					
CAM-3	fifty green light final set				
2120:42					
CAM	((sound of trim in motion horn))				
2120:45					
CAM-3	all set for landing				
2120:48					
CAM-2	below glide slope				

INTRA-COCKPIT ENGLISH
TIME &
SOURCE CONTENT

INTRA-COCKPIT SPANISH
TIME &
SOURCE CONTENT

AIR-GROUND COMMUNICATIONS
TIME &
SOURCE CONTENT

2120:53
TWR TWA eight oh one heavy if feasible reduce you to final approach
airspeed at this time

2120:56
TWA801 yes sir we're indicating one five zero now that's about the best
we can do

2121:06
CAM-1 confirm the wind

CAM-1 me confirma el viento

2121:07
TWR Avianca zero five two heavy can you increase your airspeed one
zero knots at all

2121:09
R00-2 yes we're doing it

2121:12
TWR okay thank you

2121:13
CAM ((sound of trim in motion horn))

2121:15
CAM-1 confirm the wind
CAM-1 confirmame el viento

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2121:16					
CAM-2	the wind is one hundred ninety with twenty knots	CAM-2	el viento esta de ciento noventa con veinte		
2121:20					
CAM-1	I got it	CAM-1	esa vaina		
2121:35				2121:30	
CAM-1	I'm going to leave the runway to the right okay	CAM-1	voy a dejar la pista por la derecha ok	TWR	TWA eight oh one you're gaining on the heavy seven oh seven turn left heading of ah one five zero and ah maintain two thousand
2121:36				2121:38	
CAM-2	to the right yes sir	CAM-2	por la derecha si senor	TWA801	okay TWA eight oh one heavy left to one five zero maintain two thousand
2121:41					
CAM-1	localizer glide slope one thousand feet stand by for lights	CAM-1	localizer glide slope mil pies pen diente luces		
2121:46					
CAM-2	standing by for lights	CAM-2	pendiente todavia luces		

INTRA-COCKPIT ENGLISHTIME &
SOURCECONTENT

2121:49

CAM ((sound of trim in motion horn))

2121:59

CAM-2 slightly below glide slope

2122:00

CAM ((sound of trim in motion horn))

INTRA-COCKPIT SPANISHTIME &
SOURCECONTENT

2121:50

TWR Avianca zero five two cross two two right taxi straight ahead now
correction taxi right ah ground on the outer ground one two one
point niner

2122:01

TWR correction Avensa five twenty cross two two right taxi right on
the outer ground point nine

2122:06

AVES20 cross two two right right on the outer and one two one point
niner five two zero

2122:09

TWR Clipper four seventy four cross two two right straight ahead to
the inner ground point niner

2122:07

CAM-2 one thousand feet above
field

INTRA-COCKPIT ENGLISH

TIME & SOURCE CONTENT

2122:09 CAM ((sound of trim in motion horn))

2122:10 CAM-2 instruments cross checked slightly below

2122:17 CAM-2 all set for landing

2122:19 CAM-3 stand by for lights

2122:21 CAM-1 stand by

INTRA-COCKPIT SPANISH

TIME & SOURCE CONTENT

CAM-3 pendiente luces

CAM-1 pendiente

AIR-GROUND COMMUNICATIONS

TIME & SOURCE CONTENT

2122:13 PAA474 Clipper four seventy four cleared to cross

2122:15 TWR TWA eight oh one contact approach one one eight point four

2122:22 TWAB01 eighteen four TWA eight oh one

2122:24 TWR American six ninety two taxi via Juliet hold short two two right remain this frequency

INTRA-COCKPIT ENGLISH

TIME & SOURCE

CONTENT

2122:26

CAM-2 the wind is slightly from the left one hundred ninety with twenty

INTRA-COCKPIT SPANISH

TIME & SOURCE

CONTENT

CAM-2 el viento esta ligeramente a la izquierda ciento noventa con veinte

AIR-GROUND COMMUNICATIONS

TIME & SOURCE

CONTENT

2122:28

AAL692 hold short two two right American six ninety two

2122:33

AAL40 Tower American forty heavy's with ya outside LORRS

2122:36

TWR American forty heavy Kennedy tower roger runway two two left you're number two following heavy seven oh seven traffic on a two mile final wind two zero zero at one eight RVR five thousand five hundred cleared to land

2122:44

CAM-2 below glide slope

2122:52

CAM-2 glide slope

2122:50

AAL40 cleared to land American forty heavy

2122:56

TWR American forty heavy what's your airspeed

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2122:57
CAM-2 this is the wind shear

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

CAM-2 es el wind shear

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2123:00
AAL40 ah one sixty American forty heavy

2123:03
TWR roger ah can you increase it one zero knots

2123:06
AAL40 affirm

2123:07
TWR appreciate that

2123:08
CAN-3 glide slope

GPWS whoop whoop pull up

2123:09
CAM-2 sink rate

CAM-2 rata de descenso

2123:10
CAM-2 five hundred feet

CAM-2 quinientos pies

2123:11
GPWS whoop whoop pull up

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2123:12	GPWS whoop whoop pull up				
2123:13	GPWS whoop whoop pull up				
	CAM-1 lights		CAM-1 luces		
2123:14	GPWS whoop whoop pull up				
2123:15	GPWS whoop whoop pull up				
2123:17	GPWS whoop whoop pull up				
2123:18	GPWS whoop whoop pull up				
2123:20	CAM-1 where is the runway		CAM-1 donde esta la pista		
2123:21	GPWS whoop whoop pull up				
2123:22	GPWS whoop whoop pull up				

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2123:23	GPWS whoop whoop pull up				
2123:23	CAM-1 the runway where is it	CAM-1	la pista donde esta		
2123:25	GPWS glide slope				
2123:26	GPWS glide slope				
2123:27	CAM-2 I don't see it I don't see it	CAM-2	no la veo no la veo no la veo		
2123:28	CAM-1 give me the landing gear up landing gear up	CAM-1	deme--subame las ruedas subame las ruedas		
	GPWS glide slope				
2123:29	GPWS glide slope				
2123:32	CAM ((sound of landing gear warning horn))				

INTRA-COCKPIT ENGLISH

TIME &
SOURCE

INTRA-COCKPIT SPANISH

TIME &
SOURCE

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE

CONTENT

CONTENT

CONTENT

2123:33

CAM-1 request another traffic pattern CAM-1 pidame otro trafico

2123:37

CAM-3 smooth with the nose smooth
with the nose smooth with the
nose

CAM-3 suave la nariz suave la nariz suave
nariz

2123:38

CAM ((sound of trim in motion horn))

2123:39

TWR Avianca zero five two heavy roger ah climb and maintain two
thousand turn left heading one eight zero

2123:43

CAM-1 we don't have fue-

CAM-1 no tenemos comb-

2123:45

CAM-2 maintain two thousand feet one
eight zero on the heading

CAM-2 mantener dos mil pies one eight zero
en el rumbo

2123:48

RDO-2 climb and maintain one - two thousand
one eight zero on the heading

INTRA-COCKPIT ENGLISH

<u>TIME & SOURCE</u>	<u>CONTENT</u>
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2123:54

CAM-1 flaps twenty five

2123:54

CAM-2 two thousand feet

CAM-3 flaps twenty five

2124:00

CAM-1 I don't know what happened with the runway I didn't see it

CAM-3 I didn't see it

CAM-2 I didn't see it

2124:06

CAM-1 tell them we are in emergency

CAM-3 two thousand feet

CAM ((sound of altitude alert chime))

INTRA-COCKPIT SPANISH

<u>TIME & SOURCE</u>	<u>CONTENT</u>
--------------------------	----------------

CAM-1 flaps veinticinco

CAM-2 dos mil pies

CAM-3 flaps veinticinco

CAM-1 flaps veinticinco yo no se que paso con la pista oye no la vi

2124:04

TWR Avianca zero five two you are making a left turn correct sir

2124:08

R00-2 that's right to one eight zero on the heading and ah we'll try once again we're running out of fuel

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2124:14

CAM ((sound of trim in motion horn))

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

2124:17

CAM-1 what did he say

CAM-1 que dijo

2124:18

CAM-2 maintain two thousand feet one
eight on the heading already
advise him that we are going to
attempt again because we now we
can't

CAM-2 mantener dos mil pies ciento ochenta
en el rumbo ya le dije que intentamos
de nuevo porque ya no podemos

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2124:15

TWR okay

2124:21

TWR American forty heavy two two left wind two zero zero at one niner
cleared to land wind shear reported gain and loss of ten knots
seven hundred feet to the surface by a DC-9

2124:22

CAM-1 advise him we are emergency

CAM-1 digale que estamos en emergencia

2124:26

CAM-1 did you tell him

CAM-1 ya le dijo

2124:27

AAL40 American forty

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2124:28
CAM-2 yes sir

2124:29
CAM-2 I already advised him

2124:31
CAM-1 flaps four--fifteen

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

CAM-2 si senor

CAM-2 ya le dije

CAM-1 flaps ca--quince

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2124:32
TWR Avianca zero five two heavy continue the left turn heading one
 five zero maintain two thousand

2124:36
R00-2 one five zero maintaining two thousand Avianca zero five two
 heavy

2124:39
TWR Avianca zero five two heavy contact approach on one one eight
 point four

2124:40
CAM-2 one hundred and fifty on the heading

CAM-2 ciento cincuenta en el rumbo

2124:42
R00-2 one one eight point four

INTRA-COCKPIT ENGLISH

TIME & SOURCE CONTENT

2124:45
CAM-1 they put us to reduce airspeed
that's the thing man hundred
and fifty

2124:50
CAM-2 one hundred and fifty on the
heading

INTRA-COCKPIT SPANISH

TIME & SOURCE CONTENT

CAM-1 es que lo ponen a rebajar
velocidad y toda esa vaina hombre
ciento cincuenta

CAM-2 ciento cincuenta en el rumbo

AIR-GROUND COMMUNICATIONS

TIME & SOURCE CONTENT

2124:51
APP five forty two heavy thank you four your help contact Kennedy
tower one one niner point one

2124:53
TWA542 good day thank you

2124:55
RDO-2 approach Avianca zero five ah two heavy we just missed a missed
approach and ah we're maintaining two thousand and five on th-

TIME & SOURCE CONTENT

2124:55
CAM-1 flaps fifteen

2124:58
CAM-3 flaps fourteen

CAM-3 flaps catorce

INTRA-COCKPIT ENGLISH

TIME &
SOURCE

TIME &
SOURCE

INTRA-COCKPIT SPANISH

TIME &
SOURCE

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE

CONTENT

CONTENT

CONTENT

CONTENT

2125:00

CAM-1 flaps fourteen

CAM-1 flaps catorce

2125:07

APP Avianca zero five two heavy New York good evening climb and maintain three thousand

2125:08

CAM-1 advise him we don't have fuel

CAM-1 digale que no tenemos combustible

2125:10

R00-2 climb and maintain three thousand and ah we're running out of fuel sir

2125:12

APP okay fly heading zero eight zero

2125:15

R00-2 flying heading zero eight zero climb to three thousand

2125:19

CAM-2 three thousand feet please

CAM-2 tres mil pies por favor

2125:19

APP TWA eight zero one heavy turn left heading zero four zero

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2125:20	CAM-1 what zero eighty	CAM-1	zero que ochenta		
	CAM-2 hundred and eighty	CAM-2	ciento ochenta		
2125:22	CAM-1 ah			2125:22	TWR zero four zero TWA eight oh one heavy
	CAM-2 hundred and eighty	CAM-2	ciento ochenta		
2125:28	CAM-1 did you already advise that we don't have fuel	CAM-1	ya le dijiste que no tenemos combustible		
2125:29	CAM-2 yes sir I already advise him hundred and eighty on the heading we are going to maintain three thousand feet and he's going to get us back	CAM-2	si senor ya le dije ciento ochenta en el rumbo mantenemos tres mil pies y nos va a volver a meter		
	CAM-1 okay	CAM-1	bueno	2125:41	APP Evergreen one zero two heavy fly two seven zero

INTRA-COCKPIT ENGLISH

TIME & SOURCE CONTENT

2125:47
CAM-2 one hundred and eighty

2125:50
CAM-1 give me bugs

2125:52
CAM-2 one eighty on the heading

INTRA-COCKPIT SPANISH

TIME & SOURCE CONTENT

CAM-2 ciento ochenta

CAM-1 deme el bug

CAM-2 ciento ochenta en el rumbo

AIR-GROUND COMMUNICATIONS

TIME & SOURCE CONTENT

2125:44
ELA102 two seven zero one oh two heavy

2125:53

APP American four heavy present heading I'll give you a turn here in a minute

2125:54

CAM-1 give me bugs

CAM-1 deme el bug

2125:56

AAL40 American four heavy wilco

2125:58

CAM ((sound of altitude alert chime))

2126:00

CAM-2 three thousand feet

CAM-2 tres mil pies

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2126:01

CAM ((sound of altitude alert chime))

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

2126:11

CAM-2 *

2126:21

CAM-1 okay

CAM-1 bueno

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2126:07

APP American four heavy turn left heading one eight zero you're nine miles from outer marker maintain two thousand until established on the localizer cleared for ILS two two left.

2126:15

AAL40 okay one eight zero two thousand maintain two until established cleared ILS two two left American four heavy

2126:21

APP Evergreen one zero two heavy descend and maintain three thousand

2126:24

ELA102 okay leaving four for three Evergreen one two heavy

2126:27

APP Avianca zero five two heavy turn left; heading zero seven zero

2126:31

R00-2 heading zero seven zero Avianca zero five two heavy

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2126:34				2126:35	
CAM-2	zero seven zero	CAM-2	cero siete cero	APP	and Avianca zero five two heavy ah I'm gonna bring you about fifteen miles north east and then turn you back onto the approach is that fine with you and your fuel
2126:46				2126:43	
CAM-1	what did he say	CAM-1	que dice	RDO-2	I guess so thank you very much
CAM-3	the guy is angry	CAM-3	el man se calento		
2126:47					
CAM-2	fifteen miles in order to get back to the localizer	CAM-2	quince millas para volvernos a meter en el localizador		
2126:50				2126:50	
CAM-1	zero seventy	CAM-1	cero setenta	APP	evergreen one zero two heavy turn left heading two five zero you're one five miles from th outer marker maintain three thousand until established on the localizer cleared for ILS two two left

INTRA-COCKPIT ENGLISH

TIME &
SOURCE

CONTENT

2126:52

CAM-2 zero seven zero on the heading
maintaining three thousand feet

INTRA-COCKPIT SPANISH

TIME &
SOURCE

CONTENT

CAM-2 cero siete cero en el rumbo
manteniendo tres mil pies

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE

CONTENT

2126:59

ELA102 * cleared for the approach Evergreen zero two heavy

2127:02

APP TWA eight zero one heavy turn left heading two nine zero

2127:03

CAM-1 give me the Kennedy ILS in
number one

CAM-1 deme el ILS de Kennedy--en el uno

2127:08

CAM-2 the ILS or the VOR

CAM-2 el ILS o el VOR

2127:09

CAM-1 i iike say the VOR

CAM-1 el VOR digo

2127:11

CAM-2 fifteen point nine is on number
one

CAM-2 quince nueve esta en el numero uno

2127:13

CAM-1 zero ninety

CAM-1 cero noventa

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2127:14

CAM-2 zero seven zero on the heading

2127:20

CAM-3 zero seventy

CAM-2 we must follow that ILS

2127:29

CAM-2 it is not centered the
localizer of the radial no

2127:31

CAM-1 I'm going to follow this--

2127:32

CAM-2 we must follow the identified
ILS

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

CAM-2 cero siete cero en el rumbo

CAM-3 cero setenta

CAM-2 hay que seguir ese ILS

2127:28

APP American four heavy contact Kennedy tower one one niner point one
good evening

CAM-2

eh esta como descentrado el
localizer del radial no

CAM-1

yo voy a seguir esto--

CAM-2

toca seguir el ILS identificado

2127:32

AAL40 nineteen one for American four heavy you have a good evening sir

INTRA-COCKPIT ENGLISH

TIME & SOURCE CONTENT

2127:36
CAM-1 to die

INTRA-COCKPIT SPANISH

TIME & SOURCE CONTENT

CAM-1 a morir

AIR-GROUND COMMUNICATIONS

TIME & SOURCE CONTENT

2127:35
APP thank you

2127:38
PAA1812 Kennedy approach Clipper eighteen twelve heavy with alpha's
descending to five thousand heading zero six zero

2127:43
APP Clipper eighteen twelve New York good evening

2127:52
APP TWA eight zero one heavy turn left heading two seven zero

2127:54
TWA801 two seven zero TWA eight zero one heavy

2128:10
CAM ((sound of trim in motion horn))

2128:11
APP Clipper eighteen twelve heavy descend and maintain four thousand

2128:15
PAA1812 Eighteen twelve heavy to four thousand

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2128:16

CAM-1 take it easy take it easy

2128:21

CAM ((sound of altitude alert chime))

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

CAM-1 tranquilo tranquilo

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2128:42

ELA102 ah approach for Evergreen one oh two heavy is one seven zero a good speed on final

2128:47

APP ah what's it gonna be in knots ah I don't know the MACH ah

2128:54

ELA102 ah yes sir a hundred and seventy knots on final for Evergreen is that okay

2128:48

CAM ((sound of altitude alert chime))

2128:55

CAM ((sound of altitude alert chime))

2128:56

CAM ((sound of trim in motion horn))

INTRA-COCKPIT ENGLISH

TIME & SOURCE CONTENT

INTRA-COCKPIT SPANISH

TIME & SOURCE CONTENT

AIR-GROUND COMMUNICATIONS

TIME & SOURCE CONTENT

2128:58 APP yeah that's fine ah I have a heavy jet seven ahead and he's about twenty knots slower that's due to the winds I'm gonna need you to slow twenty knots in three or four miles

2129:09 ELA102 okay sir

2129:11 R00-2 ah can you give us a final now Avianca zero five two heavy

2129:20 APP Avianca zero five two affirmative sir turn left heading zero four zero

2129:25 R00-2 zero four zero Avianca zero five two heavy

2129:24 CAN-1 zero four zero

CAN-1 cero cuatro cero

2129:30 CAN-1 give me a bug

CAN-1 deme bug

2129:33

CAN-2 zero four zero okay that's fine

CAN-2 cero cuatro cero okay ahi esta bien

2129:36

CAN-2 I'm giving you bugs for--

CAN-2 ahi le estoy dando bugs para--

11-20-48
SECRET

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2129:42
APP Evergreen one zero two heavy contact Kennedy tower one one niner point one good day

2129:46
ELAI02 ah good day

2129:58
PAA11 New York approach control it's Clipper one one heavy maintaining four thousand feet turning right to zero three zero what speed would like

2130:05
APP Clipper eleven heavy New York good evening speed one eight zero please

2130:09
PAA11 back to one eight zero for eleven heavy

2130:11
CAM-3 I have the lights on

2130:14
APP TWA eight zero one heavy turn left heading two five zero you're one five miles from outer marker maintain two thousand until established on the localizer cleared for ILS two two left

2130:21
RDO-2 Avianca zero five two heavy left turn two five zero and ah we're cleared for ILS

CAM-3 tengo las luces prendidas

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2130:25
CAM-1 what heading tell me

2130:27
CAM-2 two five zero

2130:32
CAM-2 two five zero in the heading

2130:33
CAM ((sound of landing gear warning horn))

2130:39
CAM-1 no no three three thousand
three thousand

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

CAM-1 que rumbo digame

CAM-2 dos cinco cero

CAM-2 dos cinco cero en el rumbo

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2130:26
APP . okay two called Trans World eight oh one you were cleared for the approach

2130:30
TWA801 Affirmative TWA eight oh one we got it we're out of three for two

2130:32
APP Avianca fifty two climb and maintain three thousand

2130:36
RDO-2 ah negative sir we just running out of fuel we okay three thousand now okay

INTRA-COCKPIT ENGLISHTIME & SOURCECONTENT

2130:50
CAM-1 tell me-

INTRA-COCKPIT SPANISHTIME & SOURCECONTENT

CAM-1 digame

AIR-GROUND COMMUNICATIONSTIME & SOURCECONTENT

2130:44
APP okay turn left heading three one zero sir

2130:47
R00-2 three one zero Avianca zero five two

2130:50
APP Clipper eighteen twelve heavy turn left heading three one zero

2130:52
PAA1812 eighteen twelve heavy left three one zero

2130:52
CAM ((sound of trim in motion horn))

CAM-2 three one zero in the-- CAM-2 tres uno cero en el

2130:53
CAM-1 flaps fourteen CAM-1 los flaps catorce

2130:54
CAM-2 three one zero CAM-2 tres uno cero

CAM-3 no sir are in-- CAM-3 no señor estan en

INTRA-COCKPIT ENGLISH

TIME & SOURCE CONTENT

2130:55
CAM-1 set flaps fourteen

2130:56
CAM-2 fourteen degrees

CAM-1 tell me heading what

2130:59
CAM-3 three six zero now

2131:00
CAM ((sound of trim in motion horn))

INTRA-COCKPIT SPANISH

TIME & SOURCE CONTENT

CAM-1 pongame catorce

CAM-2 catorce grados

CAM-1 digame el rumbo cua

CAM-3 tres seis cero ahora

AIR-GROUND COMMUNICATIONS

TIME & SOURCE CONTENT

2130:55
APP and Avianca fifty two fly heading of three six zero please

2130:58
RDO-2 okay we'll maintain three six zero now

2131:01
APP okay and you're number two for the approach I just have to give you enough room so you make it without ah having to come out again

2131:07
RDO-2 okay we're number two and flying three six zero now

<u>INTRA-COCKPIT ENGLISH</u>		<u>INTRA-COCKPIT SPANISH</u>		<u>AIR-GROUND COMMUNICATIONS</u>	
<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2131:12	CAM ((sound of altitude alert chime))				
2131:20	CAM ((sound of trim in motion horn))			2131:10	APP thank you sir
2131:22	CAM-1 three sixty no	CAM-1 tres sesenta no			
2131:23	CAM-2 three sixty	CAM-2 tres sesenta			
2131:25	CAM ((sound of trim in motion horn))				
2131:26	CAM-1 flaps fourteen	CAM-1 flaps catorce		2131:27	APP TWA eight zero one heavy you're eight miles behind a heavy jet contact Kennedy tower one one nine point one thanks for the help
2131:33	CAM ((sound of altitude alert chime))				

INTRA-COCKPIT ENGLISH

TIME &
SOURCE

CONTENT

INTRA-COCKPIT SPANISH

TIME &
SOURCE

CONTENT

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE

CONTENT

2131:33

TWA801 okay eight oh one roger and what's his ground-what's his airspeed.
do you know

2131:36

APP ah he's indicating ten knots slower eight miles

2131:38

CAM ((sound of trim in motion horh))

2131:39

TWA801 okay thank you

2131:42

APP thank you

2131:45

APP Clipper eighteen twelve heavy speed one six zero if practical

2131:47

PAA1812 Eighteen twelve heavy slowing to one fifty

2132:08

APP Avianca zero five two heavy turn left heading three three zero

2132:11

R00-2 three three zero on the heading Avianca zero five two

INTRA-COCKPIT ENGLISH

INTRA-COCKPIT SPANISH

AIR-GROUND COMMUNICATIONS

<u>TIME & SOURCE</u>	<u>CONTENT</u>	<u>TIME & SOURCE</u>	<u>CONTENT</u>
2132:14	CAM-2 three three zero the heading	CAM-2 tres tres cero el rumbo	
2132:37	CAM ((sound of trim in motion horn))		
2132:38	((sound of momentary power interruption to the CVR))		
2132:39	CAM-3 flame out flame out on engine number four	CAM-3 se apagaron--se apago el motor cuatro	
2132:41	((sound of momentary power interruption to the CVR))		
2132:42	CAM-1 flame out on it	CAM-1 se apago	
2132:43	CAM-3 -flame out on engine number three essential on number two on number one	CAM-3 se apago el motor tres essential en number one--el dos--en el uno	

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2132:49
RDO-2 Avianca zero five two we just ah lost two engines and ah we need
priority please

2132:54
APP Avianca zero five two turn left heading two five zero intercept
the localizer

2132:59
RDO-2 roger

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

CAM-1 muestrame la pista

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2132:49
CAM-1 show me the runway

2132:56
CAM ((sound of engine spooling down))

2132:57
CAM-2 two five zero CAM-2 dos cinco cero

2133:00
CAM-1 select the ILS CAM-1 pongame e1 ILS

2133:01
CAM-2 ILS

2133:03
CAM-2 it is on the number - two CAM-2 esta en e1 numero dos

INTRA-COCKPIT ENGLISH

TIME &
SOURCE CONTENT

2133:04
CAM-1 select the ILS let's see

INTRA-COCKPIT SPANISH

TIME &
SOURCE CONTENT

CAM-1 pongame el ILS haber

AIR-GROUND COMMUNICATIONS

TIME &
SOURCE CONTENT

2133:04

APP Avianca zero five two heavy you're one five miles from outer marker maintain two thousand until established on the localizer cleared for ILS two two left

2133:12

RDO-2 roger Avianca

2133:14

APP Clipper eighteen twelve turn left heading two two zero

2133:18

PAAR12 Clipper eighteen twelve left two two zero

2133:15

CAM-1 that no--that

CAM-1 que no--que

2133:22

CAM-1 did you select the ILS

CAM-1 ya me puso el ILS

2133:23

CAM-2 It is ready on two

CAM-2 ya esta listo--el dos

2133:24

((end of recording))

APPENDIX C

FAA TRAFFIC MANAGEMENT

ATC Central Flow Control

The ATC Central Flow Control Facility (CFCF) in Washington, D.C., monitors airport flow programs nationwide. On the evening of the accident, an expanded quota flow program to restrict traffic was in effect for JFK airport. All operating positions at the CFCF are linked through a communications system, including an Apollo computer, to all ATC facilities. Normally, the workload is distributed to specialists at the CFCF by dividing the country into five geographical areas, the northeast, southeast, north central, south central and west. A specialist is assigned to each area. However, the sectors can be broken down in order to best accommodate the system.

One of the tools available to CFCF specialists for monitoring traffic is the aircraft situation display (ASD). Each specialist also maintains direct contact with the facilities in his or her area. At the end of a shift, a specialist can retrieve a Verification and Analysis Report from the computer to determine the effectiveness of a given program.

When the supervisor came on duty on the evening of January 25, 1990, the shift was fully staffed with seven or eight specialists. He stated that there were 10 traffic management programs already in effect, described as "a little high," because of the number of ground delay programs in effect that evening. The supervisor assigned specialists to airports determined to require special attention instead of assigning them by geographical boundaries, as follows: one specialist to Boston and the rest of the northeast, one specialist to LaGuardia and Newark Airports, one specialist to JFK and Philadelphia, one specialist to Chicago's O'Hare Airport, one specialist to the west, one specialist to the southeast, and one specialist to the south central United States.

From a weather briefing, the supervisor learned that a weather system existed that was affecting the air traffic system. It extended from the Gulf of Mexico to New England. The JFK traffic management program had been implemented between 0900 and 1000 and was intended to reduce the number of airplanes arriving each hour at JFK Airport beginning at 1400.

The acceptance rate of 33 airplanes per hour was established for the JFK program. The day watch supervisor had discussed with the NY TRACON traffic management specialist weather problems that New York area airports were expected to encounter throughout the day.

With regard to the JFK traffic management program, international flights were exempt from being placed on ground delays at their departure airports. Therefore, in order to implement the program effectively, available arrival slots were established for international flights by placing a sufficient number of US domestic flights on ground delays.

FAA order 7210.47A, Traffic Management System Handbook, states that the purpose of a ground delay program is to maintain acceptable traffic levels and/or limit airborne holding within an arrival center or approach control area.

In addition, certain domestic airports can be exempt from ground delays for flights departing JFK because of unique situations at those departure airports. Chicago's O'Hare and Midway Airports are sometimes exempt from a ground delay program due to congestion and limited ramp space. It is the decision of the CFCF shift supervisor whether to exempt certain airports from a ground delay program. On January 25, 1990, O'Hare and Midway Airports were exempt from the JFK ground delay program.

Since runway 22 left was the only operating runway at JFK, a landing rate of 33 airplanes per hour was considered permissible. Around 1630, the weather at JFK had become worse than previously forecast. The airborne inventory of airplanes increased because of missed approaches, and it became necessary to implement ground stops, for intermittent periods, for the rest of the evening.

When the CFCF becomes aware of information that affects the system or a particular airport, an advisory is sent through Aeronautical Radio, Inc., (ARINC) to inform users about the situation. ATC facility traffic management units make every effort to keep the CFCF advised of problems and delays. If the facilities do not provide information, no data can be disseminated by the CFCF to the users. It was usual practice that a 30-minute airborne delay would prompt CFCF action to adjust traffic flows and issue an advisory. However, there was no formal requirement for a specialist to take action, and such action was a decision of the specialist. The CFCF is not normally advised of cumulative holding times of airplanes as they proceeded toward their destination airports.

A specialist at the CFCF monitors the effectiveness of a program by comparing the number of airplanes that land during a particular hour with the acceptance rate at which the program was set. The specialist calls the tower at the airport where a program is in effect, and the tower provides him with the number of departure airplanes for the previous hour.

A review of the CFCF traffic management program and associated data for JFK on January 25, 1990, revealed that airplanes were holding for as long as 95 minutes while waiting to land at JFK. This value is the total holding time for a single holding fix and would not have included the time at previous holding fixes.

JFK's Ground Delay Program

At 0630, on January 25, 1990, the CFCF specialist and the NY TRACON specialist (N90) discussed the weather forecast for the New York area. The discussion focused on how the forecast winds and weather conditions could affect arriving airplanes at JFK and other New York airports during the afternoon and evening. The specialists scheduled another discussion after

meteorologists at the affected ATC facilities had an opportunity to review the weather situation.

At 0633, N90 advised Boston Center that JFK had just become a single landing runway and that the NY TRACON specialist would need 30 miles in-trail for traffic arriving at JFK via the LOVES fix. N90 advised Boston that the restriction would be necessary until 0800.

At 0644, JFK tower informed the CFCF that it had changed runways because of rain and fog and that it was now using runway 22 left for landings and runway 22 right for departures.

At 0701, N90 advised the CFCF that "we got a lot of problems already." Because of the surface wind, JFK had to begin ILS approaches to runway 22 left. Then, LaGuardia Airport (LGA) had to conduct ILS approaches to runway 13 for landing traffic and to use runway 4 for departure traffic. This action was taken to prevent airplanes from conflicting with each other while on approach to or departure from JFK or LGA. Also, arrivals to Newark Airport (EWR) had to use the ILS to runway 4. In addition, restrictions were placed on the number of arrivals per hour at Teterboro Airport (TEB), New Jersey, because of the takeoff and landing configurations at EWR, LGA, and JFK.

At 0746, a telephone conference was held between N90 and the CFCF. The need for a JFK ground delay program was discussed. N90 advised the CFCF that he believed JFK might have to change to ILS runway 13 left arrivals because of the strong southeast winds that were forecast. N90 relayed the same information to JFK, LGA, EWR, and TEB regarding active runways and expected departure delays. Concerning what the arrival rate should be, based upon the configuration of landing runway 13 left at JFK, N90 noted that they "may only be able to do 28, that's a reality today, it's one of those unfortunate days."

The CFCF specialist asked, "you don't think you can do 30 of 32?" N90 responded, "I doubt it, though we could probably run a program around 30, though."

N90 informed the CFCF that the engineered performance standards (EPS) reflected an arrival rate for runway 13 left of 26 per hour. N90 also informed the CFCF that the EPS does not take into account the additional separation required for heavy jets. The CFCF informed N90 that in addition to the JFK program there were seven programs in effect for other airports and that a Boston program would also be implemented. The CFCF specialist stated that the number of programs implemented could help the situation and added that because of snowfall in Chicago, United Airlines would be reducing its traffic for that area. The conversation was terminated with the understanding that CFCF would compute the program and discuss it with N90 before implementing it.

The daily briefing for the major ATC facilities and users began at 0816. It consisted of forecast weather conditions and how those weather conditions would affect the major airports throughout the day. The CFCF

specialist conducting the briefing advised that JFK would probably use the ILS approach to runway 13 left because of forecast winds out of the south. He also stated that a ground delay program would be implemented for JFK and that it would begin at 1400. N90 stated the problems that would be encountered if JFK were forced to change to ILS runway 13 left arrivals, and especially how such a change would affect the rest of the New York Metropolitan Area airports. When the briefing was given, JFK was operating on runway 22 left. It was stated in the briefing that sporadic airborne holding was already taking place in PHL, BWI, LGA, and EWR. The briefing was concluded at 0835.

At 0839, Boston Center (ZBW) informed the CFCF that the Moncton (New Brunswick) and Gander (Newfoundland) Centers had advised that the overseas traffic would arrive between 1430 and 1600. ZBW stated that there were 55 arrivals and that they appeared to be on schedule.

At 0855, the CFCF informed N90 that a JFK program had been established for an arrival rate of 33 airplanes per hour. The CFCF stated that the maximum ground delay would be 133 minutes, with an average of 84 minutes. He also said that "figuring in the disruption with the rest of the system and one or two guys quitting, I feel that's a fair ground delay. If I go to a 32 rate, it goes to 150; if I go to a 30 rate, it puts it up to about 190 minutes maximum. I think that's in the ball park, but I want your blessings also. N90 asked if the CFCF would wait 10 or 15 minutes, because he wanted to check with someone else. N90 then said, "33 an hour sounds..." The CFCF responded, "Well you are not going to get that, I really can't put 3-hour ground delays out." N90 stated, "No, no, I, I agree." N90 then stated, "Well, why don't you go with it." The CFCF advised that the program would run from 1400 until 2159. At 0909, the CFCF advised all domestic ARTCCs that the JFK program was being transmitted.

At 1010, N90 called the CFCF to express concerns about the JFK program and to inform the CFCF that he intended to implement "some very heavy restriction," despite the ground delay program. The CFCF advised, "do whatever you got to do...as worst scenario we are going to be on the ILS thirteen...and at best, I think we're looking at 22: with a single runway, anyway." At 1019, New York Center (ZNY) began implementing in-trail restrictions with adjacent ARTCCs for JFK arrivals.

At 1102, ZBW called the CFCF to ask whether it could reduce the in-trail restrictions requested by N90 for traffic landing at JFK. ZBW stated that the 20 miles in-trail restriction inbound to JFK would be difficult to accomplish since there were 50 airplanes coming and "the ground delay program does nothing for this European traffic." At 1607, the CFCF called N90 and explained that ZBW had requested a reduction in the 20 miles in-trail restriction during the time that the overseas traffic was arriving. To accomplish this reduction ZBW had suggested that additional restrictions be placed on ZNY and Washington Center (ZDC). N90 stated that he did not have room for these restrictions and that he was expecting the wind to begin gusting in the next hour. N90 suggested that they discuss the problem with ZBW, ZDC, and JFK to arrive at a reasonable solution. N90 also stated, "I have a worst-case scenario operation."

At 1100, a telephone conference was held involving N90, ZBW and JFK. CFCF asked ZNY if they would be able to accept additional in-trail restrictions from 1400 until 1530. ZNY stated "...if that's the way it has to be, that's the way it has to be." ZNY advised that if they were required to implement 30 miles in-trail, they would go into an airborne hold. The CFCF stated that he realized that a hold would be necessary but noted that "the point is to put the least number of airplanes in the hold at the appropriate time during the overseas rush. Boston has a heavy volume of traffic. I would just like to move the restrictions around from one point to the other during the least heaviest period of traffic."

N90 stated that he would be "real lucky" on an ILS to runway 13 left to be able to "do 25 arrivals an hour." ZBW stated that he had 55 arrivals coming in a 2 1/2 hour period, and said "what's airborne from us is going to fill up your final for 2 1/2 hours if you look at it that way." N90 then stated, "Yea, see central, that's the unfortunate reality of the operation tonight. If you want us to work the internationals, we'll do that but you're going to have to understand that, ah, the only, the only reasonable option is to give us only a few arrivals from everywhere else, possibly a ground stop."

The discussion also centered on whether to reduce the in-trail restriction for ZBW to 15 miles. The JFK sector supervisor at N90 then stated, "even with the 20...I just don't want anybody to be surprised if we're going to be in a hold." N90 stated, "there's just nothing I can do about it...33 like we ran is really unrealistic. Twenty-five is more what we can run and that's if everything goes well...if we're shooting at 33 I guarantee we'll be holding by 33."

After further discussion, it was determined that the solution would be for a good estimate of how the traffic was moving at the beginning of the "push." Such a push would involve using in-trail restrictions already implemented and to implement a ground stop for the first 90 minutes for the first tier ARTCCs and for the internal departures of N90, ZNY, and ZBW. All facilities agreed that this method would probably be the best one for preventing an airborne hold. The conference terminated at 1120.

At 1227:22, ZBW contacted the CFCF to discuss the JFK situation. The facility informed the CFCF that Canada had notified them that there were "at least 60 planes coming in that'll be coming in over ERICK." He informed the CFCF that if ZBW were to get "shut off and have to go into a hold, all our alternate airports here are below minimums or at minimums." He stated that he would like to have a backup plan and inquired about the possibility of bringing some of the traffic over CAMRN (the ZNY arrival fix for JFK). ZNY told ZBW that the best he could offer would be for ZBW to call on an airplane by airplane basis and to determine if they could allow the reroute over CAMRN. ZNY explained that he was anticipating problems over CAMRN as well and that he already had large in-trail restrictions imposed on ZDC for the CAMRN traffic.

At 1301, ZBW again asked ZNY about the possibility of bringing some of the overseas arrivals into ZNY airspace. ZNY stated that he could not

approve the request. ZNY informed ZBW that he was aware of two long-distance flights that would arrive through ZBW airspace via the Kingston arrival. ZNY advised ZBW, "Okay when they come in the picture just give us a heads up and we'll see what we can do for you." ZNY then asked the CFCF, "who is taking care of the Kennedy stuff tonight"? The CFCF named the specialist who was responsible, stating, "give him a message, I hope his program is strong enough because I got bad vibes." ZBW then stated, "you can put Boston on record for that too."

At 1345, N90 called the CFCF to inform him that the CFCF's aircraft situation display (ASD) was not operating, and he asked if this ASD was the only one that was inoperative. The CFCF informed N90 that all ASDs were down.

At 1525, an unrecorded call was made to the CFCF advising, "I need to speak to New York Center; I'm in a hold for Kennedy over Kingston." The CFCF responded that ZNY was on another line, but "looking at the ASD I wouldn't think it's too bad because he's got about five of them out there west side going to LENDY, looks like one of them is spinning and there is only three of four coming from the south so I wouldn't think it's too bad." The caller stated that he had two holding for JFK but that if he did not get an update soon he would have to take them to ERICK, contrary to his wishes.

At 1547, N90 informed the CFCF that runway 22 right at JFK had insufficient visibility for approaches and that there had been three or four missed approaches on runway 22 left. He also stated that he had more than 12 airplanes on vectors, but "virtually we have no arrivals."

At 1601, the CFCF asked ZNY if he wanted to ground stop Kennedy's arrivals. ZNY responded, "not yet." At 1604, the CFCF asked ZBW if he wanted to stop his "internals" (airplanes departing from within ZBW airspace) or "anything" for Kennedy. ZBW responded, "I already did." At 1604, the CFCF informed ZDC that airplanes were making missed approaches on runway 22 left and that 22 right was below minimums at JFK. ZDC wanted to know the number of airplanes enroute to JFK through ZDC airspace. The transcript reveals approximately eight airplanes enroute to JFK that were either in ZDC airspace or could be expected to enter ZDC airspace. ZDC stated, "If that's all...we'll go ahead and not do anything for now."

At 1621, ZOB (Cleveland ARTCC) informed the CFCF that they were holding airplanes for JFK and it was their understanding that every other airplane was making a missed approach. At 1623, the CFCF called ZOB back and suggested that they implement a ground stop for traffic landing at JFK, "going back to Minney [Minneapolis ARTCC/ZMP] Chicago [ARTCC/ZAU] and INDY [Indianapolis ARTCC/ZID]." ZOB agreed. The CFCF informed ZMP, ZAU, ZID, and ZKC (Kansas City ARTCC) to ground stop departures to JFK until 1730. The transcript reveals that between ZOB and ZDC approximately 17 airplanes were discussed as being enroute to JFK. About 12 or 13 airplanes were in N90 airspace and, according to information from ZNY, 10 airplanes were holding at CAMRN and LENDY intersections, and AVP (over Wilkes-Barre, Pennsylvania), between 1600 and 1630. Thus, approximately 39 airplanes were in the airborne

inventory, not including traffic from ZBW or airborne traffic beyond these ARTCCs.

The CFCF specialist's worksheet included the following entries:

2020 [1520 eastern standard time (EST)] - 22R BLO 22L, 4 misses, may have to change to RW13 ILS.

2102 [1602 EST] - JFK missing on 22L - VSBY LO. ACFT holding, will try ILS 13, however, RVR [runway visual range] is only about 100' more.

2102 - ZBW ground stopped internals to JFK. Req if ZNY want grnd stop - they advise no.

The N90 TMU log includes the following entry at 1602 EST:

JFK: VSBY/RVR decrsng; numerous missed apches; CF2 will ground stop 1st/2nd tier centers, landing JFK....

The ZDC TMU log contains the following entry at 2125 [1625 eastern standard time]:

In Hold for JFK - 9 flights in ZDC. Rx.

At 1625, ZNY informed the CFCF that arrival delays to JFK had exceeded 15 minutes at 1611 and would exceed 30 minutes at 1626.

At 1627, ZDC called ZNY to ask, "how long we're going to be on hold for the Kennedys?" ZNY responded, "they just started running them I think they're taking them 20 [miles] in-trail. As soon as we clean them out we'll start taking them from you." ZNY also explained that the weather was affecting the approach, "It's blowing off the water...it goes down and it comes up it goes down and it comes up."

At 1631, N90 informed the CFCF that airplanes were again making approaches to runway 22 left. He also informed the CFCF that the visibility was 1/4 mile and that the RVR was 2,000 feet.

At 1640, the CFCF advised N90 of an aircraft inbound to JFK that needed a "priority" landing because of a sick passenger. At 1643, ZNY asked ZOB if the pilot had requested priority handling because of the holding for JFK. ZNY stated, "I want to make sure that if we are going to run him priority that he is declaring a priority handling." ZOB confirmed that the pilot was indeed requesting priority because of the sick passenger.

At 1647, the CFCF initiated a call to JFK to request the number of arrivals and departures for the 1400 and 1500 hours. JFK informed the CFCF that from 1400 to 1459 there were 17 arrivals and 10 departures at JFK. From 1500 to 1559, there were 31 arrivals and 1 departure at JFK.

At 1651, ZNY informed the CFCF that JFK arrival delays had decreased to fewer than 30 minutes at 1626 and to fewer than 15 minutes at 1635.

At 1659, N90 informed the CFCF that the RVR at JFK was "just over three grand [3,000 feet]," and advised that "as long as it stays where it is we're going to be fine." At 1700, the CFCF called ZNY to determine their holding situation. ZNY advised that they were taking traffic destined for JFK from ZOB. Because they had room for them. ZOB informed asked CFCF not to cancel the ground stop because he had eight airplanes remaining in his holding stack. The CFCF replied, "Okay you let me know when."

At 1705, ZOB told the CFCF, "I guess they are slowly surely taking these Kennedy guys. Go ahead and let them go." ZOB asked the CFCF to monitor the situation, and the CFCF stated that he would do so as soon as the ASD came back on line. The CFCF contacted ZMP, ZAU, and ZKC at 1705 and instructed them to cancel the ground stop for JFK.

At 1706, the following entry was recorded in the N90 log, "JFK: hold CAMRN. We'll favor LENDY due to demand/ASD." The 1708 ZNY log entry states, "Holding CAMRN."

At 1710, ZBW informed ZNY that there was an airplane holding at Kingston that had been holding for nearly an hour. ZBW inquired whether ZNY could get the airplane started toward JFK. ZNY replied, "I'll see if I can get him through for you." The CFCF log also noted that the ASD computer was back in service at 1710.

At 1733, N90 provided an update to the CFCF regarding the New York Metropolitan airports. Regarding JFK, he stated, "Kennedy has been fluctuating but they have been mostly above minimums so they're running okay." At 1739, the CFCF was informed that the arrival delays for JFK exceeded 15 minutes at 1724 and exceeded 30 minutes at 1739.

The N90 log entry for 1745 states, "JFK: based on ASD/demand, we'll hold LENDY and accept CAMRN TFC." An entry at 1751 stated that CAMRN traffic would be accepted 10 miles in-trail and LENDY traffic would continue to hold. AT 1753, N90 informed the CFCF regarding CAMRN, "I see Washington's holding and New York down to the southeast...whatever we can accept we're accepting."

At 1803, ZNY requested a ground stop for JFK traffic arriving from the south. He informed the CFCF, "we're looking at extensive delays until they get that CAMRN area and Washington Center cleared up." A discussion was held concerning the number of airplanes headed toward ZCC airspace enroute to JFK. The CFCF asked ZDC if airplanes were being held at Raleigh, North Carolina. ZDC responded, "I don't know if they are holding down there yet, they might still be driving them on up if we only got four up at the north side they're going to drive them up, E area can hold a bunch more."

ZNY told ZDC that it appeared that ZDC traffic would have to hold a minimum of 45 minutes. The ZDC log has the following entry at 1807, "Ground

stop JFK due to weather." The log entry for ZDC for 1810 is, "observing numerous A/C diverting due to long holding delays." A ZNY log entry at 1836 stated, "holding CAMRN/LENDY due vol."

Among other entries regarding holding at CAMRN, ERICK and LENDY fixes, the log at 1837 for N90 shows "JFK: hold CAMRN and ERICK, vol." and at 1841, "JFK: radar CAMRN, 10 MIT based on vol/ASD."

The ZDC log states at 1915 that the "in house" ground stop for JFK was cancelled. At 1935, the N90 log reflected a radar operation (traffic being handed off to another controller via automation and no verbal coordination necessary) for traffic at CAMRN.

At 2007, JFK reported to the CFCF and N90 that departure delays had exceeded 30 minutes due to "IFR weather missed approaches arrivals crossing the departure runway and aircraft timing out at the No. 1 position."

At 2035, a shift change occurred and a different specialist from CFCF took over monitoring the JFK program. He called JFK to inquire about the weather conditions. JFK responded, "It's pretty bad, we got all sorts of windshears and missed approaches due to not seeing the runway...we're ILS two two left trying to depart two two right...the wind's starting to pick up so there is no chance of us making any runway change...out of the last hour I think 20 percent of the guys attempted approaches went on to miss." Traffic count information provided by JFK indicates that seven airplanes executed missed approaches between 1900 and 1959.

At 2036, the CFCF called N90 to inquire about the holding situation. N90 stated that "we're still working out of a hold." CAMRN was still holding, "but they've only got a few that I can see real close." N90 also advised that there was "a front coming through it's about 15 miles west of Newark right now."

At 2038, the CFCF was advised that arrival delays had exceeded 45 minutes at JFK at 1948 and had dropped below 45 minutes at 1950.

At 2040, the CFCF and N90 had a discussion about the approaching weather and how some departures from the New York Metropolitan airports would be held on the ground and some would be rerouted around the weather. At 2040, the CFCF specialist had entered on his work sheet, "JFK tower advises 20 percent arvl's have m.a. [missed approaches] in past hour, due to windshear G-stop/0300Z [Ground stop at 2200 EST]. A ground stop, however, was not implemented until 2057, when the CFCF conferred with ZNY and ZDC. At 2057, the list of airplanes filed for JFK indicated that five should still have been held on the ground. At 2059, a ground stop for traffic arriving at JFK was implemented for ZNY, ZDC, ZOB, ZID, ZTL (Atlanta ARTCC), and ZJX (Jacksonville ARTCC). An advisory was sent by the CFCF at 2059 indicating that first tier centers would ground stop traffic to JFK until 2200.

At 2047, the approximate time that AVA052 was cleared out of the CAMRN holding pattern into N90 airspace, an entry in the N90 log states, "JFK: holding CAMRN; favoring 4 acft holding at LENDY that are being impacted by WX [weather]."

At 2125, ZOB asked ZNY when they (New York Center) might be able to take the airplanes holding in ZOB airspace, destined for JFK. ZOB stated that some of the airplanes had "to make a decision now whether they got to divert or not." ZNY advised ZOB that it would be "anywhere from 45 minutes to 60 more minutes at the latest." ZNY also advised that they were still "holding a lot" and that a storm would probably hit JFK "in the next half hour."

At 2138, ZID called CFCF to discuss the ground stop for JFK and other New York airports. The CFCF advised that the ground stop for JFK may extend beyond 2200, "because they're doing a lot of holding."

At 2143, N90 informed the CFCF that radar contact had been lost with an Avianca flight and that traffic in and out of JFK had been stopped. An entry in the N90 log at 2135 states, "JFK: holding all fixes...emergency in progress." An entry in the CFCF log at 2146 states, "JFK...all arrivals stopped due to assumed crash of Avianca Flt 52 approx 15 miles ne of JFK."

The CFCF log had the following entry at 2200, "JFK resuming approaches due to confirmed crash site per N90." At 2206, the N90 log entry states, "TMU, resumed JFK arrvls, 15 mit [miles-in-trail]."

At 2204, the CFCF conference called with ZNY, ZDC, ZBW and ZID to determine the number of airborne airplanes still holding for JFK. Approximately 20 to 25 airplanes were still in holding patterns awaiting to land at JFK.

APPENDIX D
ATC TRANSCRIPT

This transcription covers the time period from January 26, 1990 UTC date, 0104 to January 26, 1990 UTC date, 0153 UTC.

<u>Agencies Making Transmissions</u>	<u>Abbreviation</u>
New York ARTCC, Position H67	H67
New York ARTCC, Position R67	R67
New York TRACON, JFK Arrival	N90
Washington ARTCC, Sector 51	ZDC51
Washington ARTCC, Sector 59	ZDC59
Transworld Airlines Flt 33	TWA33
Aeronaves de Mexico S.A. Flt 406	AMX406
Avianca Flt 052	AVA052
Air France	AFR026
Westwind Jet N422AW	N422AW
Saudi Arabian Airlines Flt 024	SVM024
Pan American World Airways Flt 224	PAA224
Pan American World Airways Flt 1812	PAA1812

I HEREBY CERTIFY that the following is a true transcription of the recorded conversations pertaining to the subject aircraft accident:


Gerald S. Mongrain

Quality Assurance Specialist

(0104)

0105:12

TWA33

Ah TWA thirty three with you outa flight level two zero seven for one niner zero.

0105:16 R67 TWA thirty three heavy New York Center
roger holding instructions at CAMRN when
you're ready.

0105:21 TWA33 Roger go ahead.

0105:23 R67 TWA thirty four cleared to CAMRN hold at
CAMRN as published, left turns, ten mile
legs, maintain flight level one nine
zero, expect further clearance at zero
one two five.

0105:35 TWA33 Ok we'll steer zero one two five and ah
hold at CAMRN as published ah ten mile
legs ah flight level one niner zero left
turns could you make it twenty mile
legs?

0105:45 R67 Negative six ah twenty will spill out ah
everyone else is diverting I need you
ten.

0105:50 TWA33 Roger ah understand ten mile legs ah TWA
ah (unintelligible).

0105:54 R67 Thank you.

(0106)

(0107)

0108:42 R67 TWA thirty three descend and maintain
one three thousand Kennedy altimeter two
nine seven one.

0108:48 TWA33 Down to one three thousand twenty nine
seventy one ah TWA thirty three.

0109:03 TWA33 And ah TWA thirty three leaving one nine
oh.

0109:05 R67 TWA thirty three roger.

0109:43 TWA33 And ah confirm the altimeter twenty nine
seventy one.

0109:46 R67 Two nine seven one.

0109:49 AVA052 New York Kennedy Avianca zero five two heavy good evening ahh leveling at one niner zero.

0109:54 R67 Avianca zero five two heavy New York Center good evening I'll have holding instructions at CAMRN when you're ready.

0109:59 AVA52 Alright.

0110:01 R67 Avianca zero five two heavy cleared to CAMRN CAMRN's your clearance limit hold as published, left turns, ten mile legs, and ah, maintain flight level one niner zero expect further clearance at zero one three zero.

0110:20 AVA502 Avianca zero five two heavy cleared to CAMRN and ah we'll hold as published ah left turns ahh I missed ah how much legs, how much ah nautical mile.

0110:33 R67 One zero, ten mile legs.

0110:35 AVA052 Ten mile legs maintaining one niner zero and expect further clearance zero one three zero.

0111:11 PAA224 Ah New York Clipper two two four.

0111:33 PAA224 Ah New York Clipper two two four.

0111:36 R67 Clipper two twenty four go ahead.

0111:38 PAA224 Yes sir. How's that fifteen time lookin for us.

0111:41 R67 Um I'm gonna give him a call any second now I'll let you know.

0111:44 PAA224 Ok thank you.

(0112)

0113:56 TWA33 .. And TWA thirty three entering the hold at CAMRN.

0113:59 R67 TWA thirty three roger.

0114:05 R67 Clipper two twenty four the EFC at fifteen not looking too good however before I give you a new one just hold off a minute or two sir approach control gonna call me back give me an idea what's goin on.

0114:14 PAA224 Ok ah two two ah four thank you sir.

0115:43 R67 Avianca zero five two descend and maintain one four thousand Kennedy altimeter two nine seven one.

0115:49 AVA052 Descend and maintain one four thousand two niner seven one Avianca zero five two heavy.

0116:44 R67 Clipper two twenty four they said about another ten minutes sir expect further clearance at ah zero one three zero.

0116:50 PAA224 Ah ah roger ahhh about another fifteen minutes then zero one ah three zero that's the limit for us ah well have to divert on it.

0116:59 R67 Ok keep me advised sir and I'll let you know if ah anything changes.

0117:02 PAA224 Ok fine thank you very much.

0117:04 R67 Your welcome.

0117:06 R67 Air France zero two six expect further clearance zero one three three.

0117:10 AFR026 Zero one three three further ah
expectations Air France zero two six
heavy.

0117:16 R67 .. TWA thirty three expect further
clearance zero one three six.

0117:21 TWA33 Zero one three six.
(unintelligible).

0117:27 R67 Say again.

0117:30 TWA33 TWA thirty three expect further
clearance zero one three six.

0117:33 R67 TWA thirty three roger.

0117:36 R67 Avianca zero five two ah
(unintelligible) expect further
clearance zero one three nine.

0117:41 AVA052 Ok zero one three nine ah
(unintelligible) Avianca zero five two
heavy.

0118:04 TWA33 And TWA thirty three requesting ah
holding speed at about two hundred
thirty knots or less is still valid.

0118:09 R67 Ok just ah no more than ten mile legs
sir.

0118:12 TWA33 Affirmative.

(0119)

0120:30 PAA224 Ah New York the Clipper two two four.

0120:33 R67 Clipper two two four good news ah we
have a turn into Kennedy for you now.

0125:16 AFR026 One two seven four Good bye.

0125:18 R67 Good night.

0125:27 R67 TWA thirty three heavy descend and maintain one one thousand.

0125:31 TWA33 TWA33 thirty three heavy down to one one thousand leaving on three thousand.

0125:47 AFR026 Ah confirm frequency for Air France ah zero two six heavy I'm sorry.

0125:51 R67 Air France zero two six heavy one two seven point four.

01225:54 AFR026 Roger thank you very much.

0125:57 R67 Good night.

0126:43 R67 TWA thirty three heavy turn left heading zero three zero.

0126:47 TWA33 Left heading zero three zero TWA thirty three heavy.

0126:51 R67 And TWA thirty three heavy maintain speed of ah two one zero.

0126:55 TWA33 Two hundred and ten knots TWA thirty three heavy.

0126:58 R67 Roger.

0127:47 R67 TWA thirty three heavy ah fly heading zero four zero.

0127:49 TWA33 Ok zero four zero TWA thirty three heavy.

0127:52 R67 Avianca zero five two heavy cleared to the Kennedy Airport via fly heading two three zero descend and maintain, one--one two thousand.

0128:01 AVA052 Descend and maintain one two thousand on a heading two three zero Avianca zero five two heavy.

0128:07 R67 Avianca zero five two heavy roger.

0128:39 R67 TWA thirty three heavy contact New York Approach one two seven point four good night.

0128:44 TWA33 Twenty seven four TWA ah thirty three heavy so long.

0129:30 R67 Avianca zero five two heavy traffic eleven o'clock and ah six miles opposite direction at one one thousand maintain one two thousand.

0129:39 AVA052 And we're looking for it, and we'll maintain one two thousand Avianca zero five two heavy.

0129:43 R67 Roger.

0129:45 PAA1812 New York Center Clipper eighteen twelve heavy at ah one seven thousand.

0129:49 R67 Clipper eighteen twelve heavy New York Center roger Kennedy altimeter two niner seven one.

0129:55 PAA1812 Eighteen twelve heavy two nine seven one.
(0130)

0131:37 R67 Avianca zero five two heavy turn left heading zero four zero descend and maintain one one thousand.

0131:44 AVA052 Left heading zero four zero Avianca zero five two heavy descend and maintain one one thousand.

0139:49 R67 Avianca zero five two heavy roger maintain speed two one zero.

0131:53 AVA052 Maintain two one zero knots Avianca zero five two heavy.

(0132)

(0133)

0134:18 R67 Clipper eighty one twelve heavy descend and maintain one two thousand.

0134:22 PAA1812 That Clipper eighteen twelve to one two thousand.

0134:26 R67 I'm sorry Clipper eighteen twelve descend and maintain one two thousand.

0134:29 PAA1812 Eighteen twelve heavy out of one seven for one two thousand.

0134:32 R67 Avianca zero five two heavy ah turn left go left three sixty left three sixty for Avianca zero five two.

0134:41 AVA052 Turn left three sixty for Avianca zero five two heavy.

0134:43 R67 Roger

0134:46 R67 Clipper eighty one twelve heavy cleared to the CAMRN intersection hold southwest as published maintain one two thousand expect further clearance time zero one four zero.

0135:05 R67 Clipper eighteen twelve heavy cleared to the CAMRN intersection maintain one two thousand hold southwest as published expect further clearance zero one four zero.

0135:14 PAA1812 CAMRN ah hold as published ah zero one four zero at twelve thousand Clipper eighteen twelve heavy.

0135:20 R67 Roger.

0135:24 N442AW Evening New York westwind four two two Alfa Whiskey one niner zero.

0135:28 R67 Four four two Alfa Whiskey New York Center roger.

0135:35 R67 Avianca zero five two heavy ah RVR at Kennedy is ah twenty four hundred feet can you accept an approach?

0135:42 AVA052 That's affirmative sir.

0135:43 R67 Avianca zero five two roger.

0135:46 R67 Clipper eighteen twelve heavy what type of RVR do you, do you, do you need to thirteen left.

0135:52 PAA1812 Thirteen left ah we'll look it up, and its probably, ah is that a cat two approach.

0135:58 R67 Ah stand by one we just wanna confirm this thirteen left stand by one.

0136:03 PAA1812 Ok, ah eighteen twelve is a cat three aircraft.

0136:05 R67 Ok.

0136:50 R67 Avianca zero five two ah say your heading at this time.

0136:54 AVA052 Ah we're passing ah one five zero.

0136:58 R67 .. Avianca zero five two continue to the left heading two three zero vectors for holding at CAMRN again.

0137:04 AVA052 Ok two three zero vectors for holding at CAMRN.

0137:07 PAA1812 New York Clipper eighteen twelve.

0137:10 R67 Clipper eighteen twelve go.

0137:12 PAA1812 Sixteen hundred RVR for one three left.

0137:14 R67 Clipper eighteen twelve roger ah expect further clearance time now zero one five zero I'm gonna talk to Kennedy they just put us back in a hold.

0137:24 PAA1812 Roger zero one five zero now.

0137:28 R67 Ok and its ah twenty two's the runway in use at Kennedy now.

0137:33 PAA1812 Ok.

0137:35 R67 Westwind four two two Alfa Whiskey cleared to the CAMRN intersection hold southwest as published descend and maintain one five thousand expect further clearance time zero one five five.

0137:48 N422AW CAMRN to hold southwest as published at fifteen thousand zero one five five.

0137:54 R67 Four four two Alfa Whiskey I missed the altitude (unintelligible) five thousand.

0137:57 N422AW -- Yes sir we're leaving nineteen for fifteen now.

0138:00 R67 Thank you.

0138:53 AMX406 New York Center Air Mexico four zero six maintaining flight level one niner zero.

0138:58 R67 Air Mexico four zero six heavy New York Center roger cleared to the CAMRN intersection hold southwest as published maintain flight level one niner zero expect further clearance time zero two zero zero.

0139:10 AMX406 Ah roger ah cleared to CAMRN intersection we'll hold over CAMRN intersection and expect further clearance zero two zero zero.

0139:21 N422AW How about an altimeter for Alfa Whiskey please.

0139:25 R67 Four four two Alfa Whiskey I believe you asked for the altimeter two nine seven zero.

0139:27 N422AW Twenty nine seventy two Alfa Whiskey thank you.

0139:30 R67 Air Mexico four oh six heavy confirm assigned altitude flight level one nine zero.

0139:34 AMX406 Affirmative one niner zero.

0139:36 R67 Thank you.

0139:51 (UNK) Did you say they're landing on two two left now.

0139:54 R67 .. That's correct.

0139:52 (UNK) Thank you.

0140:17 R67 Four four two Alfa Whiskey maintain one four thousand.

0140:21 N422AW One four thousand and thats ah four two two Alfa Whiskey.

0140:24 R67 Four four two Alfa Whiskey sorry about that.

0140:27 N422AW No six four two two ALPHA Whiskey.

0140:30 R67 Four two two Alfa Whiskey all right let me change your flight plan.

0140:33 N422AW OK thanks.

0140:35 PAA1812 Ah Clipper ah eighteen twelve heavy entering the hold at CAMRN descending to one two thousand.

0140:43 R67 Clipper eighteen twelve heavy roger.

0141:39 R67 Westwind two Alfa Whiskey maintain one three thousand.

0141:42 N422AW One three thousand Alfa Whiskey.

014153 R67 Air Mexico four zero six heavy descend and maintain one four thousand Kennedy altimeter two nine seven zero.

0141:59 AMX406 Ah roger cleared to fourteen thousand the altimeter two niner seven zero Air Mexico four zero six.

0142:04 R67 .. Roger.

0143:20 R67 Liberty south DIXIE ninety three CAMRN ninety three point out.

0143:24 N90 Go ahead.

0143:25 R67 I get ah aircraft north of ZIGGY by a few miles leaving fourteen descending in the hold squawking ten fifty four.

0143:29 N90 Ok what kind of heading do you need Continental six eighty three on.

0143:32 R67 I'm sorry this is the CAMRN intersection.

0143:34 N90 Ah ok.

0143:35 R67 Alright.

0143:36 N90 Alright that's ah should be approved.

0143:37 R67 Thank you.

0143:38 N90 What's he descending to? What's his heading?

0143:40 R67 He's descending to thirteen .e's ah entering the hold at CAMRN.

0143:42 N90 Alright thanks. (initials)

0143:53 AVA052 Kennedy AVIANCA zero five two heavy.

0143:56 R67 Avianca zero five two heavy go ahead.

0143:59 AVA052.. Thank you sir you have ah any estimates for us.

0144:02 R67 Avianca zero five two heavy ah might be able to get you in right now stand by one.

0144:06 AVA052 Thank you.

0144:09 R67 Avianca zero five two ah we just got off the line its ah indefinite hold at this time Avianca zero five two turn left heading zero nine zero join the Deer Park two twenty one radial hold at CAMRN maintain one one thousand.

0144:23 AVA052 Ok Avianca zero five two heavy turning left zero nine zero to join ah two two one Deer Park radial and holding CAMRN.

0144:32 R67 Avianca zero five two roger.

0144:43 R67 Avianca zero five two heavy expect further clearance time zero two zero five.

0144:50 AVA052 Zero two zero five ahhhh well I think we need priority we're passing (unintelligible).

0144:58 R67 Avianca zero five two heavy roger how long can you hold and ah what is your alternate

0145:03 AVA052 Ok stand by on that.

0145:06 R67 Clipper eighteen twelve heavy expect further clearance time zero two ten.

0145:11 PAA1812 Eighteen twelve heavy zero two ten.
(unintelligible) field closed there now
(unintelligible).

0145:16 R67 Ah they just had a few aircraft try an
approach they all missed so ah there not
taking any traffic right now I guess
they have to wait a little bit ah trying
to talk to 'em over the land line
they're really not answering the line
its hard, hard to talk to 'em.

0145:30 PAA1812 Ok thank you.

0145:37 R67 Four two two Alfa Whiskey expect further
clearance time zero two one five.

0145:43 N422AW Ah roger zero two one five four two two
Alfa Whiskey.

0145:47 R67 Air Mexico four oh six heavy expect
further clearance time zero two two
zero.

0145:52 AMX406 Ah roger zero two two zero for Air
Mexico four zero six now reaching
maintaining one four thousand.

0145:57 R67 Roger.

0145:59 AVA052 Kennedy Avianca zero five two heavy.

0146:01 R67 Avianca zero five two heavy go ahead.

0146:03 AVA052 Yes sir ah we'll be able to hold about
five minutes thats all we can do.

0146:08 R67 Avianca zero five two heavy roger what
is your alternate?

0146:13 AVA052 Ah we said Boston but ah it is ah full of traffic I think.

0146:20 R67 Avianca zero five two say again your alternate airport.

0146:24 AVA052 It was Boston but we we can't do it now we, we, don't, we run out of fuel now.

0146:29 R67 Avianca zero five two ah just stand by.

0146:32 AVA052 Thank you.

0146:47 R67 Avianca zero five two heavy cleared to the Kennedy Airport via heading zero four zero maintain one one thousand speed one eight zero.

0146:57 AVA052 Ok cleared to the Kennedy, zero four zero on the heading, maintaining one one thousand one eighty on the speed thank you.

0147:04 R67 Avianca zero five two heavy contact New York Approach one two seven point four.

0147:08 AVA052 One two seven point four.

0148:59 R67 Clipper eighty one twelve heavy descend and maintain one one thousand.

0149:03 PAA1812 For ah Clipper eighteen twelve.

0149:05 R67 Gee sorry about that that's the fifth time I've said that Clipper eighteen twelve descend and maintain one one thousand.

0149:12 PAA1812 Down to one one thousand Clipper eighteen twelve.

0149:39 R67 Clipper eighteen twelve heavy ah New York Approach advises at least another thirty minutes in the hold.

0149:45 PAA1812 Clipper eighteen twelve ah thank you.

0149:49 R67 Four two two Alfa Whiskey and Air Mexico four oh six heavy at least another ah half an hour to forty minutes in the hold.

0149:56 AMX406 Ah roger Air Mexico four zero six.

0149:58 N422AW Alfa Whiskey roger.

0150:11 SVA024 New York Center Saudi zero two four heavy good evening ah climbing to one four thousand.

0150:18 R67 Saudi zero two four heavy New York Center good evening cleared to the CAMRN intersection hold southwest as published maintain one four thousand and expect further clearance time zero two four zero.

0150:34 SVA024 Roger direct to CAMRN hold (unintelligible) expect, expect ah approach zero zero two four zero.

0150:44 R67 Saudi zero two four heavy expect further clearance zero two four zero maintain one four thousand.

0150:49 SVA024 Expect further clearance zero two four zero maintain one four thousand.

0150:55 R67 Roger.

0150:58 R67 Four two two Alfa Whiskey descend and maintain one two thousand.

0151:02 N422AW Ah roger outta thirteen for one two thousand four two two Alfa Whiskey.

0152:07 R67 .. Air Mexico four zero six heavy descend and maintain one three thousand.

0152:12 AMX406 Ah roger Air Mexico four zero six heavy leaving one four for one three thousand.

0152:44 R67 Saudi zero two four heavy say heading.

0152:51 SVA024 Zero five zero and (unintelligible) zero four one from Deer Park.

END OF TRANSCRIPT

This transcription covers the time period from January 26, 1990 UTC date, 0104 to January 26, 1990 UTC date, 0153 UTC.

<u>Agencies Making Transmissions</u>	<u>Abbreviation</u>
New York ARTCC, Position H67	H67
New York ARTCC, Position R67	R67
New York ARTCC, Position H66	H66
New York TRACON, JFK Arrival	N90
Washington ARTCC, Sector 51	ZDC51
Washington ARTCC, Sector 59	ZDC59
Unknown	UNK

I HEREBY CERTIFY that the following is a true transcription of the recorded conversations pertaining to the subject aircraft accident:

Gerald S. Mongrain
 Gerald S. Mongrain

Quality Assurance Specialist

0104:05	UNK	MANTA eighty one.
0104:17	H67	Who you calling?
0104:18	UNK	MANTA.

0104:19 H67 Oh uh hold on.

0105:45 H67 Sea Isle CAMRN ninety nine.

(0106)

(0107)

(0108)

(0109)

(0110)

0111:49 H67 Kennedy CAMRN six any updates.

0112:36 H67 Kennedy CAMRN on the six any updates.

0112:39 N90 I'll try to get an update for you I'll call you back.

0112:42 H67 Alright N F.

0112:43 N90 PB

0116:24 N90 CAMRN Kennedy six.

0116:26 H67 Yeah.

0116:27 N90 They tell me ten more minutes.

0116:28 H67 They say ten more minutes.

0116:30 N90 Ten more its always ten more (unintelligible).

0116:31 H67 Alright yeah just keep me advised ok.

0116:33 N90 Ha Ha.

0116:34 H67 Alright.

0116:35 N90 Alright thank you.

0116:36 H67 N F.

(0117)

(0118)

0119:49 N90 CAMRN Kennedy six line.

0119:51 H67 Hello.

0119:52 N90 Lets start ah taking some airplanes here.

0119:55 H67 Oh right what do you need.

0119:56 N90 (Unintelligible) in trail.

0119:57 H67 How much?

0119:59 N90 He says twenty in trail.

0120:01 H67 Twenty in trail and two ten on the speed.

0120:02 N90 That'll work.

0120:03 H67 Alright here we go first ones Clipper two twenty four N F.

0120:04 N90 RH.

0120:06 H67 Yeah will do.

0120:07 N90 Ah let me ask.

0120:09 H67 Ah ha alright.

0121:52 H67 Yep six six seven point out computer zero two four like to put on a one fifty heading and then back into CAMRN descending to one one thousand.

0121:59 H66 Ah one fifty heading you said.

0122:01 H67 Yes.

0122:02 H66 Ah.

0122:03 H67 For a while and then back into CAMRN like about a ten.

0122:05 H66 Ok yeah that's approved.

0122:06 H67 Alright N F.

(0123)

(0124)

(0125)

(0126)

(0127)

0128:00 H67 CASINO CAMRN eighty one line.

0128:02 W51 CASINO.

0128:04 H67 Um whose first in ah your holding there.

0128:07 W51 Number one would be ah Clipper eighteen twelve at seventeen.

0128:12 H67 Clipper eighteen twelve ah.

0128:13 W51 Want me to flash him (unintelligible).

0128:14 H67 Yeah, why don't, actually, yeah why don't you flash him, um tell him ah slow as possible Clipper eighteen twelve is radar contact and I'll call you on the others.

0128:25 W51 ..
Alright.

0128:26 H67 N F.

0128:27 W51 I'll switch him thanks.

0128:35 H67 SEA ISLE CAMRN ninety nine line.

0128:38 W59 SEA ISLE.

0128:39 H67 Ah who's your next one.

0128:40 W59 Ah November four two two Alfa Whiskey.

0128:43 H67 Alright ah if, if you'll take a look at CASINO its Clipper eighteen twelve alright.

0128:48 W59 Yeah.

0128:49 H67 He's turning now for Kennedy.

0128:50 W59 Yeah.

0128:51 H67 Alright put him twenty in trail behind him and I'll take him radar contact.

0128:53 W59 Alright Fox (unintelligible).

0128:54 H67 Alright N F if you need to, one more spin and I'll let you know on the rest.

0129:58 W59 I'm sorry I didn't catch the last part.

0129:00 H67 If you need to, give him one more turn
ah its fine and I'll let you know on the
rest.

0129:04 W59 " Alright twenty in trail Clipper ok Fox
(unintelligible).

0129:06 H67 N F.

0129:09 H67 I'm sorry say again.

0129:11 UNK This is ninety nine Pottstown four three
Bravo echo.

This portion of the transcript concerns the recorded Position
Relief Briefing between controller "NF" and on-coming controller
"PT".

0129:44 NF Ok Jeff we're coming out of the hold
right now. Ah they want twenty in
trail, two ten on the speed.

NF You can't hear what I'm saying? (pause)
How's that?

NF Line check.

UNK Hello.

PT Loud, loud and clear I gotcha ok go
ahead on the override.

NF Twenty in trail.

PT Right.

NF Two ten on the speed.

PT Yes.

NF We're emptying out the holding pattern.
Twenty seven four.

PT Alright.

NF Um there in and out of a hold missed approaches and they say stop em ok.

PT Alright.

UNK Um.

PT In and out ok.

NF Yeah what the plan is (unintelligible) I told CASINO we'd take there first one which is the Clipper right here. Which Clipper?

PT Clipper ah eighteen twelve. Alright.

NF Ok he's radar contact I called CASINO, and I said, I pointed out this, and I said put him twenty in trail radar alright we're gonna have to I think type him in again he's not stored anymore

PT Alright.

0131:00 NF Alright and ah yeah coded track so were gonna have to type him in again. I said we'd get back to him on the rest. What our plan is is to just follow the sequence over here alright. We'll take the first that that was my plan unless you want to work something out like maybe um you want to empty out CASINO cause there right here and then go let CAMRN run normal but its twenty in trail whatever, whatever you and (unintelligible).

PT What else could I do?

NF And ah I guess that's it (unintelligible).

PT Alright.

This completes the Position Relief Briefing

0131:38 H67 CASINO MANTA eighty one I meant CAMRN.

0131:45 W51 CASINO are you taking Kennedy's?

0131:47 H67 Ah ha ha.

0131:48 W51 Ha ha.

0131:49 H67 Listen you got Pan Am eight eighteen
left down there whats he doin?

0131:50 W51 Oh man I don't know what he's going to
do I just sat down here.

0131:53 H67 Ah, well I got I'll tell you what we can
slide him in underneath everybody.

0131:56 W51 Alright, at nine or something.

0131:57 H67 Ah he can come in at eleven that'll be
fine.

0131:59 W51 Eleven, alright we'll move em out of the
way to get him down to eleven.

0132:01 H67 Ok.

0132:01 W51 RC.

0132:02 H67 Alright PT.

0133:19 W59 CAMRN uh SEA ISLE ninety nine.

0133:21 H67 Yes.

0133:23 W59 Are you taking em twenty miles in trail
now or are you just gonna take Alfa
Whiskey from us.

0133:25 H67 Ah you know we were just, we were just discussing that ah who whose the next guy you got in there Air Mexico.

0132:32 W59 Air Mexico.

0132:33 H67 Ok I'll take Air Mexico four oh six twenty miles in trail and I'll get back to you on the rest (unintelligible).

0132:36 W59 Alright. Alright thanks.

0132:38 H67 PT.

0132:59 H67 Hey CASINO CAMRN eighty one.

0133:00 W51 Yeah.

0133:01 H67 You got Pan AM one seventy one down there too.

0133:02 W51 Yeah we're going to dump him to nine and give him to CAMRN. He's, will that work?

0133:04 H67 Ahhh yeah just ah give us alot of spacing there (unintelligible) we eventually both work him.

0133:09 W51 Yeah right ah alright we're gonna let the other one hold for a bit we just got him stuck on top of everybody, yeah ok (unintelligible) are you running them in the props.

0133:17 H67 Yeah the props no problem.

0133:18 W51 Ok ok we'll stay probably like twenty in trail or so.

0133:21 H67 Yeah they go at eight and the ah let's go at eleven over CAMRN they got a different set up there.

0133:25 W51 What's the deal with the jets.

0133:26 H67 Ah tell ya what, reduce, we're still lookin at it I got two comin from SEA ISLE, I got one from you from CASINO and ah I'll let you know when I can take something here. It should be goin up I got to alternate between the both of you guys.

0133:35 W51 Right ok.

0133:36 H67 Alright.

0133:36 W51 RC.

0133:37 H67 Ok PT.

0133:59 H67 Kennedy CAMRN six handoff.

0134:14 H67 Kennedy CAMRN six.

0134:21 N90 Hey hold Avianca we'll take him in a minute.

0134:23 H67 Alright.

0134:24 N90 CO.

0134:24 H67 PT.

0134:38 W59 CAMRN ninety nine line SEA ISLE handoff.

0134:39 H67 Yeah.

0134:40 W59 Yeah south of BOTON code of one zero five four is four two two Alfa Whiskey.

0134:43 H67 Ah just south of Atlantic City you said.

0134:45 W59 Yeah.

0134:46 H67 Ok he's radar contact.
0134:47 W59 Thanks BD.

0134:54 H67 Hey Kennedy CAMRN six.

0135:01 N90 Ok CAMRN the problem is these guys are comin over and they don't have the RVR could you make sure they know its two thousand four hundred.

0135:06 H67 Two thousand four hundred (unintelligible).

0135:08 N90 Right and we don't want them unless they can take it cause like we're getting guys who can't take it and we gotta spin em.

0135:11 H67 Ok I understand ah just watch Avianca zero five two in his turn he may just cut your corner.

0135:15 N90 Yeah that's fine approved.

0135:16 H67 Alright PT.

0135:58 H67 Hey Kennedy CAMRN six are you still on thirteen left?

0136:02 N90 We haven't been on thirteen since we got here twenty two left all day.

0136:05 H67 OK I just got here. What category is that over there?

0136:09 N90 Uh lets see.

0136:10 H67 You know?

0136:12 N90 They need an RVR of eighteen hundred if they're real pilots but a lot of these guys need forty five.

0136:15 H67 Yeah you know, you know if category it is their asking for the category.

0136:18 N90 Oh ok hold on.

0136:21 H67 .. Be right with you man.

0136:23 UNK Ok I'm waiting.

0136:24 UNK Hey CAMRN ah disregard.

0136:32 N90 Ok we I guess this is category one there's nothing special about it.

0136:35 H67 Ok category one Avianca zero five two can I come around with him on a forty heading.

0136:39 N90 Ahh not right now cause we're getting missed approaches again, just keep him (unintelligible).

0136:41 H67 Ok I'll be ah holding in the hold you tell me when you can take these guys.

0136:43 N90 Ok thank you. DX.

0136:47 H67 He said go back in now, he just said it to me go ahead on the override.

0136:49 H66 (Unintelligible) ah I just want to let you know we're holding at nine under (unintelligible).

0136:59 H67 Wilco.

0137:33 H67 SEA ISLE CAMRN ninety nine.

0137:35 W59 SEA ISLE.

0137:36 H67 I'm back in the hold again.

0137:38 W59 Can you take Air Mexico four oh six.
0137:39 H67 Yeah yeah I can take him.

0137:40 W59 Ok BD.

0137:41 H67 PT.

0137:55 H67 CASINO CAMRN (unintelligible).

0137:57 W51 CASINO.

0137:58 H67 I'm back in the hold again I don't know how long it will be it indefinite.

0138:00 W51 Alright.

0138:00 H67 This guy is killing me.

0138:07 W51 Alright.

(0139)

(0140)

(0141)

0142:27 W59 CAMRN ninety nine line SEA ISLE.

0142:29 H67 CAMRN.

0142:30 W59 My next EFC's at zero one five zero how far should I delay that?

0142:33 H67 Ah delays indefinite I've got four in the stack now and there's no end in sight I can say indef I can't give you times I'd be guessing if I did.

0142:39 W59 Thirty minutes you say.

0142:40 H67 Ah you're guess is as good as mine.
0142:41 W59 Ok.

0142:42 H67 PT.

0143:37 N90 Hey CAMRN WATER you can run ah Avensa in and another one twenty in trail. Do you have anything comin up behind Avensa water?

0143:47 H67 Ah there on the line there what do you want Avensa five twenty run him in.

0143:49 N90 Yeah and well take one twenty in trail behind him at CAMRN, but we need twenty behind him.

0143:53 H67 Ok I'll tell him we're gonna need vectors.

0143:55 H66 Hey Avensa five twenty I can't flash him you have radar on him five miles south of CAMRN.

0143:57 N90 He's radar forty heading.

0143:59 H66 Show it.

0144:00 N90 BL.

0144:07 H67 And CAMRN gonna start running twenty in trail (unintelligible).

0144:02 N90 No we're just taking one right now.

0144:04 H67 Ok.

0144:05 N90 BL.

0146:24 H67 And Kennedy CAMRN six.

0146:26 N90 Kennedy.

0146:27 H67 Avianca zero five two just coming on CAMRN can only do five more minutes in the hold you going to be able to take him or I'll set him up for his alternate.

0146:31 N90 What's his speed now?

0146:33 H67 Ahh, I'm not to sure, be quite honest with you, holding speed.

0146:35 N90 .. Slow him to one eighty and I'll take him.

0146:37 H67 Say again.

0146:38 N90 Slow him to one eight zero knots and I'll take him he's radar three southwest of CAMRN.

0146:41 H67 One eighty on the speed radar contact and I'll put him on a forty heading.

0146:43 N90 That's good.

0146:44 H67 PT.

0147:39 W59 CAMRN SEA ISLE ninety nine.

0147:43 H67 Yes.

0147:44 W59 Any ideas how long the delays are gonna be?

0147:46 H67 I spoke to someone else over there no idea I'm holding over here delays indefininte due to weather traffics ah missing the approaches they're going around I just can't give you a good answer your guess would be as good as mine that's the best I can tell you.

0147:58 W59 My, my guess would probably be better than yours.

0148:00 H67 Yeah probably this Vernon.

0148:01 W59 Yeah.

0148:02 H67 How ya doin?

0148:03 W59 Alright.

0148:04 H67 You guys holding a lot or what?

0148:05 W59 Ahh we're holding all up, all up and down the coast man.

0148:07 H67 Ah that's good, good practice.

0148:08 W59 Alright talk to ya later.

0148:09 H67 See ya.

0148:21 W51 CAMRN eighty one CASINO.

0148:23 H67 Yeah.

0148:24 W51 I see ya took ah Pan Am eight eighteen ah you want to flash him onto MANTA.

0148:27 H67 Ah he's already flash to MANTA they got the handoff on him.

0148:29 W51 Oh ok great how bout jets just give me an update if you could.

0148:32 H67 Ah what time did the Saudi go into the hold let me ask you that.

0148:34 W51 Ah an hour ago.

0148:35 H67 An hour ago.

0148:36 W51 Yep.

0148:37 H67 Ahh hang on a second I'll take the Saudi Air.

0148:39 W51 You're gonna take him.

0148:41 H67 Yeah and go to one four thousand
alright.

0148:42 W51 Ah yeah ok when he swings out he'll be
going to fourteen.

0148:45 H67 Ah, ok thanks.

0148:46 W51 RC.

0149:05 N90 (Unintelligible).

0149:06 H67 Hello.

0149:07 N90 Expect another three zero minute delay
for ones you got left.

0149:10 H67 Ah thirty minute delay what was the last
part you said.

0149:12 N90 Yeah ah for the aircraft we haven't
taken yet.

0149:14 H67 Ok thirty minute PT.

0149:22 H67 Hey Vernon on the ninety nine.

0149:25 W59 Yeah.

0149:26 H67 They just told me another thirty minutes
and I got for in the stack it will take
me about ten minutes fifteen minutes to
get those guys out so it looks like
about forty five minute delay.

0149:32 W59 Forty five minutes until you can take
one from us.

0149:33 H67 Right.

0149:34 W59 Alright thank you. (Unintelligible)

(0150

This transcription covers the time period from January 26, 1990, 0142 UTC to January 26, 1990, 0208 UTC.

<u>Agencies Making Transmissions</u>	<u>Abbreviation</u>
New York Approach CAMRN Sector	CAMRN
American Airlines Flight 692	AAL692
Pan American Airways Flight 474	PAA474
US Air Flight 117	USA117
Avensa Aerovias Venezolanas S.A. Flight 520	AVE520
American Airlines Flight 40	AAL40
New York Air Route Traffic Control Center	ZNY
Avianca Aeroovias Nacionales de Columbia S.A Flight 052	AVA052
Evergreen International Airlines Flight 102	EIA102
New York Approach Islip Sector Landline Coordination with unidentified position/sector	UNK
American Airlines Flight 4	AAL4
El Al Israeli Airline Flight 842	ELY842

I HEREBY CERTIFY that the following is a true transcription of the recorded conversations pertaining to the subject aircraft accident.

William C Fetter

 William C. Fetter

System Effectiveness Specialist

0142:00 CAMRN American six ninety two descend and maintain five thousand contact approach ah on one one eight point four

0142:08 AAL692 Five thousand one one eight point four six ninety two good night

0142:09 CAMRN Night

0142:16 CAMRN Clipper four seventy four reduce speed one eight zero

0142:21 PAA474 Going to one eight zero Clipper four seven four

(0143)

0143:03 CAMRN US Air one seventeen turn left one five zero

0143:06 USA117 One five zero US Air one seventeen

0143:56 CAMRN Clipper four seventy four turn right heading zero six zero

0143:58 PAA474 Zero six zero Clipper four seventy four

0144:19 CAMRN US Air one seventeen descend and maintain seven thousand special weather at zero one four two it's indefinite ceiling two hundred sky obscured visibility is one quarter light drizzle and fog wind one eight zero at two two gusts two eight the RVR two thousand eight hundred two two left

0144:34 USA117 US Air one seventeen seven thousand

0144:38 CAMRN Did you copy the weather

0144:39 USA117 Affirmative sir

0144:40 CAMRN Clipper four seventy four did you copy that special

0144:41 PAA474 Affirmative four seven four

0144:43 CAMRN Appreciate it thanks

0144:45 AVE520 New York approach good evening Avenza five two zero with yankee at niner thousand

0144:51 CAMRN Avenza five twenty New York approach thank you ident proceed direct Deer Park expect ah VOR runway one three correction expect an ILS two two left Kennedy altimeter ah two niner six niner

(0145)

0145:06 AVE520 Direct Deer Park expecting ILS two two left two niner six niner on (unintelligible) five two zero

0145:12 CAMRN Clipper four seventy four descend and maintain five thousand contact approach on one eight point four

0145:18 PAA474 Down to five thousand over to eighteen four Clipper four seventy four good night

0145:22 CAMRN Good night - - US Air one seventeen turn left heading zero two zero

0145:27 USA117 Zero two zero US Air one seventeen

0145:38 AAL40 And New York approach American forty heavy one nine zero with yankee

0145:42 CAMRN Avenza five twenty descend and maintain seven thousand

0145:47 AVE520 Descend and maintain seven thousand Avensa
five two zero

0145:51 CAMRN American forty heavy New York approach good
evening fly heading one eight zero descend
and maintain one six thousand Kennedy
altimeter two niner six niner expect an ILS
runway two two left

0146:00 AAL40 Okay one eight zero on the heading and ah
descend to one six thousand and say the
altimeter again

0146:04 CAMRN Kennedy altimeter two niner six niner
American forty

0146:07 AAL40 Two nine six nine thank you American forty
heavy right to one eighty

0146:11 CAMRN Avensa five twenty reduce speed one eight
zero verify you have information ah yankee

0146:15 AVE520 We have yankee and reducing to one eight zero
knots five two zero

0146:26 CAMRN Kennedy

0146:27 ZNY Avianca zero five two just coming on Cameron
can only do five more minutes in the hold
think you'll be able to take him or I'll set
him up for his alternate

0146:30 CAMRN What's his speed now

0146:32 ZNY Ah I'm not too sure be quite honest with you
his holding speed

0146:35 CAMRN Slow him to one eighty and I'll take him

0146:37 ZNY Say again

0146:38 CAMRN Slow him to one eight zero knots and I'll take him he's radar three southwest of Camern

0146:40 ZNY One eighty on the speed radar contact and I'll put him on a forty heading

0146:42 CAMRN That's good

0146:44 ZNY Alright (unintelligible)

0147:00 CAMRN Yes ma'am

0147:07 UNK Yea I got a little Pan Am there at eight thousand south of ZIGGY just keep an eye on him and if he fits into your flow at any point just ah give me the high sign

0147:11 CAMRN I'll let you know

0147:12 UNK Alright thanks (unintelligible)

0147:15 CAMRN US Air one seventeen turn right zero five zero

0147:19 USA117 Zero five zero US Air one seventeen

0147:21 AVA052 New York approach Avianca zero five two heavy we have information yankee with you one one thousand

0147:27 CAMRN Avianca zero five two heavy New York approach thank you reduce speed to one eight zero if you're not already doing it you can expect an ILS two two left altimeter two niner six niner proceed direct Deer Park

0147:35 AVA052 Okay direct Deer Park maintaining one eight zero knots

0147:39 CAMRN US Air one seventeen reduce speed one eight zero

0147:41 USA117 Hundred and eighty knots US Air one seventeen

0147:48 CAMRN American forty heavy descend and maintain one three thousand leaving one six thousand reduce speed two one zero

0147:55 AAL40 Okay ah descend to one three thousand and out of one six thousand slow to two one zero American forty heavy

(0148)

0148:23 CAMRN Avianca zero five two descend and maintain seven thousand

0148:27 AVA052 Descending to seven thousand Avianca zero five two heavy

0148:44 CAMRN US Air one seventeen turn right heading zero nine zero descend and maintain five thousand

0148:48 USA117 Zero nine zero five thousand US Air one seventeen

(0149)

0149:21 EIA102 New York approach Evergreen ah one zero two heavy with you level two zero zero

0149:22 CAMRN Ah who is that now

00149:24 CAMRN Evergreen one zero two return to center frequency please and remain in the holding pattern

0149:31 EIA102 Roger

0149:32 ELY842 New York approach El Al eight forty two heavy maintaining one niner zero

0149:41 CAMRN El Al eight forty two heavy New York approach turn right heading one seven zero maintain flight level one niner zero expect an ILS two two left

0149:44 ELY842 Okay one seven zero maintaining one niner zero two two left

(0150)

0150:18 CAMRN American forty heavy reduce speed one eight zero

0150:20 AAL40 Reduce to one eight zero American forty heavy

0150:55 CAMRN El Al eight forty two heavy descend and maintain one six thousand Kennedy altimeter two niner six niner

0151:00 ELY842 One six thousand altimeter one two niner six niner El Al eight four two

0151:25 USA117 New York US Air one seventeen how long can we ah expect to continue before approach clearance

0151:36 CAMRN You can expect about another thirty miles before you touch down at least

0151:43 CAMRN Ah base leg in about twelve miles US Air one seventeen

0151:48 USA117 Kay

0151:51 CAMRN Avensa five twenty descend and maintain five thousand

0151:53 AVE520 Descend and maintain five thousand Avensa five two zero

0152:00 CAMRN El Al eight forty two heavy reduce speed two one zero leaving one seven thousand please

0152:04 ELY842 Reducing two one zero El Al eight four two

0152:08 CAMRN Islip Kennedy point out

0152:11 ISP Go ahead

0152:13 CAMRN At Captree Bridge I'm eastbound right now I might have to borrow some airspace overhead your place at five if that's alright with US Air one seventeen

0152:18 CAMRN Say again

0152:19 ISP (Unintelligible)

0152:20 CAMRN M E

0152:28 CAMRN Avensa five twenty turn right heading zero nine zero

0152:31 AVE520 Right heading zero nine zero Avensa five two zero

0152:57 CAMRN US Air one seventeen turn left heading zero four zero contact approach one one eight point four

0153:00 USA117 Zero four zero eighteen four US Air one seventeen

0153:12 CAMRN American forty heavy descend and maintain eight thousand

0153:16 AAL40 Out of one three thousand for eight thousand American forty heavy

0153:55 CAMRN Avensa five twenty ah wind shear on two two left its an increase of ten knots at fifteen hundred feet and also a wind shear at ah increase ah ten knots at five hundred feet reported by seven twenty seven

(0154)

0154:07 AVE520 Five two zero roger

0154:11 CAMRN Kennedy

0154:13 UNK Do you want a heading for this Evergreen like a one ninety

0154:14 CAMRN Yes that's fine

0154:16 UNK Okay one ninety here he comes

0154:20 CAMRN M E

0154:23 CAMRN Avianca zero five two turn right heading zero nine zero

0154:27 AVA052 Turning right heading zero nine zero Avianca zero five two

0154:33 EIA102 And New York approach Evergreen one oh two heavy with you one nine zero

0154:40 CAMRN Avianca zero five two turn right right turn heading two two zero I'm going to have to spin you sir

0154:45 AVA052 Okay heading two two zero Avianca zero five two

0154:52 ELY842 El Al eight four two maintaining sixteen thousand we are a heavy we'll need ah more space

0155:00 CAMRN El Al eight forty two heavy descend and maintain eight thousand thank you

0155:05 ELY842 Down to eight thousand El Al eight four two

0155:07 EIA102 Ah approach Evergreen one zero two heavy is with you one nine zero

0155:11 CAMRN Ah say again please

0155:13 EIA102 Evergreen one zero two heavy at level one niner zero

0155:18 CAMRN Evergreen one zero two heavy New York thank you expect an ILS runway two two left

0155:21 EIA102 Yes sir

0155:27 CAMRN Avianca zero ah correction Avensa five twenty turn left heading zero four zero

0155:30 AVE520 Left heading zero four zero Avensa five two zero

0155:34 CAMRN Islip Kennedy

0155:35 ISP Islip's on

0155:36 CAMRN Over the Captree again Avensa five twenty northeast bound at five

0155:37 ISP Point out approved

0155:38 CAMRN M E

0155:48 CAMRN Aversa five twenty contact approach one one eight point four

0155:50 AVE520 One one eight point four so long

0155:52 CAMRN Avianca zero five two traffic in your turn twelve thirty and five miles eastbound at six thousand

0156:00 AVA052 Avianca we have the traffic in sight thank you

0156:01 CAMRN Roger

0156:07 CAMRN Evergreen one zero two heavy descend and maintain one six thousand

0156:12 EIA102 Ah leaving one nine for one six thousand Evergreen ah one zero two heavy

0156:15 CAMRN Avianca zero five two I have a wind shear for you ah at fifteen ah increase of ten knots at fifteen hundred feet and then an increase of ten knots at five hundred feet reported by seven twenty seven

0156:26 AVA052 Thank you very much Avianca zero five two

0156:48 CAMRN American forty heavy descend and maintain seven thousand turn right heading two zero zero

0156:53 AAL40 Okay ah right to two zero zero and out of eight for seven

0156:58 CAMRN American forty affirmative receive delaying vectors for final

0157:00 AAL40 Roger

0157:03 CAMRN And El Al eighty forty two heavy turn right heading two zero zero ah delaying vectors

0157:07 ELY842 Heading two zero zero El Al eight forty two

0157:44 AAL4 New York approach American four heavy one nine zero we're heading direct to ah LaGuardia with yankee

0157:50 CAMRN American four heavy roger you can expect an ILS two two left altimeter two niner six eight

0157:55 AAL4 Nine six eight two two left American four heavy

(0158)

0158:18 CAMRN Evergreen one zero two heavy reduce speed two one zero

0158:22 EIA102 Roger two one zero Evergreen two zero one

0158:43 CAMRN Avianca zero five two turn right heading zero six zero

0158:45 AVA052 Turning right heading zero six zero Avianca zero five two heavy

(0159)

0159:10 CAMRN American four heavy turn right heading one niner zero descend and maintain sixteen one six thousand altimeter two niner six eight

0159:20 AAL4 Two nine six eight down to one six thousand and ah one ninety on the heading American four

0159:22 CAMRN El Al eight forty two heavy descend and maintain seven thousand

0159:26 ELY842 Down seven thousand El Al eight forty two

0159:31 CAMRN American forty heavy turn left heading zero two zero

0159:34 AAL40 Left zero two zero American forty heavy

0159:40 CAMRN Evergreen one zero two heavy descend and maintain one three thousand

0159:44 EIA102 One three thousand Evergreen ah zero one heavy

(0200)

0200:05 CAMRN Avianca zero five two stop turn heading zero four zero

0200:08 AVA052 Ah zero four zero Avianca zero five two heavy

0200:17 CAMRN Evergreen one zero two you can expect a few delaying vectors turn left heading one five zero

0200:21 EIA102 One five zero one zero two heavy

0200:25 CAMRN American four heavy leaving one seven thousand reduce speed two one zero

0200:29 AAL4 Okay two ten out of one seven thousand American four heavy

(0201)

0201:15 CAMRN Avianca zero five two descend and maintain five thousand

0201:18 AVA052 Descend and maintain five thousand Avianca
zero five two

0201:24 CAMRN Evergreen one zero two reduce speed one eight
zero

0201:27 EIA102 One eight zero one zero two heavy

0201:32 CAMRN El Al eight forty two heavy reduce speed one
eight zero

0201:35 ELY842 One eight zero reducing El Al eight four two

0201:43 CAMRN Avianca zero five two turn right heading zero
nine zero

0201:47 AVA052 Right heading zero nine zero Avianca zero
five two

0201:51 CAMRN American forty heavy turn right heading zero
seven zero

0201:56 AAL40 Zero seven zero American forty heavy

(0202)

0202:07 CAMRN El Al eight forty two heavy turn left heading
zero nine zero

0202:12 ELY842 Left zero nine zero El Al eight four two

0202:14 CAMRN Evergreen one zero two heavy turn right
heading two two zero

0202:18 EIA102 Two two zero one zero two heavy

0202:22 CAMRN Evergreen one zero two affirmative and
descend and maintain eight thousand

0202:23 EIA102 Ah leaving one three for eight thousand
Evergreen ah one zero two heavy

0202:26 CAMRN Avianca zero five two turn left heading zero
four zero
..

0202:29 AVA052 Left heading zero four zero Avianca zero five
two

0202:38 CAMRN Avianca zero five two heavy approach one one
eight point four

0202:42 AVA052 One one eight point four so long

0202:44 CAMRN Avianca zero five two and before you go there
is a wind shear alert on final at fifteen
hundred feet it's an increase of ten knots
then again at five hundred feet increase of
ah ten knots by a seven twenty seven New York
now on one one eight point four good night

0203:00 AVA052 One eighteen four

0203:02 CAMRN American forty heavy turn left zero four zero

0203:06 AAL40 Left zero four zero American forty heavy

0203:08 CAMRN American four heavy descend and maintain one
three thousand

0203:09 AAL4 One three thousand American four heavy

0203:28 CAMRN American forty heavy correction four heavy
you can expect the few delaying vectors turn
left heading one five zero

0203:30 AAL4 Roger one five zero American four heavy

0203:39 CAMRN El Al eight forty two heavy turn left heading
zero four zero

0203:42 ELY842 Heading zero four zero El Al eight forty two

0204:00 CAMRN American forty heavy wind shear on final it's an increase of ten knots at fifteen hundred and then again at five hundred an increase of ten knots seven twenty seven

0204:08 AAL40 Ah we copy that thank you American forty heavy

0204:54 EIA102 And approach an confirm speed you want Evergreen one oh two at

0205:00 CAMRN Sorry what was that

0205:01 EIA102 Evergreen one oh two confirm the airspeed you want us to fly right now

0205:06 CAMRN Hundred and eighty knots Evergreen one zero two

0205:09 EIA102 Okay thank you

0205:16 CAMRN American forty heavy turn right zero nine zero

0205:19 AAL40 Right zero nine zero American forty heavy

0205:35 CAMRN American forty heavy descend and maintain five thousand

0205:38 AAL40 Left seven for five American forty heavy

(0206)

0206:10 CAMRN American forty heavy turn left heading zero six zero

0206:16 AAL40 Left zero six zero American forty heavy

0206:18 CAMRN Evergreen one zero two turn left heading one two zero

0206:21 EIA102 One two zero one zero two

0206:23 CAMRN American four heavy descend and maintain eight thousand

0206:25 AAL4 Down to eight thousand American four heavy

0206:35 CAMRN American forty heavy contact approach one one eight point four

0206:39 AAL40 Eighteen four American forty heavy

0206:47 CAMRN Evergreen one zero two descend and maintain seven thousand

0206:50 EIA102 Down to seven thousand one zero two heavy

0207:00 CAMRN American four heavy turn right heading two one zero

0207:02 AAL4 That's two one zero American four heavy

0207:05 CAMRN El Al eight forty two heavy wind shear on two two left ah it's an increase of ten knots at fifteen hundred feet and an increase of ten knots at five hundred feet reported by seven twenty seven

0207:19 ELY842 Okay eight four two

0207:50 CAMRN El Al eight forty two heavy turn right heading zero seven zero descend and maintain five thousand

0207:54 ELY842 Right zero seven zero and cleared now to five thousand eight four two

End of Transcript

This transcription covers the time period from January 26, 1990, 0158 UTC to January 26, 1990, 0238 UTC.

<u>Agencies Making Transmissions</u>	<u>Abbreviation</u>
New York TRACON Final Vector	FV
Air France Flight 26	AFR26
U. S. Air Flight 117	USA117
Pan American Airlines Flight 474	PAA474
American Airlines Flight 692	AAL692
Pan American Commuter Flight 793	PXX793
Avensa Aerovias Venezolanas S.A. Flight 520	AVE520
Avianca Aerovias Nacolales de Columbia S.A. Flight 052	AVA052
Trans World Airlines Flight 801	TWA801
American Airlines Flight 40	AAL40
El Al - Israeli Airlines Flight 842	ELY842
American Airlines Flight 4	AAL4
Evergreen International Airlines Flight 102	EIA102
Pan American Airlines Flight 1812	PAA1812
Pan American Airlines Flight 11	PAA11
Recorded Transmissions from an Unknown Source	UNK

I HEREBY CERTIFY that the following is a true transcription of the recorded conversations pertaining to the subject aircraft accident.

William C Fetter

William C. Fetter

System Effectiveness Specialist

(0158)

0158:04 FV Air France zero two six heavy turn left
heading two five zero intercept the localizer

0158:09 AFR026 Heading two five zero to intercept localizer
Air France zero two six heavy

0158:10 FV US Air one seventeen descend and maintain
three thousand

0158:16 USA117 Five for three US Air one seventeen

0158:18 FV Clipper four seventy four turn left heading
one five zero I'm going to put you right back
in the sequence sir

0158:23 PAA474 One five zero Clipper four seventy four thank
you

(0159)

0159:17 AAL692 Ninety two very unhappy at two thousand feet

0159:20 FV American six ninety two New York I understand
maintain two thousand fly heading one uh one
four zero for now

0159:26 AAL692 Okay one forty at two thousand American six
ninety two

0159:29 FV American six ninety two climb and maintain
three thousand you're number five I'll make
sure you get a lot of room there

0159:36 AAL692 Maintain three thousand you say three
thousand American six ninety two

0159:39 FV Affirmative sir

0159:40 UNK Alright

0159:53 FV US Air one seventeen turn left heading two eight zero

0159:56 USA117 Two eight zero US Air one seventeen

(0200)

0200:07 FV Air France zero two six heavy contact Kennedy Tower one one niner point one good day

0200:12 UNK One nineteen one good day

0200:15 FV Clipper four seventy four turn left heading zero five zero

0200:18 PAA474 Zero five zero Clipper four seven four

0200:23 PXX793 Un approach do you want Pan Am seven ninety three over to tower

0200:25 FV Pan Am seven ninety three contact Kennedy Tower one one niner point one good evening

0200:29 UNK Good night sir

0200:30 FV US Air one seventeen turn left heading two five zero you're one five miles from the outer marker maintain two thousand until established localizer cleared ILS two two left

0200:39 USA117 Cleared to the ILS to two two left US Air one seventeen

0200:54 USA117 What's the spacing on the traffic ahead for US Air one seventeen

0200:57 FV Heavy jet eight miles

(0201)

0201:02 FV Avensa five twenty turn left heading two six zero

0201:05 AVE520 Left heading two six zero Avensa five two zero

0201:42 FV American six ninety two turn left heading zero six zero

0201:47 AAL692 Left to zero six zero american six ninety two

0201:51 FV Avensa five twenty descend and maintain two thousand

0201:54 AVE520 Descend and maintain two thousand Avensa five two zero

0202:00 AAL692 American six ninety two I want to advise you we're at minimum fuel uh we're uh about uh twelve or fourteen minutes from declaring an emergency

0202:08 FV I understand uh you're number four with me sir

0202:11 UNK Ok

0202:16 FV Clipper four seventy four turn left heading three three zero speed uh one seven zero if you're not back

0202:21 PAA474 Three three zero slow to one seven zero Clipper four seven four

0202:36 FV American six ninety two I'm going to take you another eight miles where you are then turn ya to the final

0202:42 UNK Roger

0202:48 FV Avensa five twenty speed one six zero

0202:51 AVE520 Six zero on the speed Avensa five two zero

(0203)

0203:07 AVA052 New York approach Avianca zero five uh two leveling five thousand

0203:11 FV Avianca zero five two heavy New York approach good evening fly heading of zero six zero

0203:16 AVA052 Zero six zero Avianca zero five two heavy

0203:20 FV US Air one seventeen contact Kennedy Tower one one niner point one good day

0203:26 USA117 One seventeen good night

0203:28 FV Good night

0203:35 FV Clipper four seventy four turn left heading two seven zero

0203:39 PAA474 Two seven zero Clipper four seven four

0203:41 FV Avensa five twenty turn left heading of two five zero you're one four miles from outer marker maintain two thousand till established localizer cleared ILS two two left

0203:50 AVE520 Heading two five zero maintain two thousand till established cleared ILS two two left Avensa five two zero

(0204)

0204:26 FV Clipper four seventy four descend and maintain two thousand

0204:30 PAA474 Down to two thousand Clipper four seventy four

0204:33 FV American six ninety two turn left heading three two zero

0204:36 AAL692 Three two zero American six ninety two

(0205)

0205:12 FV Avianca zero five two heavy turn left heading three six zero

0205:16 AVA052 Left heading three six zero Avianca zero five two heavy

0205:20 FV American six ninety two turn left heading of two seven zero

0205:23 AAL692 Left to two seventy American six ninety two

0205:25 FV Clipper four seventy four turn left heading two five zero you're one five miles from the outer marker maintain three thousand till established on the localizer cleared ILS two two left

0205:35 PAA474 Three thousand till established now we will not pick it back up cleared for the approach Clipper four seven four

0205:41 TWA801 Approach TWA eight zero one heavy's with you four thousand

0205:44 FV TWA eight zero one heavy new york approach good afternoon make it good evening fly heading zero six zero

0205:49 TWA801 Zero six zero eight oh one heavy

0205:53 FV Avensa five twenty contact kennedy tower one one nine point one good day

0205:57 AVE520 One niner point one good night sir

0206:00 FV Avianca zero five two heavy turn left heading of three zero zero

0206:04 AVA052 Left heading three zero zero Avianca zero five two heavy

0206:12 FV American six ninety two how are we making out

0206:15 AAL692 We got enough fuel for the approach and landing and that's it

0206:18 FV Ok understand

(0207)

0207:06 AAL40 Approach American forty heavy's with you leveling five

0207:09 FV American forty heavy New York approach good evening

0207:12 UNK Good evening

0207:16 FV Avianca zero five two heavy turn left heading two niner zero

0207:20 AVA052 Left heading two nine zero Avianca zero five two heavy

0207:53 FV TWA eight on one heavy turn left heading two niner zero

0207:56 TWA801 Left to two nine zero TWA eight oh one heavy

(0208)

0208:16 FV American six ninety two speed one six zero if practical

0208:20 AAL692 American six ninety two roger

0208:34 FV Avianca zero five two heavy descend and maintain uh descend and maintain three thousand

0208:40 AVA052 Descend and maintain three thousand Avianca zero five two heavy

(0209)

0209:18 FV American forty heavy turn left heading three one zero

0209:20 AAL40 Left three one zero American forty heavy

0209:43 FV Avianca zero five two heavy turn left heading two seven zero

0209:47 AVA052 Left heading two seven zero Avianca zero five two heavy

0209:50 FV American six ninety two turn left heading two one zero you're one three miles from outer marker maintain two thousand till established localizer cleared ILS two two left

0209:59 AAL692 Turning to two ten uh two thousand feet cleared the ILS two two left American uh six ninety two

(0210)

0210:26 FV Avianca zero five two heavy turn left heading two five zero intercept the localizer

0210:31 AVA052 Heading two five zero intercept the localizer Avianca zero five two heavy

0210:35 FV TWA eight on one heavy turn left heading two seven zero

0210:37 FV Two seven zero TWA eight oh one heavy

0210:41 FV Clipper four seventy four contact Kennedy Tower one one niner point one thanks for your help

0210:46 UNK Blocked

0210:48 FV American six ninety two you're six miles behind a seven two seven compatible speed

0210:53 UNK Thank you

0210:55 ELY842 El Al eight four two maintaining five thousand

0210:58 FV El Al eight fifty two heavy New York good evening fly heading of zero two zero

(0211)

0211:02 ELY842 Heading zero two zero El Al eight four two

0211:06 FV Avianca zero five two heavy you're one five miles from outer marker maintain two thousand till established on localizer cleared ILS two two left

0211:14 AVA052 Cleared ILS two two left maintain two thousand until established Avianca zero five two heavy

0211:19 FV American forty heavy turn left heading of two eight zero

0211:22 AAL40 Left to two eight zero American forty heavy

0211:24 PAA474 Want Clipper four seven four to tower

0211:27 FV Affirmative sir tower nineteen one good evening

0211:35 FV TWA eight oh one heavy descend and maintain two thousand

0211:37 TWA801 TWA eight oh one heavy we'll leave four for two

0211:40 FV American forty heavy descend and maintain three thousand

0211:43 AAL40 Out of five for three American forty heavy

0211:55 FV Avianca zero five two heavy speed one six zero if practical

0211:59 AVA052 One six zero Avianca zero five two heavy

(0212)

0212:01 FV American six ninety two again thank you for your cooperation contact Kennedy Tower one one niner point one good evening

0212:07 AAL692 Teen one American six ninety two (unintelligible)

0212:15 FV El Al eight forty two heavy turn left heading three one zero

0212:19 ELY842 Left heading three one zero El Al eight four two

0212:24 FV TWA eight zero one heavy speed uh say your indicated airspeed

0212:27 UNK Indicating one eight zero knots

0212:29 FV Ok

0212:57 FV TWA eight zero one heavy turn left heading two five zero intercept the localizer

(0213)

0213:02 TWA801 Two fifty intercept the localizer TWA eight oh one heavy

0213:12 FV TWA eight zero one heavy reduce speed to one six zero if practical

0213:15 TWA801 We'll slow to one sixty eight oh one heavy

0213:17 FV American forty heavy speed one six zero if practical

0213:20 AAL40 One sixty American forty heavy

0213:22 FV TWA eight zero one heavy one five miles from outer marker maintain two thousand till established localizer cleared for ILS two two left

0213:28 TWA801 TWA eight oh one heavy cleared for the ILS two two left

0213:36 FV American forty heavy turn left heading of two six zero

0213:39 AAL40 Left two six zero American forty heavy

0213:44 FV El Al eight forty two heavy descend and maintain four thousand

0213:47 ELY842 Four thousand El Al eight four two leaving five

(0214)

0214:45 ELY842 El Al eight four two maintaining four thousand

0214:47 FV El Al eight forty two heavy turn left heading two two zero I just want to get uh get you into the wind to slow you up a little bit

0214:52 ELY842 Heading two two zero El Al eight four two

0215:00 FV American forty heavy turn left heading two five zero intercept the localizer

0215:06 AAL40 Left two five zero intercept the localizer American forty heavy

0215:08 FV Avianca zero five two heavy contact Kennedy Tower one one niner point one good day

0215:12 AVA052 One one niner point one so long

(0216)

0216:48 ELY842 El Al eight four two maintaining heading two two zero

0216:50 FV Thank you sir I'll have a turn northwest bound again here shortly I just want to bring you in closer to the final here

0216:58 UNK Roger

(0217)

0217:46 AAL4 Kennedy approach American four heavy is out of uh six thousand four hundred for five thousand

0217:50 FV American four heavy New York approach good evening maintain five thousand

0217:54 AAL4 American four heavy

(0218)

0218:16 FV American forty heavy turn left heading one eight zero I want to give you a little more room there

0218:22 AAL40 One eight zero on the heading American uh forty heavy

0218:25 FV El Al eight forty two heavy make a left turn a left turn heading of two seven zero

0218:30 ELY842 Left turn two seven zero El Al eight four two

0218:46 FV TWA eight zero one heavy contact Kennedy Tower one one niner point one good evening

0218:50 TWA801 TWA eight oh one good night

(0219)

0219:47 EIA102 New York approach Evergreen ah one oh two heavy is with you out of seven for five

0219:51 FV Evergreen one zero two heavy New York good evening

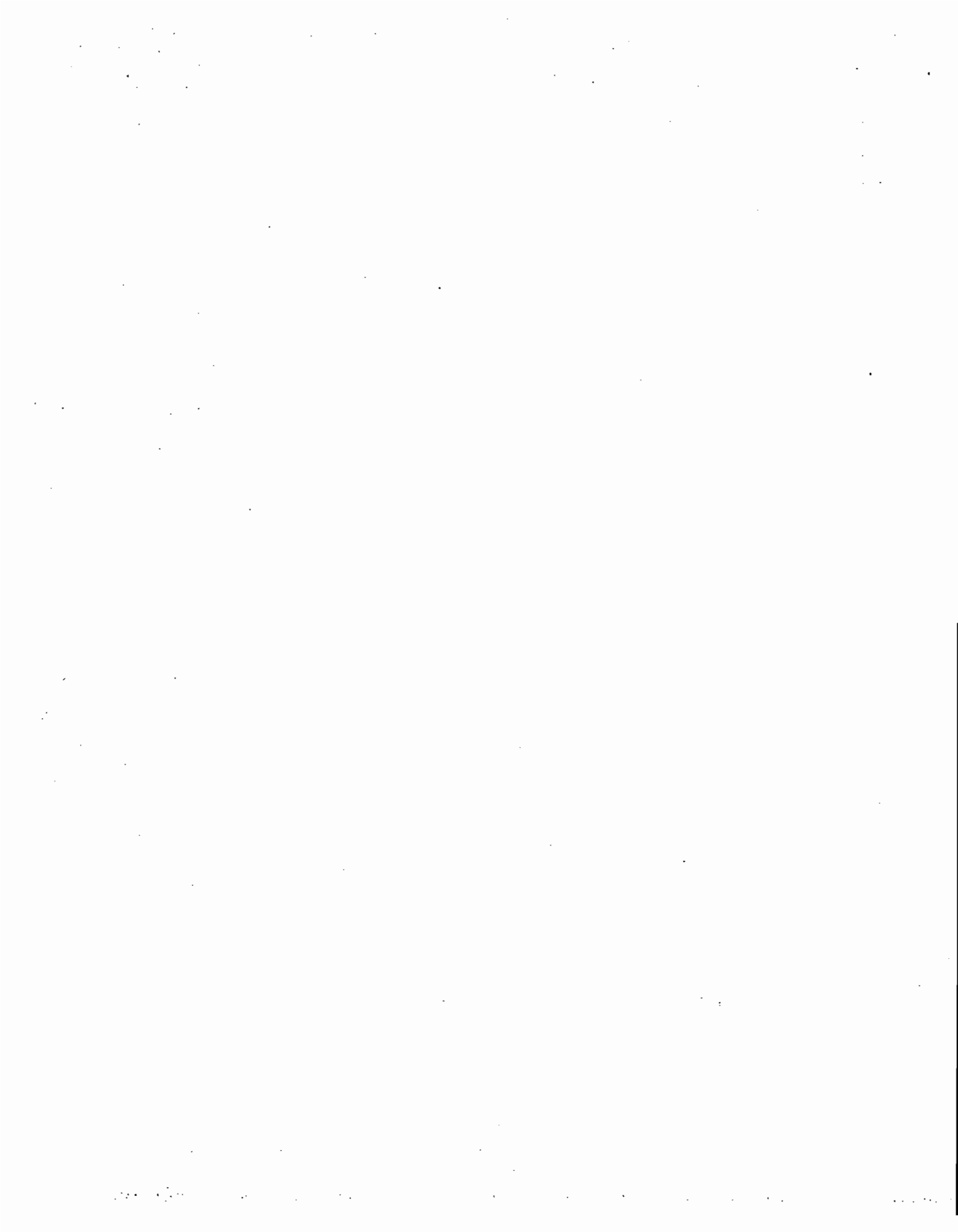
0219:55 FV American forty heavy turn right heading two eight zero

0219:57 AAL40 Right two eight zero American forty heavy

(0220)

0220:01 AAL40 Un American forty are you going to put us on the localizer and go in

0220:05 FV Yes sir that's why I'm turning you I just want to make sure you get there the first time



0220:24 FV American four heavy turn left heading of three one zero

0220:29 AAL40 Left turn three one zero American four heavy

0220:34 FV American forty heavy descend and maintain two thousand thank you for your help

0220:39 AAL40 Out of there for two American forty heavy roger

0220:43 ELY842 El Al eight four two heading two seven zero

0220:45 FV El Al eight forty two heavy New York approach good evening thank you maintain you can descend and maintain three thousand now please

0220:53 ELY842 El Al eight four two cleared now three thousand

0220:55 FV Affirmative sir

0220:59 AAL40 And you want American forty heavy to intercept the localizer on this heading

(0221)

0221:01 FV American forty heavy turn left heading two four zero you're eight miles from outer marker maintain two thousand till established localizer cleared ILS two two left

0221:10 AAL40 Okay left to two forty two thousand till established cleared for ILS two two left American forty heavy

0221:35 FV American forty heavy contact Kennedy Tower one one niner point one good evening

0221:41 AAL40 Nineteen one good evening American forty heavy

0221:42 FV American four heavy descend and maintain three thousand heading of two seven zero

0221:47 AAL4 Okay heading of two seventy three thousand American four heavy

0221:53 ELY842 El Al eight four two maintaining three thousand

0221:56 FV Thank you sir

(0222)

0222:06 FV El Al eight forty two heavy turn right heading three zero zero just want to provide ya a little extra room

0222:12 ELY842 Heading three zero zero El Al eight four two

0222:15 FV TWA eight uh one heavy if you're with me sir climb and maintain three thousand fly heading of one two zero

0222:31 TWA801 Approach TWA eight oh one is with you at two thousand feet

0222:34 FV TWA eight oh one heavy New York approach sorry about that climb and maintain three thousand fly heading of one one zero

0222:40 TWA801 Okay one one zero on the heading back up to three

0222:42 FV TWA eight oh one you're number four I'll have a short approach for you

0222:45 TWA801 Okay thanks a lot

0222:51 FV El Al eight forty two heavy descend and maintain two thousand

0222:54 ELY842 (Unintelligible) two thousand El Al eight four two

(0223)

0223:11 FV El Al eight forty two heavy turn left heading of two one zero you're nine miles from outer marker maintain two thousand till established on localizer cleared for ILS two two left

0223:20 ELY842 ILS two two left El Al eight four two

0223:24 TWA801 TWA eight oh one is doing a hundred and eight knots now is that okay

0223:27 FV Yeah that's good sir

0223:29 FV Evergreen one zero two heavy turn left heading three three zero

0223:33 EIA102 Three three zero one oh two heavy

0223:55 FV Evergreen one zero two heavy descend and maintain four thousand

0223:58 EIA102 Roger leaving five for four Evergreen one oh two heavy

(0224)

0224:07 DEPT Final departure point out

0224:09 FV Final

0224:11 DEPT Seven seven east Command (unintelligible)

0224:12 FV Point out approved alpha zulu

0224:33 ELY842 Established El Al eight four two

0224:35 FV Thank you sir

0224:47 FV El Al eight forty two heavy thank you for your help contact Kennedy Tower one one niner point one

0224:52 ELY842 (Unintelligible) thank you

0224:55 AVA052 Approach Avianca zero five two heavy we just (missed)* a missed approach and uh we're maintaining two thousand one five (unintelligible)

(0225)

0225:02 FV Avianca zero five two heavy New York good evening climb and maintain three thousand

0225:07 AVA052 Climb and maintain three thousand and uh we're running out of fuel sir

0225:14 FV Okay ah fly a heading of zero eight zero

0225:16 AVA052 Right heading zero eight zero climb to three thousand

0225:20 FV TWA eight zero one heavy turn left heading zero four zero

0225:22 TWA801 Zero four zero TWA eight oh one heavy

0225:41 FV Evergreen one zero two heavy fly heading two seven zero

0225:44 EIA102 Two seven zero one oh two heavy

0225:53 FV American four heavy present heading I'll give you a turn here in a minute

0225:56 AAL4 American four heavy WILKO

(0226)

0226:08 FV American four heavy turn left heading one eight zero your nine miles from outer marker maintain two thousand until established on the localizer course cleared for ILS two two left

0226:14 AAL4 Okay one eight zero two thousand maintain two until established cleared ILS two two left American four heavy

0226:21 FV Evergreen one zero two heavy descend and maintain three thousand

0226:24 EIA102 We're leaving four for three Evergreen one zero two heavy

0226:28 FV Avianca zero five two heavy turn left heading zero seven zero

0226:32 AVA052 Heading zero seven zero Avianca zero five two heavy

0226:36 FV And Avianca zero five two heavy ah I'm going to bring you about fifteen miles northeast and then turn you back on for the approach is that fine with you and your fuel

0226:41 AVA052 I guess so thank you very much

0226:50 FV Evergreen one zero two heavy turn left heading two five zero you're one five miles from the outer marker maintain three thousand until established on the localizer cleared for ILS two two left

0227:00 EIA102 (Unintelligible) cleared for approach Evergreen one two heavy

0227:02 FV TWA eight zero one heavy turn left heading two nine zero

0227:04 TWA801 Two nine zero TWA eight oh one

0227:28 FV American four heavy contact Kennedy Tower one one niner point one good evening

0227:30 AAL4 Nineteen one for American four heavy you have a good evening sir

0227:35 FV Thank you you too

0227:47 PAA1812 Kennedy approach Clipper eighteen twelve heavy with alpha's descending to five thousand heading zero six zero

0227:49 FV Clipper eighteen twelve heavy New York good evening

0227:51 FV TWA eight zero one heavy turn left heading two seven zero

0227:55 TWA801 Two seven zero TWA eight oh one heavy

(0228)

0228:12 FV Clipper eighteen twelve heavy descend and maintain four thousand

0228:14 PAA1812 Eighteen twelve heavy to four thousand

0228:43 EIA102 And approach Evergreen one zero two heavy is one seven zero a good speed on final

0228:49 FV Ah what's it going to be in knots I don't know the mach ah

0228:54 EIA102 Ah yes sir a hundred and seventy knots on final for Evergreen is that okay

0228:58 FV Yea that's fine ah just ah I have a heavy jet seven ahead and he's about twenty knots slower it's going to due to the winds I'm going to need you to slow about twenty knots in about three or four miles

(0229)

0229:10 EIA102 Okay sir

0229:19 AVA052 When can you give us a final now Avianca zero five two heavy

0229:22 FV Avianca zero five two affirmative sir turn left heading zero four zero

0229:25 AVA052 Zero four zero Avianca zero five two heavy

0229:42 FV Evergreen one zero two heavy contact Kennedy Tower one one niner point one good day

0229:46 EIA102 Ah good day

0229:56 PAA11 New York approach control it's Clipper one one heavy maintaining four thousand feet turning right to zero three zero what speed would you like

(0230)

0230:04 FV Clipper ah eleven heavy New York good evening speed one eight zero please

0230:09 PAA11 Back to one eight zero for eleven heavy

0230:12 FV TWA eight zero one heavy turn left heading two five zero you're one five miles from outer marker maintain two thousand until established on localizer cleared for ILS two two left

0230:21 (Unintelligible)

0230:26 FV Okay two called Trans World eight oh one you were cleared for the approach

0230:33 TWA801 Affirmative TWA eight oh one we got it we're out of three for two

0230:36 FV Avianca fifty two climb maintain three thousand

0230:40 AVA052 Ah negative sir we we're just running out of fuel we okay three thousand now we could

0230:44 FV Okay turn left heading three one zero sir

0230:46 AVA052 Three one zero Avianca zero five two

0230:49 FV Clipper eighteen twelve heavy turn left heading three one zero

0230:52 PAA1812 Eighteen twelve heavy left three one zero

0230:55 FV And Avianca fifty two fly a heading of three six zero please

0231:00 AVA052 Okay we're about three six zero now

0231:03 FV Okay you number two for the approach I just have to give you enough room so you make it without having to come out again

0231:08 AVA052 Okay we're number two and flying three six zero now

0231:12 FV Thank you sir

0231:27 FV TWA eight zero one heavy your eight miles behind a heavy jet contact Kennedy Tower one one niner point one thanks for your help sir

0120:38 PAA224 Roger "ah" thank you very much ah we're ready whenever you are.

0120:41 R67 .. Clipper two twenty four heavy cleared to the Kennedy Airport via left turn heading zero four zero maintain speed two one zero ah maintain eleven thousand.

0120:51 PAA224 Roger left turn ah heading of zero four zero to Kennedy maintain two ten on the speed maintain one one thousand.

0120:58 R67 Clipper two twenty four heavy contact New York Approach one two seven point four good night.

0121:03 PAA224 Roger one twenty seven four, good night sir and thank you for all your help.

0121:12 R67 Air France zero two six heavy say heading.

0121:15 AFR026 Turning ah left ah zero two six heavy.

0121:28 AFR026 We're turning back to CAMRN Air France zero two six heavy.

0121:32 R67 Air France zero two six heavy ah fly heading of two three zero, two three zero heading vectors for Kennedy.

0121:38 AFR026 Left turn or right turn.

0121:43 R67 Air France zero two six fly heading one five zero one fifty heading vectors for Kennedy.

0121:47 AFR026 Heading one five zero to Kennedy Air France zero two six heavy.

0121:51 R67 Roger.

0122:27 R67 Air France, zero two six heavy cleared to the Kennedy Airport via present heading vectors for Kennedy descend and maintain one one thousand (unintelligible) speed two one zero.

0122:36 AFR026 Down one one thousand speed two one zero ah Air France zero two six heavy.

0122:41 R67 Roger.

0123:11 R67 Air France zero two six heavy turn left heading three four zero.

0123:15 AFR026 Left heading three four zero Air France zero two six heavy.

0123:32 R67 TWA thirty three heavy cleared the Kennedy Airport via heading two three five vectors for Kennedy maintain one three thousand.

0123:39 TWA33 Ok cleared to Kennedy ah heading two three five ah maintain one three thousand TWA ah thirty three.

0123:46 R67 Roger.

(0124)

0125:05 R67 Air France zero two six heavy fly heading zero three zero.

0125::09 AFR026 Heading zero three zero Air France zero two six heavy

0125:12 R67 Air France zero two six heavy contact New York Approach one two seven point four.

0231:32 TWA801 Okay eight oh one roger and what's his ground
what's his airspeed do you know

0231:35 FV Ah he's indicating ten knots slower eight
miles

0231:38 TWA801 Okay thank you

0231:40 FV Thank you

0231:43 FV Clipper eighteen twelve heavy speed one six
zero if practical

0231:48 PAA1812 Eighteen twelve heavy slowing to one sixty

(0232)

0232:07 FV Avianca zero five two heavy turn left heading
three three zero

0232:11 AVA052 Three three zero on the heading Avianca zero
five two

0232:51 AVA052 Avianca zero five two we just ah lost two
engines and we need priority please

0232:56 FV Avianca zero five two turn left heading two
five zero intercept the localizer

0233:00 AVA052 Roger

0233:07 FV Avianca zero five two heavy you're one
five miles from outer marker maintain two
thousand until established on localizer
cleared for ILS two two left

0233:16 AVA052 Roger (Unintelligible)

0233:18 FV Clipper eighteen twelve turn left heading two
two zero

0233:21 PAA1812 Eighteen twelve left two two zero

0233:51 FV Clipper one eleven ah Clipper eleven heavy
turn right heading zero six zero

0233:56 PAA11 Right to zero six zero for Clipper eleven
heavy

0234:00 FV Avianca zero five two you have uh you have
enough fuel to make it to the airport

0234:29 FV Clipper eighteen eleven heavy turn left
heading two two zero

0234:36 FV Avianca zero five two New York

0234:53 PAA1812 New York Clipper eighteen twelve heading two
two zero

0234:56 FV Thank you sir

0235:00 FV Clipper one eleven heavy Clipper eleven heavy
turn right heading two two zero

0235:04 PAA11 Right to two two zero for Clipper eleven
heavy

0235:07 FV That's a right turn heading two two zero

0235:09 PAA11 Right turn to two two zero Clipper eleven

0235:26 FV Avianca zero five two radar contact lost

0235:50 FV Clipper eighteen twelve heavy turn left
heading two two zero ah turn left heading one
eight zero

0235:55 PAA1812 One eight zero Clipper eighteen twelve heavy



(0236)

0236:21 FV Clipper eleven heavy fly heading one eight zero contact New York one two five point seven
..

0236:26 PAA11 One eight zero for Clipper eleven heavy and one two five seven

0236:28 FV Ah affirmative sir

0236:40 FV Clipper eighteen twelve heavy turn right heading two two zero

0236:45 PAA1812 Eighteen twelve heavy right to two two zero

End of Transcript

This transcription covers the time period from January 26, 1990, 0216 UTC to January 26, 1990, 0238 UTC.

Agencies Making Transmissions

Abbreviation

New York TRACON Kennedy Sequencer
Kennedy Air Traffic Control Tower

SEQ
Tower

I HEREBY CERTIFY that the following is a true transcription of the recorded conversations pertaining to the subject aircraft accident.

William C. Fetter

William C. Fetter

System Effectiveness Specialist

(0217)

0217:06 UNK Tracon Kennedy

(0218)

(0219)

(0220)

(0221)

0221:10 SEQ Yes

0221:11 Tower Hello there I think this AW ah TWA eight oh one's gonna come out Avianca must be puttin his feet out the window

0221:17 SEQ Okay uh if you have to one uh fifty heading and two thousand back to eighteen four

0221:22 Tower One fifty two thousand eighteen four thank you

0221:24 SEQ D L

(0222)

(0223)

(0224)

0224:03 SEQ Yes

0224:04 Tower Avianca's missing due to the weather thing (unintelligible) one eighty at two speak to who

0224:11 SEQ Okay one fifty at two if you can and

0224:11 Tower One five zero okay

0224:16 SEQ And go to eighteen four with him

0224:17 Tower Eighteen point four thank you

0224:18 SEQ D L

(0225)

(0226)

(0227)

(0228)

(0229)

0229:41 Tower Tower cab

0229:42 SEQ Yeah Avianca fifty two says he can't go around so we'll give him plenty of room

0229:46 Tower Okay thanks

0229:46 SEQ D L

0229:47 Tower Bye bye

0229:47 SEQ (Unintelligible)

(0230)

(0231)

(0232)

0232:50 Tower Tower

0232:51 SEQ Yeah we're uh uh let's see do you know Robbinsvilles Dixies and Whites are released

0232:55 Tower Yeah just got the word

0232:56 SEQ Ok thanks

022:57 Tower (Unintelligible)
(0233)

0233:14 Tower Tower cab

0233:15 SEQ Yeah Avianca fifty two lost an engine and we're trying to find out why and get the personnel and fuel

0233:20 Tower Okay thank you

0233:21 SEQ D L

0233:43 Tower Tracon Kennedy
(0234)

0234:15 Tower Tower cab

0234:16 SEQ Yeah we're not talking to Avianca any longer he's fifteen northeast of Kennedy

0234:20 Tower Umhm

0234:21 SEQ Okay so uh if you get him uh he's nordo we don't know what his altitude what his problem was he last reported losing an engine

0234:26 Tower Ah wonderful

0234:27 SEQ Okay

0234:27 Tower Thank you

0234:28 SEQ D L

0234:28 Tower A L

(0235)

0235:06 Tower Tower cab

0235:06, SEQ We lost radar contact fifteen northeast of
Kennedy with Avianca

0235:11 Tower Thank you

0235:12 SEQ D L

(0236)

(0237)

(0238)

(0239)

(0240)

End of Transcript

This transcription covers the time period from January 26, 1990, 0210 UTC to January 26, 1990, 0240 UTC.

<u>Agencies Making Transmissions</u>	<u>Abbreviation</u>
New York TRACON	NYT
Kennedy Tower Local Control	Tower
Avianca Airlines Flight 052	AVA052
Pan American Airlines Flight 474	PAA474
American Airlines Flight 692	AAL692
American Airlines Flight 4	AAL4
American Airlines Flight 40	AAL40
Air France Airlines Flight 026	AFR026
Avensa Airlines Flight 520	AVE520
USAir Airlines Flight 117	USA117
Trans World Airlines Flight 801	TWA801
EL-AL-Israel Airlines Flight 842	ELY842
Evergreen Airlines Flight 102	EIA102
Transmissions from an unknown source	UNK

I HEREBY CERTIFY that the following is a true transcription of the recorded conversations pertaining to the subject aircraft accident:


 SUSAN F. FARRELL
 Program Specialist

(0210)

(0211)

0211:29 Tower Avensa five twenty, runway two two left wind one niner zero at two one cleared to land

0211:33 AVE520 Cleared to land zero -- two one cleared to land avensa five two zero

0211:38 PAA474 Clipper four seven four's about ten out

0211:40 Tower Avensa five twenty what's your airspeed now

0211:42 AVE520 One four zero knots

0211:45 Tower Alright Clipper four -- seventy four Kennedy Tower two two left number three following seven two seven traffic a half mile inside the outer marker

0211:53 PAA474 Seven four roger

0211:54 Tower Air France zero two six heavy cross runway two two right taxi ah right on the outer or straight in Kilo whichever you need ground point niner

(0212)

0212:02 AFRC26 Cleared to cross two two right via Kilo and ah ground point niner for Air France twenty six heavy

0212:08 Tower Ah Clipper four seventy four wind windshear reported a loss of five knots at a thousand and a loss of fifteen knots at ah -- five hundred feet reported by an airbus two two left R V R more than six thousand

0212:20 PAA474 Seven four roger

0212:22 AAL692 American's six ninety two we're fourteen out for two two ah left

0212:25 Tower American six ninety two roger you are number -- four on the approach following seven two seven traffic -- four miles ahead

0212:33 AAL692 Roger

0212:37 AAL692 American six ninety two slowing to one fifty

0212:41 Tower American six ninety two roger

0212:44 Tower Clipper four seventy four what's your
airsp. 1

0212:47 PAA474 one six zero

0212:48 Tower Alright

0212:49 USA117 U S Air one seventeen clear at Hotel

0212:51 Tower U S Air one seventeen roger

0212:56 Tower U S Air one seventeen via Hotel hold short of
runway two two right and remain this
frequency

(0213)

0213:03 USA117 Hotel short of two two right U S Air one
seventeen

0213:30 Tower U S Air one seventeen can you make the right
on Zulu and a left turn at Golf for me please
to hold short two two right

0213:36 USA117 Sure enough ah we still have time to do that
U S Air one seventeen right at Zulu Golf
short of two two right U S Air one seventeen

0213:42 Tower Affirmative sir remain this frequency

0213:45 USA117 The windshear by the way was ah pretty
choppy started at a about seven hundred feet
ah A G L we are getting ah fluctuations of
plus or minus ten all the way down to the
ground

0213:58 Tower Understand plus or minus ten knots ah from
seven hundred feet to the surface by a D C
nine

(0214)

0214:02 USA117 Yeah it was ah it was rough down through there

0214:06 Tower Avensa five twenty report of windshear a plus or minus ah -- ten knots seven hundred feet to the surface report reported by a D C nine

0214:14 AVE520 OK Avensa five two zero

0214:17 Tower Clipper four seventy four a report of windshear -- gain or loss of ten knots seven hundred -- to the surface by a ah D C nine

0214:24 PAA474 Roger we're marker inbound

0214:26 Tower American six ninety two did you copy that windshear

0214:29 AAL692 Affirmative

0214:30 Tower OK

0214:37 Tower Clipper four seventy four two two left wind one niner zero at one niner cleared to land R V R more than six thousand

0214:43 PAA474 Cleared to land Clipper four seven four

(0215)

0215:19 AVA052 Kennedy Tower Avianca zero five two heavy established two two left

0215:24 Tower Avianca zero five two heavy Kennedy Tower two two left you're number three following seven two seven traffic on a ah -- niner mile final

0215:32 AVA052 Avianca zero five two heavy roger

0215:35 Tower Clipper four seventy four what's your airspeed now

0215:38 PAA474 One four five

0215:40 Tower American six ninety two traffic ahead four miles is one forty five now on the airspeed

0215:45 AAL692 Thank you

0215:47 AVE520 Avensa five two zero on Juliet

0215:49 Tower Avensa five twenty ah taxi via Juliet hold short two two right and remain this frequency

0215:54 AVE520 Hold short of two two right five two zero

0215:58 USA117 U S Air one seventeen holding short of two two right at Golf

0216:00 Tower Affirmative sir hold short two two right

0216:03 USA117 Holding

0216:40 Tower U S Air one seventeen cross two two right taxi right on the outer ground's on one two one point niner on the other side

0216:46 USA117 Cleared to cross and twenty one eighty nine you say

0216:49 Tower No one two one point niner

0216:51 USA117 I was going to say is that a new one thanks a lot cleared across U S Air one seventeen

0216:55 Tower American six ninety two two two left wind one niner zero at two one cleared to land

0217:00 AAL692 Cleared to land American six ninety two

0217:18 Tower Avianca zero five two what's your airspeed

0217:20 AVA052 Avianca zero five two one four zero knots

0217:31 Tower Avianca zero five two can you increase
airspeed ah one zero knots

0217:36 AVA052 Can you say again the speed

0217:37 Tower Can you increase your airspeed one zero
knots

0217:40 AVA052 Okay one zero knots increasing

0217:42 Tower Increase increase

0217:44 AVA052 Increasing

0217:45 Tower Alright

(0218)

0218:18 Tower Clipper four seventy four turn right taxi via
Juliet hold short two two right and remain
this frequency

0218:23 PAA474 Clipper four seven four roger

0218:56 TWA801 Kennedy Tower T W A eight zero one heavy's
twelve point two on the D M E

0219:00 Tower T W A eight oh one heavy Kennedy Tower roger
you're number three on the approach following
heavy seven oh seven traffic ah four and a
half miles ahead you indicate ten knots
faster on the ground speed there
was a windshear report a loss of one a loss a
gain or loss of ten knots seven hundred feet
to the surface by a D C nine runway two two
left R V R more than six thousand

0219:19 TWA801 All right thank you sir

0219:57 Tower Avianca zero five two two two left wind one
nine zero at two zero cleared to land

0220:00 AVA052 Cleared to land Avianca zero five two heavy

0220:04 AVA052 Wind check please

0220:05 Tower One niner zero at two zero

0220:07 AVA052 Thank you

0220:10 Tower Avianca zero five two say airspeed

0220:13 AVA052 Zero five two is ah one ah four five knots

0220:16 Tower T W A eight oh one heavy if feasible reduce airspeed one four five

0220:20 TWA801 Okay we'll do our best

0220:53 Tower T W A eight oh one heavy if feasible reduce to your final approach speed at this time

0220:56 TWA 801 Yes sir we're indicating one five zero now that's about the best we can do

0220:59 Tower Alright

(0221)

0221:07 Tower Avianca zero five two heavy can you increase your airspeed one zero knots at all

0221:11 AVA052 Yes we're doing it

0221:12 Tower Yeah ah thanks

0221:30 Tower T W A eight oh one you're gaining on the heavy seven oh seven turn left heading of ah -- one five zero and maintain ah -- two thousand

0221:38 TWA801 Okay T W A eight oh one heavy a left to one five zero maintain two thousand

0221:49 Tower Avianca zero five two cross two two right taxi straight ahead now --- correction taxi right ah -- right on the outer ground one two one point niner

(0222)

0222:02 JFK Avensa

0222:02 Tower Correction Avensa five twenty cross two two right taxi right on the outer ground point nine

0222:06 AVE520 Cross two two right right on the outer and one two one point niner five two zero

0222:10 Tower Clipper four seventy four cross two two right straight to the inner ground point niner

0222:14 PAA474 Seven four cleared to cross

0222:16 Tower T W A eight oh one contact approach one one eight point four

0222:21 TWA901 Eighteen four T W A eight oh one

0222:24 Tower American six ninety two taxi via Juliet hold short two two right remain this frequency

0222:28 AAL692 Juliet short of two two right American six ninety two

0222:32 AAL40 Tower American forty heavy's with you outside Lorrs

0222:36 Tower American forty heavy Kennedy Tower roger runway two two left -- you're number two following heavy seven oh seven traffic on a three mile final wind two zero zero at one eight R V R five thousand five hundred -- and you're cleared to land

0222:51 AAL40 Cleared to land American forty heavy

0222:56 Tower American forty heavy what's your airspeed

0223:00 AAL40 Ah one sixty American forty heavy

0223:03 Tower Roger can you ah increase it one zero knots

0223:06 AAL40 Affirm

0223:08 Tower I appreciate that

0223:33 AVA052 Executing a missed approach Avianca zero five two heavy

0223:39 Tower Avianca zero five two heavy roger ah -- climb and maintain two thousand turn left heading one eight zero

0223:48 AVA052 Climb and maintain one ah two thousand one eight zero on the heading

0223:58 Tower All right Charlie we're working ah

0224:00 Tower Avianca's in a right turn

0224:04 Tower Avianca zero five two you're making the left turn correct sir

0224:07 AVA052 That's right to one eight zero on the heading and ah we'll try once again we're running out of fuel

0224:13 Tower Okay

0224:15 Tower Okay we got Avianca on the missed

0224:16 Tower Yes I've got that

0224:17 Tower Climbing to two one eighty zero ah

0224:20 Tower American forty heavy Runway two two left wind two zero zero at one niner cleared to land windshear report a gain or loss of ten knots seven hundred feet to the surface by a D C nine

0224:29 AAL40 American forty

0224:30 Tower I got it

0224:31 Tower Okay

0224:32 Tower Avianca zero five two heavy continue the left turn heading one five zero maintain two thousand

0224:36 AVA052 One five zero maintaining two thousand Avianca zero five two heavy

0224:39 Tower Avianca zero five two heavy contact approach on one one eight point four

0224:43 AVA052 One one eight point four

0224:47 Tower And you got the windshear over here

0224:49 Tower Got that

0224:50 Tower All right where's my log here

0224:51 Tower Twenty two left you own twenty two right belongs to Sam on twenty three nine final in -- and he's holding short of Juliet right

0224:58 Tower That's correct

0224:59 ELY842 Tower ELAL eight four two good evening

0225:00 Tower No that's it

0225:01 Tower Okay thanks I got it

0225:03 Tower ELAL eight forty two heavy Kennedy Tower caution wake turbulence heavy D C ten seven miles ahead wind two zero zero at one niner runway two two left R V R more than six thousand cleared to land

0225:12 ELY842 Cleared to land ELAL eight four two two two left

0225:14 Tower ELAL eight forty two heavy ah plus minus ten knots reported from seven hundred feet to surface ah by a D C nine

0225:21 ELY842 Thank you copy

0225:30 AAL692 American six ninety two short of two two right at Juliet

0225:33 Tower American six ninety two roger

0225:37 Tower American six ninety two cross runway two two right at Juliet taxi straight ahead on the inner advise clear of runway two two right on this frequency

0225:43 AAL 692 Six ninety two

(0226)

0226:41 AAL 692 American six ninety two is a -- clear of two two right

0226:44 Tower American six ninety two taxi via the inner monitor ground point niner good night

0226:47 AAL692 Night now

(0227)

0227:55 AAL4 Kennedy Tower its American four heavy at thirteen out two two left

0227:59 Tower American four heavy Kennedy Tower a gain and loss of ten knots reported at seven hundred feet to the surface by a D C nine wind two zero zero at one niner runway two two left R V R more than six thousand cleared to land

(0228)

0228:10 AAL4 Roger the shear and the winds for American four heavy we're cleared to land American four heavy

0228:17 AAL40 Ah ah tower American forty the ah shear is here and it's quite rough in the shear also, plus or minus ten knots

0228:25 Tower American forty heavy roger four hundred feet

0228:29 Tower ELAL eight forty two heavy plus or minus ten knots reported by a heavy D C ten at four hundred feet right now

0228:33 ELY942 Thank you

0228:34 Tower American four heavy plus or minus ten knots reported by company heavy D C ten at this time four hundred feet there is also a heavy boeing seven forty seven ahead five miles caution wake turbulence

0228:42 AAL4 And I copy for American four heavy

(0229)

0229:15 AAL4 What's the speed on the seven four in front of American four heavy

0229:19 Tower American four heavy speeds comparable he's six miles ahead no factor

0229:21 AAL4 Roger

0229:43 Tower American forty heavy if able turn right at first intersection Juliet hold short of runway two two right remain this frequency

0229:49 AAL40 OK ah we're turning right here at juliet and hold short of two two right American forty heavy

0229:57 EIA102 Tower Evergreen one oh two heavy is a mile out for two two left

0229:59 Tower Evergreen one oh two heavy Kennedy Tower caution wake turbulence heavy D C ten six miles ahead runway two two left R V R more than six thousand wind two zero zero at one eight plus or minus ten knots reported at four hundred feet by a heavy D C ten also other reported at plus or minus ten knots from seven hundred feet to the surface by a D C nine you're cleared to land runway two two left

(0230)

0230:13 EIA102 Roger and cleared to land Evergreen one oh two heavy

0230:50 Tower American forty heavy cross runway two two right Juliet taxi straight ahead via the inner advise clear of runway two two right on this frequency

0230:57 AAL40 Cleared to cross two two right and ah straight across on the inner and ah call clear american forty heavy

(0231)

0231:05 Tower Wind two zero zero at one eight

0231:50 TWA801 Kennedy Tower T W A eight zero one heavy is with you again ah we're seventeen out

0231:55 Tower T W A eight oh one heavy Kennedy Tower caution wake turbulence six miles in trail of a heavy boeing seven forty seven runway two two left R V R more than six thousand wind two zero zero at one niner

(0232)

0232:03 TWA801 Roger eight zero one heavy thank you

0232:06 AAL40 Forty heavy's clear of two two right

0232:07 Tower American forty heavy taxi via the inner monitor ground point niner good day

0232:10 AAL40 OK via the inner monitor ground point nine thank you good night

0232:13 Tower ELAL eight forty two heavy if able turn right first intersection Juliet, hold short of runway two two right remain this frequency

0232:19 ELY842 Eight four two

0232:21 Tower And T W A eight oh one heavy plus minus one zero knots reported from seven hundred feet to the surface by a D C nine and then again at four hundred feet by a heavy D C ten a few minutes ago

0232:29 TWA801 T W A eight oh one thank you

(0233)

0233:04 Tower American four heavy say your airspeed

0233:12 Tower American four heavy say airspeed

0233:14 AAL4 Ah one fifty three

0233:16 Tower Ah ah evergreen one oh two heavy say your airspeed

0233:18 EIA102 One seven zero

0233:20 Tower Ah ah evergreen one oh two heavy if practical reduce speed to one five zero

0233:24 EIA102 Ah roger

0233:43 Tower ELAL eight forty two heavy cross runway two two right at Juliet taxi straight ahead via the inner advise on this frequency when clear of runway two two right

0233:50 ELY842 ELAL eight four two copy

(0234)

0234:27 ELY842 Tower eight four two two two right is clear

0234:30 Tower ELAL eight forty two heavy taxi via the inner and monitor ground point niner

0234:34 ELY842 (Unintelligible) Thank you

(0235)

0235:25 NYT Departure

0235:26 Tower Yeah

0235:26 NYT Stop departures

0235:27 Tower All departures stopped

0235:28 NYT L D

0235:40 Tower American four heavy if able turn right first intersection Juliet hold short runway two two right remain this frequency

0235:45 AAL4 Roger sir we're on ah juliet we'll hold short

0235:54 AAL4 And for American four a little bit of turbulence at a thousand feet, you do get the ah ten knot rise and the sink at about ah five hundred feet

0236:00 Tower American four heavy say again

0236:03 AAL4 (Unintelligible) a little bit of turbulence at a thousand feet then you get the ten knot increase and the decrease just about five hundred feet

0236:09 Tower That's moderate turbulence

0236:11 AAL4 It's light

0236:12 Tower Evergreen one oh two heavy mod light turbulence one thousand feet plus or minus ten knots at four hundred feet reported by arrival heavy D C ten you're cleared to land runway two two left runway two two left R V R more than six thousand wind two zero zero at one niner

0236:24 EIA102 Roger evergreen ah one oh two heavy

0236:29 Tower T W A eight oh one heavy --- light turbulence one thousand feet reported by a heavy D C ten plus or minus ten knots reported at four hundred feet by the same D C ten cleared to land runway two two left runway two two left R V R more than six thousand wind two zero zero at one niner

0236:43 TWA801 Roger T W A eight zero one heavy

(0237)

0237:02 Tower American four heavy cross runway two two right at Juliet taxi straight ahead on the inner advise on this frequency clear of two two right

0237:17 Tower American four heavy cross two two right juliet straight ahead on the inner advise clear of two two right this frequency

0237:25 Tower American four heavy Kennedy Tower

(0238)

0238:16 EIA102 And for evergreen ah one oh two heavy's clearing at juliet

0238:20 Tower Evergreen one oh two heavy hold short of runway two two right juliet remain this frequency

0238:27 EIA102 Roger

0238:37 AAL688 Ah Kennedy Tower American six eight eight

0238:39 Tower American six eighty eight heavy tower

0238:41 AAL688 Yes sir ah you got the R V R for two two left

0238:44 Tower Runway two two left more than six thousand

0238:45 AAL688 Thank you

0238:58 TWA801 T W A eight oh one heavy's the outer marker

0239:00 Tower T W A eight oh one heavy Kennedy tower wind two zero zero at one niner cleared to land

0239:02 TWA801 Cleared to land eight oh one

0239:06 Tower Evergreen one oh two heavy say your destination on the field

0239:10 EIA102 Ah eastern ramp

0239:12 Tower Ah evergreen one oh two heavy what's your position now sir

0239:15 EIA102 We're ah taxiing down Juliet

0239:18 Tower You're on Juliet right now

0239:20 EIA102 That's affirmative

0239:22 Tower Evergreen one oh two heavy cross runway two two right at juliet you're in sight now on the ah ground radar cross runway two two right juliet taxi via the inner advise clear two two right this frequency

0239:29 EIA102 Ah roger we'll do ah evergreen one oh two heavy

End of transcript

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SUSAN F. FARRELL
 Program Specialist

(0210)

(0211)

(0212)

(0213)

(0214)

0214:36 NYT Yes ..

0214:37 JFK Windshear new and improved

0214:38 NYT Windshear OK

0214:41 JFK Plus or minus ten knots - - - seven hundred
and below - - - D C nine

0214:48 NYT Ah seven hundred and below

0214:49 JFK Yup

0214:50 NYT OK thank you

0214:51 JFK Right A O

0214:51 NYT J O

(0215)

0215:27 Tower seven two seven traffic on a

0215:32 AVA052 Avianca zero five two heavy roger

0215:35 Tower Clipper four seventy four what's your
airspeed now

0215:38 PAA474 One four five

0215:40 Tower American six ninety two traffic ahead four
miles is one forty five now on the airspeed

0215:45 AAL692 Thank you

0215:47 AVE520 Avensa five two zero on Juliet

0215:49 Tower Avensa five twenty ah taxi via Juliet hold short two two right and remain this frequency

0215:54 AVE520 Hold short of two two right five two zero

0215:58 USA117 U S Air one seventeen holding short of two two right at Golf

0216:01 Tower Affirmative sir hold short two two right

0216:03 USA117 Holding

0216:20 UNK You want us to stay with you or go back to gate hold

0216:30 UNK Ah thanks

0216:40 Tower U S Air one seventeen cross two two right taxi right on the outer ground's on one two one point niner on the other side

0216:46 USA117 Cleared to cross and twenty one eighty nine you say

0216:49 Tower No one two one point niner

0216:51 USA117 I was going to say is that a new one thanks a lot cleared across U S Air one seventeen

0216:55 Tower American six ninety two two two left wind one niner zero at two one cleared to land

0217:01 AAL692 Cleared to land American six ninety two

0217:18 Tower Avianca zero five two what's your airspeed

0217:20 AVA052 Avianca zero five two one four zero knots

0217:31 Tower Avianca zero five two can you increase airspeed ah one zero knots

0217:36 AVA052 Can you say again the speed

0217:37 Tower Can you increase your airspeed one zero knots

0217:40 AVA052 Okay one zero knots increasing

0217:42 Tower Increase increase

0217:44 AVA052 Increasing

0217:45 Tower Alright

0218:18 Tower Clipper four seventy four turn right taxi via Juliet hold short two two right and remain this frequency

0218:23 PAA474 Clipper four seven four roger

0218:56 TWA801 Kennedy Tower T W A eight zero one heavy's twelve point two on the D M E

0219:01 Tower T W A eight oh one heavy Kennedy Tower roger you're number three on the approach following heavy seven oh seven traffic ah four and a half miles ahead you indicate ten knots faster on the ground speed there was a windshear report a loss of one a loss a gain or loss of ten knots seven hundred feet to the surface by a D C nine Runway two two left R V R more than six thousand

0219:19 TWA801 Alright thank you sir

0219:57 Tower Avianca zero five two two two left wind one nine zero at two zero cleared to land

(0220)

0220:01 AVA052 Cleared to land Avianca zero five two heavy

0220:04 AVA052 Wind check please

0220:05 Tower One nine zero at two zero

0220:07 AVA052 Thank you

0220:10 Tower Avianca zero five two say airspeed

0220:13 AVA052 Zero five two is ah one ah four five knots

0220:16 Tower T W A eight oh one heavy if feasible reduce airspeed one four five

0220:20 TWA801 OK we'll do our best

0220:53 Tower T W A eight oh one heavy if feasible reduce to your final approach speed at this time

0220:56 TWA801 Yes sir we're indicating one five zero now That's about the best we can do

0220:59 Tower Alright

(0221)

0221:11 NYT One said yes

0221:12 JFK Hello there I think this A W ah T W A eight oh one's gonna come out Avianca must be putting his feet out the window

0221:18 NYT OK ah if you have to one ah fifty heading and two thousand back to eighteen four

0221:23 JFK One fifty two thousand eighteen four thank you

0221:25 NYT J O

0223:19 JFK Yes weather

0223:20 NWS Yes Tower could I have a visibility check please

0223:22 JFK Todd get a vis check

0223:26 JFK Quarter mile

0223:27 NWS Still one quarter

0223:28 JFK That's it

0223:29 NWS OK thank you very much

0223:29 JFK Alright

0223:30 NWS Bye bye

0223:46 JFK Does he have anybody rolling

0223:48 UNK Negative

0223:53 JFK Yeah

0223:54 JFK Yeah

0224:05 NYT Yes

0224:07 JFK Avianca's missing

0224:08 NYT OK

0224:08 JFK Due to the weather thing

0224:10 NYT OK

0224:11 JFK I'll give you one eighty at two speak to who

0224:12 NYT OK one fifty at two if you can and one and ah go to eighteen four with him

0224:14 UNK (Intelligible)

0224:17 JFK Eighteen point four. thank you

0224:18 NYT J O

0224:53 Tower Sam on twenty three nine final in -- and he's holding short of Juliet right

0224:58 Tower That's correct

0224:59 ELY842 Tower ELAL eight four two good evening (unintelligible)

0225:00 Tower No that's it

0225:01 Tower OK thanks I got it

0225:03 Tower ELAL eight forty two heavy Kennedy Tower caution wake turbulence heavy D C ten seven miles ahead wind two zero zero at one niner runway two two left R V R more than six thousand cleared to land

0225:12 ELY842 Cleared to land ELAL eight four two two two left

0225:14 Tower ELAL eight forty two heavy ah plus minus ten knots reported from seven hundred feet to surface ah by a D C nine

0225:21 ELY842 Thank you copy

0225:30 AAL692 American six ninety two short of two two right at Juliet

0225:33 Tower American six ninety two roger

0225:37 Tower American six ninety two cross runway two two right at Juliet taxi straight ahead on the inner advise clear of runway two two right on this frequency

0225:43 AAL692 Six ninety two

0226

0226:41 AAL692 American six ninety two is a - clear of two two right

0226:44 Tower American six ninety two taxi via the inner monitor ground point nine good night

0226:47 AAL692 Bye now

(0227)

0227:55 AAL4 Kennedy Tower its American four heavy at thirteen out two two left

0227:59 Tower American four heavy Kennedy Tower a gain and loss of ten knots reported at seven hundred feet to the surface by a D C nine wind two zero zero at one nine runway two two left RVR more than six thousand cleared to land

(0228)

0228:10 AAL4 Roger the shear and the winds for American four heavy we're cleared to land American four heavy

0228:17 AAL40 Ah ah Tower American forty the ah shear is here and it's quite rough in the shear also plus or minus ten knots

0228:25 Tower American forty heavy roger four hundred feet

0228:28 Tower ELAL eight forty two heavy plus or minus ten knots reported by a heavy D C ten at four hundred feet right now

0228:33 ELY842 Thank you

0228:34 Tower American four heavy plus or minus ten knots reported by company heavy D C ten at this time four hundred feet there is also a heavy Boeing seven forty seven ahead five miles caution wake turbulence

0228:42 AAL4 And I copy for American four heavy

(0229)

0229:15 AAL4 What's the speed on the seven four in front of American four heavy

0229:18 Tower American four heavy speeds comparable he's six miles ahead no factor

0229:21 AAL4 Roger

0229:42 JFK Tower Cab

0229:43 NYT Yeah Avianca fifty two says he can't go around so we'll give him plenty of room

0229:47 JFK OK thanks

0229:48 NYT J O

0229:48 JFK Bye bye

0229:49 NYT J O

(0230)

0230:02 Tower D C ten six miles ahead. Runway two two left R V R more than six thousand wind two zero zero at one eight plus or minus ten knots reported at four hundred feet by a heavy D C ten also other reported at plus or minus ten knots from seven hundred feet to the surface by a D C nine you're cleared to land runway two two left

0230:18 EIA102 Roger and cleared to land Evergreen one oh two heavy

0230:50 Tower American forty heavy cross runway two two right Juliet taxi straight ahead via the inner advise clear of runway two two right on this frequency

0230:57 AAL40 Cleared to cross two two right and ah straight across on the inner and ah call clear American forty heavy
(0231)

0231:05 Tower Wind two zero zero at one eight

0231:50 TWA801 Kennedy Tower T W A eight zero one heavy is with you again ah we're seventeen out

0231:55 Tower T W A eight oh one heavy Kennedy Tower caution wake turbulence six miles in trail of heavy boeing seven forty seven runway two two left R V R more than six thousand wind two zero zero at one niner
(0232)

0232:03 TWA801 Roger eight zero one heavy thank you

0232:06 AAL40 Forty heavy's clear of two two right

0232:07 Tower American forty heavy taxi via the inner. monitor ground point niner good day

0232:10 AAL 40 OK via the inner monitor ground point nine thank you good night

0232:13 Tower ELAL eight forty two heavy if able turn right first intersection Juliet, hold short of runway two two right remain this frequency

0232:19 ELY842 Eight four two

0232:21 Tower And T W A eight oh one heavy plus minus one zero knots reported from seven hundred feet to the surface by a D C nine and then again at four hundred feet by a heavy D C ten a few minutes ago

0232:29 TWA801 T W A eight oh one thank you

0232:54 Unknown Ah let's see did you know ROBINSVILLE
DIXIE's and WHITE's are released

(0233)

0233:15 JFK Tower crab

0233:16 NYT Yeah Avianca fifty two lost an engine and
we're trying to find out why and get the
personnel and fuel

0233:21 JFK OK thank you

0233:22 NYT J O

(0234)

0234:17 JFK Tower Cab

0234:17 NYT Yeah we're not talking to Avianca any longer
he's fifteen northeast of Kennedy

0234:21 JFK Uh hum

0234:22 NYT OK so ah if you get him ah he's NORDO We
don't know what his altitude what his problem
was he last reported losing an engine

0234:28 JFK Oh wonderful

0234:28 NYT OR

0234:29 JFK Thank you

0234:30 NYT J O

0234:30 JFK A O

(0235)

0235:07 JFK Tower crab

0235:08 NYT We lost radar contact fifteen northeast of Kennedy with Avianca

0235:11 JFK Thank you

0235:12 NYT J O

(0236)

(0237)

0237:02 Tower American four heavy cross runway two two right at Juliet taxi straight ahead on the inner advise on this frequency clear of two two right

0237:17 Tower American four heavy cross two two right Juliet straight ahead on the inner advise clear of two two right this frequency

0237:25 Tower American four heavy Kennedy Tower

(0238)

0238:06 Tower Alright Jim you checked your status information areas the airport conditions we're I F R no runway taxiway closures no windshear uh actually there is windshear plus or minus ten knots seven hundred below by a D C nine at four hundred feet by a heavy D C ten no bird advisories braking action no adverse ah action equipment status is all normal no special coordinations ah frequencies are standard we're on taxis we have some apreqs some stops I believe which are all ah released no other than normal restrictions we have eight minutes in trail Boston no altitude restrictions at this time that I know of no special activities except for Avianca weather's I F R the only unusual is you know Avianca and the traffic is all being worked by local the only guy he's got on the frequency T W A eight oh one heavy inbound for two two left

(0239)

0239:02 Tower Check got it

0239:02 Tower Thank you

End of transcript

APPENDIX E

SURFACE WEATHER OBSERVATIONS

10. Weather observations.

The following are the clouds, visibility, weather and wind from the surface observations at John F. Kennedy International Airport during the period from 0700 to 2200, January 25, and at Boston-Logan, Philadelphia, Baltimore-Washington, and Hancock (Syracuse, NY) International Airports for the period from 1900 to 2200, January 25.

The following are the clouds, visibility, weather, and wind from the surface observations at John F. Kennedy International Airport during the period from 0700 to 2200, January 25.

0650, surface aviation, ceiling measured 300 feet overcast, visibility 2-1/2 miles in light rain and fog, wind 150 degrees 6 knots.

0753, record special, ceiling measured 400 feet overcast, visibility 1 mile in moderate rain and fog, wind 120 degrees 7 knots, Runway 4R visual range 5,500 feet variable 6,000 feet, surface visibility 2 miles, ceiling variable 300 to 500 feet.

0839, special, ceiling measured 300 feet overcast, visibility 1-3/4 miles in light rain and fog, wind 110 degrees 5 knots.

0850, surface aviation, ceiling measured 300 feet overcast, visibility 1-3/4 miles in light rain and fog, wind 110 degrees 5 knots.

0952, surface aviation, ceiling measured 300 feet overcast, visibility 1-3/4 miles in light rain and fog, wind 140 degrees 8 knots, light rain occasionally moderate rain.

1031, special, ceiling measured 300 feet broken 2,000 feet overcast, visibility 2 miles in light rain and fog, wind 160 degrees 12 knots, surface visibility 2-1/2 miles.

1050, surface aviation, ceiling measured 300 feet broken 2,000 feet overcast, visibility 2 miles in light rain and fog, wind 140 degrees 8 knots, surface visibility 3 miles, 300 feet broken variable scattered, pressure falling rapidly.

1152, surface aviation, ceiling measured 300 feet overcast, visibility 2 miles in moderate rain and fog, wind 160 degrees 9 knots, surface visibility 2-1/2 miles.

1211, special, ceiling measured 300 feet overcast, visibility 1/2 mile in light rain and fog, wind 140 degrees 8 knots, Runway 4R visual range 6,000 feet plus, surface visibility 2 miles, pressure falling rapidly.

1242, special, ceiling measured 300 feet overcast, visibility 1-1/2 miles in light rain and fog, wind 140 degrees 10 knots, surface visibility 2 miles, light rain occasionally moderate rain.

1252, surface aviation, ceiling measured 300 feet overcast, visibility 1-1/2 miles in light rain and fog, wind 140 degrees 8 knots, surface visibility 2 miles.

1350, surface aviation, ceiling measured 300 feet overcast, visibility 1-1/2 miles in light rain and fog, wind 110 degrees 6 knots, surface visibility 3 miles, light rain occasionally moderate rain.

1428, special, ceiling measured 400 feet overcast, visibility 2-1/2 miles in light rain and fog, wind 110 degrees 7 knots, surface visibility 4 miles.

1450, surface aviation, ceiling measured 400 feet overcast, visibility 2-1/2 miles in light rain and fog, wind 110 degrees 8 knots, surface visibility 4 miles, precipitation very light.

1515, special, ceiling measured 300 feet overcast, visibility 2-1/2 miles in fog, wind 130 degrees 9 knots, surface visibility 3 miles, wind variable 110 to 170 degrees.

1533, special, ceiling measured 300 feet overcast, visibility 1 mile in fog, wind 140 degrees 10 knots, Runway 4R visual range 5,000 feet variable 6,000 feet, surface visibility 1-1/2 miles, ceiling ragged.

1544, special, partial obscuration ceiling measured 300 feet overcast, visibility 1/2 mile in fog, wind 140 degrees 11 knots, Runway 4R visual range 3,500 feet variable 5,000 feet, fog obscuring 1/10 sky, surface visibility 3/4 mile, ceiling ragged.

1553, record special, partial obscuration ceiling measured 200 feet overcast, visibility 1/4 mile in fog, wind 140 degrees 10 knots, Runway 4R visual range 2,600 feet variable 4,000 feet, fog obscuring 3/10 sky, rain ended 1456.

1650, surface aviation, partial obscuration ceiling measured 200 feet overcast, visibility 1/4 mile in fog, wind 130 degrees 8 knots, Runway 4R visual range 2,800 feet variable 4,000 feet, fog obscuring 1/10 sky, surface visibility 1 mile.

1750, surface aviation, partial obscuration ceiling measured 200 feet overcast, visibility 1/4 mile in fog, wind 130 degrees 8 knots, Runway 4R visual range 3,500 feet variable 6,000 feet, fog obscuring 5/10 sky, surface visibility 1/2 mile.

1850, record special, ceiling indefinite 200 feet obscured, visibility 1/4 mile in light drizzle and fog, wind 170 degrees 11 knots, Runway 4R visual range 1,800 feet variable 2,000 feet, drizzle began 1840.

1950, surface aviation, ceiling indefinite 200 feet obscured, visibility 1/4 mile in light drizzle and fog, wind 170 degrees 15 knots, Runway 4R visual range 1,800 feet variable 2,000 feet.

2024, special, ceiling indefinite 200 feet obscured, visibility 1/4 mile in light drizzle and fog, wind 180 degrees 20 knots, Runway 4R visual range 2,200 feet variable 2,600 feet.

2042, special, ceiling indefinite 200 feet obscured, visibility 1/4 mile in light drizzle and fog, wind 180 degrees 22 knots gusting to 28 knots, Runway 4R visual range 1,800 feet variable 2,200 feet.

2050, surface aviation, ceiling indefinite 200 feet obscured, visibility 1/4 mile in light drizzle and 200 feet obscured, visibility 1/4 mile in light drizzle and fog, wind 190 degrees 20 knots gusting to 28 knots, Runway 4R visual range 1,800 feet variable 2,200 feet.

2100, special, ceiling indefinite 200 feet obscured, visibility 1/4 mile in light drizzle and fog, wind 190 degrees 21 knots, Runway 4R visual range 2,200 feet variable 3,500 feet.

2135, special, partial obscuration ceiling measured 300 feet overcast, visibility 3/4 mile in fog, wind 190 degrees 20 knots, Runway 4R visual range 5,500 feet variable 6,000 feet plus, fog obscuring 3/10 sky.

2150, surface aviation, partial obscuration ceiling measured 300 feet overcast, visibility 3/4 mile in fog, wind 200 degrees 21 knots, Runway 4R visual range 5,500 feet variable 6,000 feet plus.

The following are the clouds, visibility, weather and wind from the surface observations at Boston Logan International Airport, Massachusetts, during the period from 1900 to 2200, January 25.

1850, surface aviation, ceiling indefinite 300 feet obscured, visibility 1/4 mile in light rain and fog, wind 030 degrees 7 knots, Runway 4R visual range 1,400 feet variable 2,400 feet.

1933, special, ceiling indefinite 200 feet obscured, visibility 1/8 mile in light rain and fog, wind 170 degrees 10 knots, Runway 4R visual range 1,000 feet variable 1,400 feet.

1950, record special, ceiling indefinite 0 feet obscured, visibility 1/8 mile in light drizzle and fog, wind 070 degrees 8 knots, Runway 4R visual range 1,200 feet variable 1,800 feet, rain ended drizzle began 1945.

2050, surface aviation, ceiling indefinite 0 feet obscured, visibility 1/8 mile in light drizzle and fog, wind 100 degrees 9 knots, Runway 4R visual range 1,400 feet variable 1,600 feet.

2126, special, ceiling indefinite 300 feet obscured, visibility 1/8 mile in light drizzle and fog, wind 100 degrees 7 knots, Runway 4R visual range 2,400 feet variable 3,000 feet.

2150, record special, ceiling indefinite 300 feet obscured, visibility 1/4 mile in light drizzle and fog, wind 110 degrees 4 knots, Runway 4R visual range 2,600 feet variable 3,000 feet, surface visibility 1/2 mile.

The following are the clouds, visibility, weather, and wind from the surface observations at the Philadelphia, Pennsylvania, International Airport during the period from 1900 to 2200, January 25.

1850, surface aviation, partial obscuration, ceiling measured 300 feet overcast, visibility 1-1/4 miles in fog, wind 140 degrees 7 knots, fog obscuring 5/10 sky.

1901, special, ceiling measured 400 feet overcast, visibility 2 miles in fog, wind 150 degrees 10 knots.

1917, special, ceiling measured 700 feet broken, 4,000 feet overcast, visibility 3 miles in fog, wind 160 degrees 10 knots.

1950, record special, 700 feet scattered, ceiling estimated 4,000 feet overcast, visibility 5 miles in fog, wind 240 degrees 13 knots.

1957, special, ceiling measured 700 feet broken, 4,000 feet overcast, visibility 4 miles in light rain showers and fog, wind 270 degrees 20 knots gusting to 25 knots.

2009, special, ceiling measured 700 feet broken, 2,300 feet overcast, visibility 2-1/2 miles in light rain showers and fog, wind 240 degrees 12 knots gusting to 20 knots, thunderstorm began 2008 west and north moving northeast, occasional lightning in clouds.

2021, special, 700 feet scattered, 2,300 feet scattered, ceiling estimated 4,000 feet overcast, visibility 1-1/2 miles in moderate rain showers and fog, wind 210 degrees 10 knots, thunderstorm northeast moving northeast, occasional lightning in cloud.

2041, special, 1,200 feet scattered, ceiling estimated 4,000 feet overcast, visibility 2-1/2 miles in light rain showers and fog, wind 200 degrees 10 knots, thunderstorms moved northeast.

2050, special, 1,200 feet scattered, ceiling estimated 4,000 feet overcast, visibility 2-1/2 miles in light rain showers and fog, wind 170 degrees 10 knots, thunderstorm began 2008, ended 2038, moved northeast, rain began 1953. (This observation should have been labeled surface aviation vice special.)

2116, special, 800 feet scattered, 1,500 feet scattered, ceiling estimated 4,000 feet overcast, visibility 5 miles in light rain shower and fog, wind 180 degrees 10 knots.

2150, surface aviation, 800 feet scattered, ceiling estimated 4,500 feet overcast, visibility 5 miles in light rain showers and fog, wind 180 degrees 16 knots.

The following are the clouds, visibility, weather, and wind from the surface observations at the Baltimore-Washington International Airport, Maryland, during the period from 1900 to 2200, January 25.

1850, surface aviation, ceiling measured 8,000 feet overcast, visibility 1/2 mile in light rain and fog, wind 130 degrees 7 knots, Runway 10 visual range 6,000 feet plus.

1930, special, 5,000 feet scattered ceiling measured 10,000 feet overcast, visibility 4 miles in light rain and fog, wind 170 degrees 6 knots.

1950, surface aviation, 600 feet scattered ceiling measured 10,000 feet overcast, visibility 7 miles in light rain, wind 180 degrees 9 knots.

2050, surface aviation, ceiling measured 8,000 feet overcast, visibility 10 miles in light rain, wind 190 degrees 8 knots.

2150, record special, ceiling measured 1,800 feet overcast, visibility 8 miles in light rain, wind 180 degrees 9 knots.

The following are the clouds, visibility, weather, and wind from the surface observations from Hancock International Airport, Syracuse, New York, during the period from 1900 to 2200, January 25.

1850, surface aviation, ceiling measured 1,900 feet broken, 2,800 feet overcast, visibility 10 miles, wind 130 degrees 10 knots, breaks in overcast.

1951, surface aviation, ceiling measured 2,000 feet broken 3,000 feet broken 4,500 feet overcast, visibility 10 miles, wind 100 degrees 10 knots, breaks in overcast.

2053, surface aviation, ceiling measured 2,300 feet broken 4,500 feet broken 7,500 feet overcast, visibility 10 miles, wind 100 degrees 7 knots.

2151, record special, 2,300 feet scattered ceiling estimated 4,500 feet broken 7,500 feet overcast, visibility 10 miles, wind 230 degrees 9 knots.

APPENDIX F

COMMENTS ON DRAFT REPORT FROM THE ADMINISTRATIVE DEPARTMENT
OF CIVIL AERONAUTICS, COLOMBIA

REPÚBLICA DE COLOMBIA
Departamento Administrativo de Aeronáutica

Bogotá, 9th April 1991.

TO : RONALD L. SHCLEEDE
CHIEF, MAJOR INVESTIGATIONS
NTSB WASHINGTON
FAX 202-382 6576

FROM : MAYOR JORGE ENRIQUE LEAL
CHIEF, FLIGHT SAFETY DIVISION
ADMINISTRATIVE DEPARTMENT OF CIVIL AVIATION
FAX 4136091
BOGOTÁ COLOMBIA

REF : CONSIDERATIONS TO THE ACCIDENT INVESTIGATION REPORT DRAFT OF
AVIANCA FLIGHT 052 AT COVE NECK, NEW YORK ON JANUARY 25, 1990.

The Administrative Department of Civil Aeronautics (D.A.A.C.) in representation of the government of Colombia would like to submit to the consideration of the honorable members of the national transportation safety board the inclusion of the following points here stated in the final report of the accident investigation involving Avianca flight 052.

This petition is requested in accordance with the protocol of the International Civil Aviation Organization contained in its Annex 13 as the State of Registry of the aircraft involved in the accident. The chief of Flight Safety Division of DAAC, as the Colombia accredited tried to analyze the entire report in the very short time you gave us. It would be better if we had the 60 days ICAO recommends to the State of Registry of the aircraft.

COMMENTS.-

1b.- THE THIRD ITEM IN THE PARAGRAPH UNDER PROBABLE CAUSE WHICH ADDRESSES THE USE OF INADEQUATE TRAFFIC MANAGEMENT ON THE PART OF THE F.A.A. SHOULD ALSO INCLUDE THE INADEQUATE HANDLING OF THE FLIGHT ITSELF


The actions and omissions on the part of atc that sustains such allegation include :

The acceptance of flight 052 by the New York tracon under the repeated insistence of New York A.R.T.C.C. was unsafe and misleading to the flight crew. Consider that the conditions (weather and traffic) at JFK should have been known by the controller before accepting an aircraft he had no place for. If the controller had rejected the Hand-Off, the crew of Avianca 052 would have been confronted with a less ambiguous situation that would have demanded an alternative course of action. If in fact the Hand-Off was made because of the request for priority the subsequent handling of the flight was incorrect. The N.Y. tracon is an airspace that contemplates no airborne holdings within it and flight crews expect no delays once they are inside. The "SPIK" given to AV052 was in fact a racetrack holding pattern (see Radar Track) and presented an unannounced delay to the flight after a priority request from the flight crew was made and they declared that they were running out of fuel and could not make their alternate.

The Air Traffic Control Service rendered by the Control Tower at JFK did not include mandatory information that should have been given to the flight and in fact was given to every other aircraft that landed prior to AV052. This information concerning runway visual range and pireps of wind shear could have aided the pilot in his evaluation of the conditions present during his approach. In addition, the control tower gave no special meaning to the statement made by the flight crew: "And we are running out fuel sir" made during their missed approach.

25.- THE RECOMMENDATIONS OF THE REPORT SHOULD ENCOURAGE THE MODIFICATION OF THE WAY THE AIR TRAFFIC CONTROL SYSTEM PRESENTS THE ANTICIPATED DELAYS TO FLIGHT CREWS. THE CURRENT EXPECT FURTHER CLEARANCE TIME DOES NOT PROVIDE A PILOT WHEN HE CAN EXPECT TO LAND AND THUS SERVES LITTLE PURPOSE IN CONTEMPLATING THE ENTIRE DELAY SCENARIO.

30.- THE FEDERAL AVIATION REGULATIONS SHOULD REQUIRE AN ACTIVE FLIGHT FOLLOWING SYSTEM TO ASSIST FLIGHT CREWS IN EVALUATING WEATHER CONDITIONS AND TRAFFIC DELAYS AT THEIR INTENDED AND ALTERNATE DESTINATIONS FOR INTERNATIONAL FLIGHTS WHICH ARE NOT SUBJECT TO GROUND HOLDS AND ARE NOT CONSIDERED DIRECTLY IN THE CENTRAL FLOW CONTROL FACILITY PROGRAM.


MAYOR JORGE ENRIQUE LEAL
Chief, Flight Safety Division.

Bogotá, D.E.
Abril 9 de 1.991

36-111

FAX

PARA : Señor
RONALD L. SCHLEEDE.
JEFE INVESTIGACIONES MAYORES
NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON D.C.
202-3826576

DE : MAYOR JORGE ENRIQUE LEAL C.
JEFE DIVISION SEGURIDAD AEREA DAAC COLOMBIA
FAX 413-8091 BOGOTA D.E. - COLOMBIA

REF : CONSIDERACIONES SOBRE INFORME ACCIDENTE AVIANCA 052
EN NEW YORK.-

Apreciado señor:

El Departamento Administrativo de la Aeronáutica Civil (DAAC) en representación del Gobierno de Colombia, desea presentar a la consideración de los Honorables Miembros de la Junta de Seguridad Nacional del Transporte, lo incluido en los siguientes puntos en relación con el informe final sobre la investigación del accidente de AVIANCA en su vuelo 052.-

Esta apreciación se hace de acuerdo con lo estipulado en el protocolo de la Organización de Aviación Civil (OACI) como base de registro de la aeronave implicada en el accidente.-

La División de Seguridad Aérea, como representante acreditado para esta investigación, llevo a cabo el análisis completo del informe, no obstante el reducido tiempo disponible de acuerdo a su solicitud; los presentes comentarios, podrían haber sido un poco más profundos, de haberse contado con los 60 días que recomienda el Anexo 13 de la OACI.-

COMENTARIOS

1. EL TERCER PUNTO DEL PARAGRAFO RESPECTO A LA CAUSA PROBLEMA EN EL CUAL SE MENCIONA EL MANEJO INADECUADO DEL TRAFICO POR PARTE DE LA F.A.A. DEBERIA SER MAS ESPECIFICO, MENCIONANDO AL VUELO 052, EL CUAL ES MOTIVO DE ESTA INVESTIGACION.-

Las actuaciones y omisiones por parte del control de tráfico aéreo que sostienen esta afirmación incluyen:

La aceptación del Vuelo 052 por el control terminal de radar de aproximación de New York (New York Tracon), ante la repetida insistencia del Centro de Control de Tráfico Aéreo de New York (ARTCC New York), fué insegura, ocasionando una posible confusión a la tripulación de vuelo. Se considera que las condiciones (Atmosféricas y Tráfico) en el

Aeropuerto Internacional JOHN F. KENNEDY, deberían haber sido conocidas por el Controlador antes de aceptar otra aeronave para la cual no tenía espacio. Si el Controlador se hubiera negado, la tripulación de la Aeronave de AVIANCA, en su Vuelo 052, se habría encontrado ante una situación menos ambigua, lo que hubiera requerido un curso de acción alternativo. Si de hecho, la aceptación de manejar la aeronave, se llevó a cabo debido a la exigencia de prioridad, el subsecuente manejo del vuelo fue incorrecto. El Control Terminal del Radar de Aproximación de New York (New York Traccon), es un espacio aéreo que no contempla el sostenimiento en vuelo, por lo cual, las tripulaciones de vuelo no esperan demoras una vez se encuentran dentro.-

El Circuito ordenado a la aeronave del vuelo 052, de hecho fue un patrón de espera (Ver Gráfica del Radar), presentandose una demora no anunciada para el vuelo, después de que la tripulación de vuelo requirió prioridad y declararon que se estaban quedando sin combustible y que no podían alcanzar el aeropuerto alternativo.-

El servicio dado por el Control de Tráfico Aéreo en la Torre de Control del aeropuerto JOHN F. KENNEDY, no incluyó la información mandatoria del caso, que debería haber sido dada al vuelo 052, y de hecho, si fue dada a todas las otras aeronaves que aterrizaron antes del vuelo 052 de AVIANCA. Esta información se relaciona con el rango visual de pista y reportes de Pilotos sobre cortantes de viento, lo cual habría ayudado al Piloto en su evaluación de las condiciones presentes durante su aproximación. Además, la Torre de Control no dio especial significado a lo manifestado por la tripulación cuando dijeron durante su aproximación frustrada: "...nos estamos quedando sin combustible, señor".

LAS RECOMENDACIONES DEL INFORME DEBERIAN ESTIMULAR LA MODIFICACION DE LA MANERA EN QUE EL SISTEMA ACTUAL DE CONTROL DE TRAFICO AEREO (ATC) PRESENTA LAS DEMORAS POR ANTICIPADO A LA TRIPULACION DE VUELO. EL TERMINO CORRIENTE DE "HORA PREVISTA DE AUTORIZACION", NO INDICA AL PILOTO CUANDO PUEDE ESPERAR ATERRIZAR Y SIRVE DE POCO EN EL ANALISIS DEL ESCENARIO GENERAL DE DEMORAS.-

3. LAS REGULACIONES DE LA AVIACION FEDERAL DEBERIAN REQUERIR UN SISTEMA ACTIVO DE SEGUIMIENTO DE VUELO, PARA AYUDAR A LA TRIPULACION A EVALUAR LAS CONDICIONES ATMOSFERICAS Y DEMORAS EN EL TRAFICO EN SUS AEROPUERTOS DE DESTINO Y ALTERNOS PARA VUELOS INTERNACIONALES, LOS CUALES NO ESTAN SUJETOS A SER MANTENIDOS EN TIERRA Y NO SON CONSIDERADOS DIRECTAMENTE EN EL "PROGRAMA DE FACILITACION DEL CONTROL CENTRAL DE FLUJO".-

Atentamente.

MAYOR 
 JORGE ENRIQUE LEAL C.
 Jefe División Seguridad Aérea