

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering *JAN*
Washington, D.C. 20594

February 19, 2002

Flight Path Study - United Airlines Flight 175

A. SUBJECT AIRCRAFT

Location: New York City, NY
Date: September 11, 2001
Time: 09:03 AM Eastern Daylight Time
Flight: United Airlines Flight 175
Aircraft: Boeing 767
NTSB#: DCA01MA063

B. GROUP

N/A

C. SUMMARY

This document provides a brief description of the flight path of the aircraft based on information obtained from various sources of recorded radar of the subject aircraft both before and after the hijacking events. Flight paths are overlaid onto maps of the area, and time histories of altitude data are presented.

United Airlines Flight 175 – Flight Profile


The following description of United Airlines Flight 175 is based on radar data obtained from the Federal Aviation Administration's Air Route Traffic Control Centers, approach control at JFK Airport, and the U.S. Air Force 84th Radar Evaluation Squadron.

Figure 1 shows the flight path of the aircraft from take off at Boston Logan airport to the crash site at the World Trade Center. Figure 2 shows the aircraft's altitude profile for the 49-minute duration of the flight.

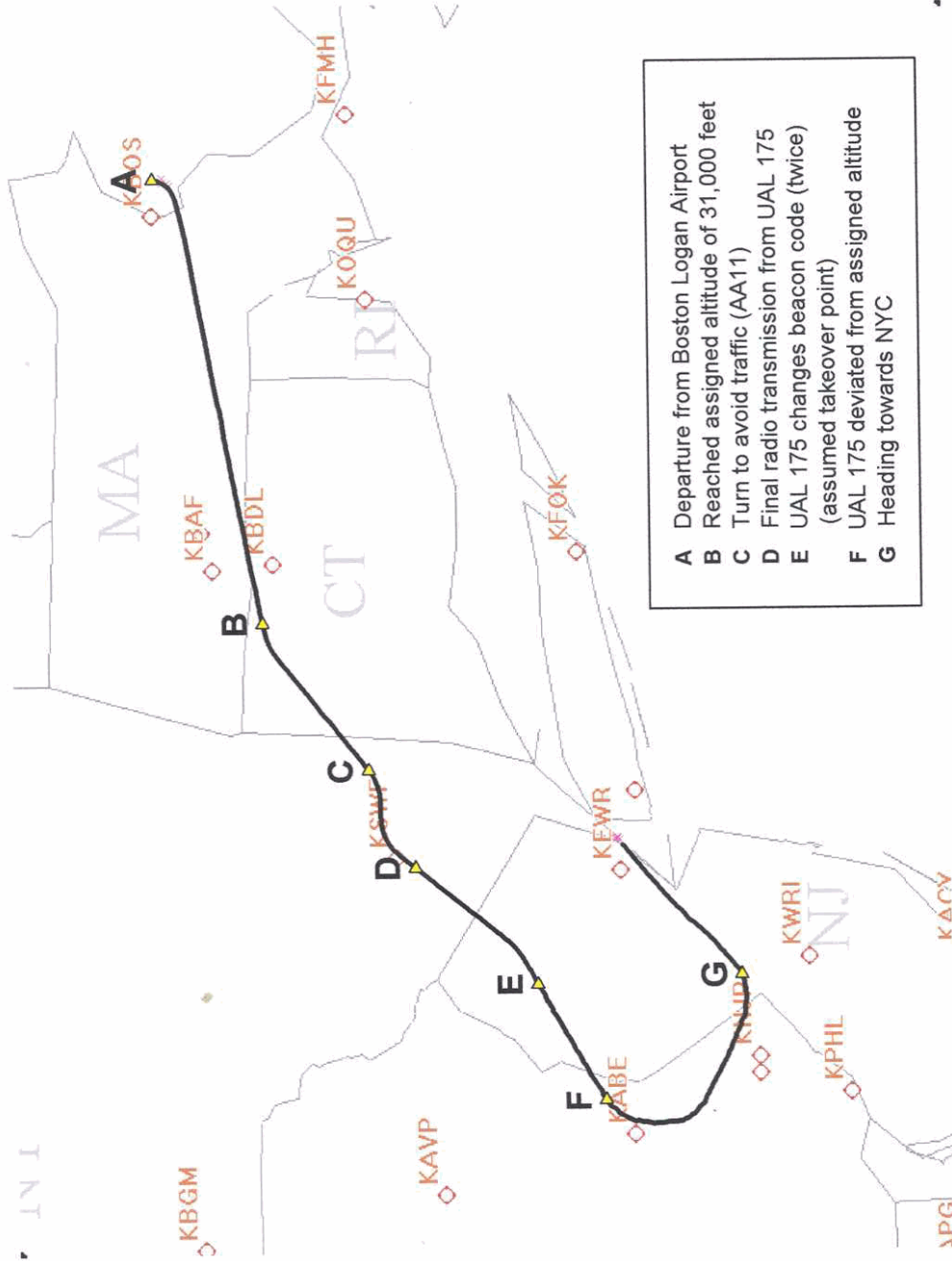
United Airlines Flight 175 departed Boston Logan airport at 8:14 AM (point A in Figures 1 and 2) and reached its assigned cruising altitude of 31,000 feet at

about 8:33 AM (B). At 8:39 AM (C), flight 175 is instructed to turn right to avoid southbound traffic, an American Airlines 767. The final radio transmission from UAL flight 175 occurred at 8:42 (D). The first indication of deviation from normal routine occurred at 8:47, when the aircraft changed beacon codes twice within a one-minute period (E). At approximately 8:51, UAL175 deviated from the assigned altitude (F). At 8:52, FAA's New York Center Air traffic control facility attempted to contact the flight several times, with no response, as the aircraft started a turn to the southeast. The aircraft continued to climb during the turn, reaching 33,500 feet.

The airplane started to descend as it flew in a southeasterly direction. At approximately 8:57, the airplane started a turn to the northeast, while momentarily stopping the descent at 28,500 feet. By 8:58 (G) the aircraft was heading towards New York City, and continued its descent. The final radar return from United Flight 175 at JFK approach control occurred at an altitude of 1000 feet and close proximity to the World Trade Center. The airplane impacted the south tower of the World Trade Center at approximately 9:02:40 AM.


Jim Ritter
Chief, Vehicle Performance Division
NTSB

United Airlines Flight 175 Ground Track (Simple Map Background)



- A Departure from Boston Logan Airport
- B Reached assigned altitude of 31,000 feet
- C Turn to avoid traffic (AA11)
- D Final radio transmission from UAL 175
- E UAL 175 changes beacon code (twice) (assumed takeover point)
- F UAL 175 deviated from assigned altitude
- G Heading towards NYC

Figure 1 – Flight Path

United Airlines Flight 175 Pressure Altitude from Radar Mode C Returns

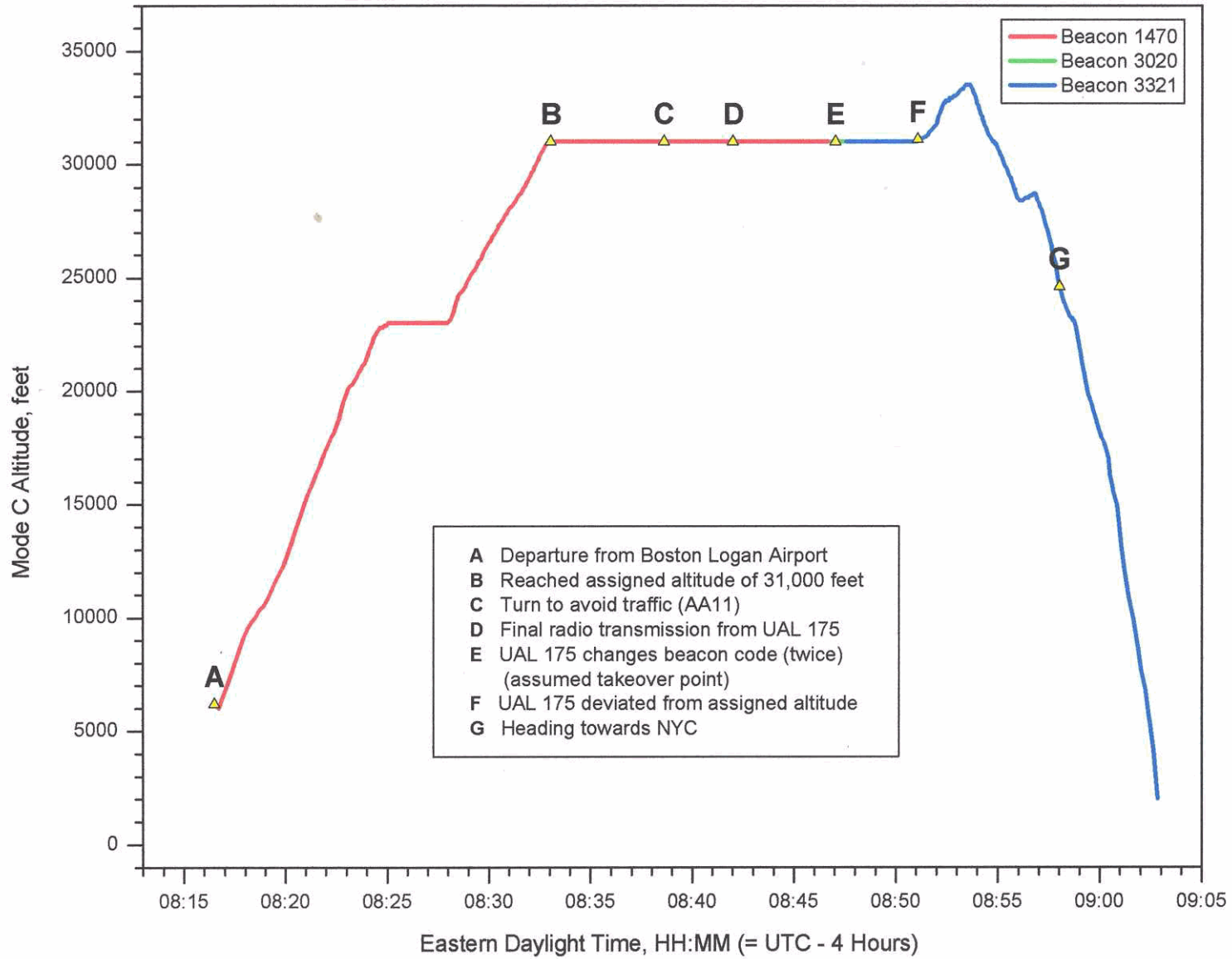


Figure 2 – Altitude Profile

Radio Communications with UA 175
[Compiled from FAA Transcripts, each source shown in brackets]

8:13:26 LCE United one seventy five heavy runway niner cleared for takeoff traffic's holding in position on four right. [BOS 1202-1220 ICE]

8:13:31 UAL-175 cleared for takeoff runway niner Uniteds one seventy five heavy. [BOS 1202-1220 ICE]

8:14:33 LCE United one seventy five heavy contact departure. [BOS 1202-1220 ICE]

8:14:36 UAL-175 departure Uniteds one seventy five heavy. [BOS 1202-1220 ICE]

8:14:44 UAL-175 departure Uniteds one seventy five heavy is with you out of twelve hundred. [BOS 1209-1228 Initial Departure]

8:14:46 ID United one seventy five heavy Boston departure radar contact climb and maintain one four thousand. [BOS 1209-1228 Initial Departure]

8:14:51 UAL-175 one four thousand Uniteds one seventy five heavy. [BOS 1209-1228 Initial Departure]

8:15:41 ID United one seventy five heavy turn right heading two one zero. [BOS 1209-1228 Initial Departure]

8:15:45 UAL-175 turn two one zero Uniteds one seventy five heavy. [BOS 1209-1228 Initial Departure]

8:16:50 ID United one seventy five heavy turn right heading two seven zero. [BOS 1209-1228 Initial Departure]

8:16:53 UAL-175 turn to two seven zero Uniteds one seventy five heavy. [BOS 1209-1228 Initial Departure]

8:17:09 ID United one seventy five heavy contact Boston approach one two seven point two good day. [BOS 1209-1228 Initial Departure]

8:17:13 UAL-175 two seven point two Uniteds one seventy five heavy good day. [BOS 1209-1228 Initial Departure]

8:17:21 UAL-175 Boston good morning Uniteds one seventy five heavy is out of eight thousand. [BOS 1211-1224 lincoln Departure]

8:17:25 SL United one seventy five heavy Boston approach fly heading two seven zero. [BOS 1211-1224 lincoln Departure]

8:17:28 UAL-175 two seven zero on the heading Uniteds one seventy five. [BOS 1211-1224 lincoln Departure]

8:19:08 SL United one seventy five heavy contact Boston center one three three point four two. [BOS 1211-1224 lincoln Departure]

8:19:13 UAL-175 three three four two Uniteds one seventy five heavy good day. [BOS 1211-1224 lincoln Departure]

8:19:24 UAL-175 Boston good morning Uniteds one seventy five heavy heavy out of eleven seven for one four thousand. [ZBW 1219-1230 Sector 47R]

8:19:42 47R United one seventy five Boston center climb maintain flight level two three zero you're cleared direct BIGGO. [ZBW 1219-1230 Sector 47R]

8:19:48 UAL-175 direct BIGGO up to two three zero United one seventy five heavy. [ZBW 1219-1230 Sector 47R]

8:22:06 47R United one seventy five contact Boston center one two seven point eight two. [ZBW 1219-1230 Sector 47R]

8:22:10 UAL-175 two seven eight two United one seventy five so long. [ZBW 1219-1230 Sector 47R]

8:22:33 UAL-175 Boston morning United one seventy five's out of uh nineteen for two three oh. [ZBW 1222-1227 Sector 46R]

8:22:39 46R United one seventy five Boston uh center roger. [ZBW 1222-1227 Sector 46R]

8:27:09 47R United one seventy five you with me? [ZBW 1219-1230 Sector 47R]

8:27:19 46R United one seventy five contact the ah Boston center on ah one three three point four two. [ZBW 1222-1227 Sector 46R]

8:27:28 UAL-175 'kay three four two United one seventy five so long. [ZBW 1222-1227 Sector 46R]

8:27:34 UAL-175 Boston United ah one seventy five two three oh. [ZBW 1219-1230 Sector 47R]

Radio Communications with UA 175

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8:27:37 47R United one seventy five Boston center roger climb and maintain flight level three five zero. [ZBW 1219-1230 Sector 47R]

8:27:42 UAL-175 up to three five zero we want to request three one zero if it's smooth for United one seventy five. [ZBW 1219-1230 Sector 47R]

8:28:43 UAL-175 Boston Uniteds one seventy five like to request three one oh if it's smooth. [ZBW 1219-1230 Sector 47R]

8:28:45 47R United one seventy nine you say you want three one oh? [ZBW 1219-1230 Sector 47R]

8:28:49 UAL-175 yes sir if it's smooth for Uniteds one seventy five heavy. [ZBW 1219-1230 Sector 47R]

8:28:52 47R United one seventy nine maintain ah flight level that's ah correction there I have one seventy five maintain flight level three one zero. [ZBW 1219-1230 Sector 47R]

8:28:58 UAL-175 three one zero Uniteds one seventy five we'd like to keep that as a final. [ZBW 1219-1230 Sector 47R]

8:30:50 47R United one seventy five maintain three one oh and contact the Boston center on one two five point five seven. [ZBW 1219-1230 Sector 47R]

8:30:56 UAL-175 two five five seven we'll maintain three one oh Uniteds one seventy five. [ZBW 1219-1230 Sector 47R]

8:31:04 UAL-175 Boston morning Uniteds one seventy five is out of two eight oh for three one oh. [ZBW 1231-1239 Sector 20R]

8:31:08 20R United one seventy five Boston center roger good morning. [ZBW 1231-1239 Sector 20R]

8:37:03 20R United one seventy five Boston. [ZBW 1231-1239 Sector 20R]

8:37:06 UAL-175 one seventy five go ahead sir. [ZBW 1231-1239 Sector 20R]

8:37:08 20R roger do you have traffic look at uh your twelve to one o'clock at about uh ten miles south bound see if you can see an American seventy sixty seven out there please. [ZBW 1231-1239 Sector 20R]

8:37:18 UAL-175 okay were looking negative contact United one seventy five. [ZBW 1231-1239 Sector 20R]

8:38:00 20R okay United one seventy five do you have him at your twelve o'clock now and five, ten miles. [ZBW 1231-1239 Sector 20R]

8:38:04 UAL-175 affirmative we have him uh he looks uh about ah twenty ah yeah about twenty nine, twenty eight thousand. [ZBW 1231-1239 Sector 20R]

8:38:11 20R okay thank you. [ZBW 1231-1239 Sector 20R]

8:38:24 20R United one seventy five turn thirty degrees to the right I want to keep you away from this traffic. [ZBW 1231-1239 Sector 20R]

8:38:28 UAL-175 thirty degrees to the right United one seventy five heavy. [ZBW 1231-1239 Sector 20R]

8:39:33 20R United one seventy five cleared direct SPARTA. [ZBW 1231-1239 Sector 20R]

8:39:36 UAL-175 direct SPARTA United one seventy five. [ZBW 1231-1239 Sector 20R]

8:39:41 20R United one seventy five contact New York center one two seven point one seven. [ZBW 1231-1239 Sector 20R]

8:39:44 UAL-175 one two seven one seven United one seventy five. [ZBW 1231-1239 Sector 20R]

8:40:32 UAL-175 center good morning United one seventy five heavy three one oh. [ZNY 1237-1307 Sector 42R]

8:40:37 R42 United one seventy five * -- correction United one seventy five New York center roger. [ZNY 1237-1307 Sector 42R]

8:41:28 UAL-175 New York United one seventy five heavy. [ZNY 1237-1307 Sector 42R]

8:41:31 R42 United one seventy five go ahead. [ZNY 1237-1307 Sector 42R]

8:41:33 UAL-175 ya we figured we'd wait to go to you center ah we heard a suspicious transmission on our departure out of Boston ah with someone ah, ah sound like someone sound like someone keyed the mike and said ah everyone ah stay in your seats. [ZNY 1237-1307 Sector 42R]

Radio Communications with UA 175
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8:41:51 R42 oh okay I'll pass that along over here. [ZNY 1237-1307 Sector 42R]
8:41:55 UAL-175 that's ah cut out. [ZNY 1237-1307 Sector 42R]
8:42:12 UAL-175 did you copy that? [ZNY 1237-1307 Sector 42R]
8:51:42 R42 United one seventy five recycle your transponder and squawk code of one four seven zero. [ZNY 1237-1307 Sector 42R]
8:51:53 R42 United one seventy five New York. [ZNY 1237-1307 Sector 42R]
8:52:09 R42 United one seventy five do you read New York? [ZNY 1237-1307 Sector 42R]
8:52:20 R42 United, United one seventy five do you read New York? [ZNY 1237-1307 Sector 42R]
8:53:52 R42 United one seventy five New York. [ZNY 1237-1307 Sector 42R]
8:54:33 R42 United one seventy five do you read New York? [ZNY 1237-1307 Sector 42R]