

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, DC

Group Chairman's Factual Report

August 1, 2002

Witness Group Factual Report

A. ACCIDENT

Location: Belle Harbor, New York
Date: November 12, 2001
Time: 0916 Eastern Standard Time
Aircraft: American Airlines Flight 587, Airbus A300-600
NTSB Number: DCA02MA001

B. GROUP

Chairman: Luke Schiada
National Transportation Safety Board
Parsippany, New Jersey

Members: John Darbo
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Dallas/Fort Worth, Texas

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Dallas/Fort Worth, Texas

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Association of Professional Flight Attendants
Euleless, Texas

C. SUMMARY

On November 12, 2001, about 0916 Eastern Standard Time, American Airlines flight 587, an Airbus A300-600, was destroyed when it crashed into a residential area of Belle Harbor, New York, shortly after takeoff from the John F. Kennedy International Airport

(JFK), Jamaica, New York. Two pilots, 7 flight attendants, 251 passengers, and 5 persons on the ground were fatally injured. Visual meteorological conditions prevailed and an instrument flight rules flight plan had been filed for the flight destined for Santo Domingo, Dominican Republic. The scheduled passenger flight was conducted under 14 CFR Part 121.

D. DETAILS OF INVESTIGATION

Initial Activities

The witness group was formed during the organizational meeting of November 12, 2001. At that time, agents from the Federal Bureau of Investigations (FBI), and local police departments were in the process of canvassing the neighborhoods surrounding the accident site. The witness group began collecting and reviewing witness related information obtained from the FBI and local authorities. In addition, witness group members began contacting known and potential witnesses, and conducted both telephone and in-person interviews.

The witness group concluded its on-site activity on November 17, 2001; however, over the next several weeks the Safety Board collected several hundred pages of documentation which included FBI "FD-302" interview summary forms, interview summaries obtained from the Port Authority of New York and New Jersey Police Department, the Rockaway Police Department, and results of the neighborhood canvasses.

Approximately 400 witnesses and potential witnesses were identified.

For the purposes of this report, a witness was defined as an individual who reported observing the accident airplane in-flight and was able and willing to provide information regarding their observation.¹

Due to the varied level of detail present in the witness accounts, and to provide witnesses an opportunity to provide a first hand account of their observations to the Safety Board, the witness group mailed 355² questionnaires to witnesses and potential witnesses between November 21, 2001, and January 9, 2002. They were sent with self-addressed, prepaid postage return envelopes.

In the questionnaire³, witnesses were asked to provide the Safety Board with a written statement, which indicated their location and what they observed and/or heard. They were also asked to provide a contact phone number and if applicable, discuss:

1. The direction the airplane was traveling.
2. Any parts which may have separated or fallen from the airplane.

¹ The level of detail provided for a particular witness varied significantly. Many individuals simply acknowledged they observed "a plane crash" and did not provide any further information.

² Eighteen of the 355 questionnaires were returned as "undeliverable."

³ Copies of the questionnaires mailed to witnesses can be found in appendix I of this report.

3. Any indications of smoke or fire coming from the airplane.
4. The duration of their observation.
5. Their final view of the airplane.

The Safety Board established the Internet email address AA587WIT@NTSB.GOV. The email address was posted on the Safety Board's web site⁴, and all persons who could provide eyewitness testimony about the accident who had not yet been in contact with Safety Board personnel, were asked to contact the Safety Board through the email address. Additionally, many witnesses provided their response to the questionnaire via the email address.

Video Images

The witness group obtained a video on CD-ROM, that was reported to be taken by a construction crew working at JFK, in the vicinity of runway 4R. The video depicted the accident airplane as it taxied into position for takeoff, began its takeoff roll, lifted-off the runway and then began a left turn. The person operating the video camera then panned away from the airplane and turned off the camera. The next image was of smoke rising from the ground in the distance.

The witness group also obtained surveillance videotape taken by the Metropolitan Tri-borough Bridge and Tunnel Authority at the Marine Parkway Bridge. The tape included two video clips of what was believed to be the accident airplane in the distance. The first clip showed an airplane transverse through the frame from left to right. The second clip showed an airplane in the distance, on a parabolic descent from left to right. Shortly thereafter, smoke was observed rising from the ground.

All video footage was forwarded to Safety Board Headquarters, Washington, DC, for further review⁵.

Information Processing (Methodology)

On March 19, and April 9, 2002, the witness group reconvened at the Safety Board's Northeast Regional Office, Parsippany, New Jersey, to evaluate the witness information collected to date. The witness group developed a series of categories and subcategories with associated codes to document the general and specific observations of each witness based on the available information. A spreadsheet was then created to track the codes for each category and subcategory. The spreadsheet contained the following 6 categories and 43 sub-category abbreviated codes:

- 1: **SOURCES:** Identified the sources of available information regarding a particular witness and contained the following subcategories:
 - W:** The witness provided a written/typed statement.

⁴ WWW.NTSB.GOV

⁵ Please see the NTSB Video Study Report for further information regarding video footage.

- I:** Interview conducted by Witness Group member or other Safety Board personnel.
- F:** Interview conducted by FBI.
- P:** Interview or other information provided by Port Authority and/or Rockaway Police Departments.
2. **FIRE:** Used to document reports of in-flight fire with the following subcategories identifying location when applicable⁶:
- FRE:** Fire Right Engine
- FRW:** Fire Right Wing
- FTL:** Fire Tail⁷
- FFS:** Fire Fuselage⁸
- FLE:** Fire Left Engine
- FLW:** Fire Left Wing
- FMC:** Fire Miscellaneous Area⁹
- FWU:** Fire Wing Undefined¹⁰
- FEU:** Fire Engine Undefined
- NoF:** No Fire Observed¹¹
- FEX:** Explosion¹²
3. **SMOKE:** Used to document reports of in-flight smoke with the following subcategories identifying location where applicable:¹³
- SRE:** Smoke Right Engine
- SRW:** Smoke Right Wing
- STL:** Smoke Tail
- SFS:** Smoke Fuselage
- SLE:** Smoke Left Engine
- SLW:** Smoke Left Wing
- SMC:** Smoke Miscellaneous Area
- SWU:** Smoke Wing Undefined
- SEU:** Smoke Engine Undefined
- NoS:** No Smoke Observed
4. **NOISE:** Used to document sound reported while the airplane was in-flight with the following subcategories identifying two basic sound conditions¹⁴:

⁶ “Fire” included, but was not limited to observations of: “flames,” “orange glow” and “sparks.”

⁷ “Tail” included, but was not limited to: empennage, and “back of airplane.”

⁸ “Fuselage” included, but was not limited to: “side of airplane.”

⁹ “Miscellaneous” codes were utilized in situations when a specific area or part could not be reasonably determined.

¹⁰ “Undefined” codes were utilized in situations when a witness did not specify “left” or “right” wing or engine.

¹¹ “No” codes were utilized in situations when a witness specifically indicated he or she did not see any Fire, Smoke, or Parts separate from the airplane in-flight.

¹² “Explosion” included, but was not limited to observations of: “expanding flash.”

¹³ If a witness reported “smoke,” it was not necessarily assumed he or she observed a fire.

NL: Noise/Loud
NE: Explosion

5. **MOTION:** Used to identify observed motion with subcategories identifying the following movements¹⁵:

MU: Motion Up
MD: Motion Down
ML: Motion Left
MR: Motion Right
MW: Motion Wobble¹⁶
MS: Motion Spin¹⁷

6. **PARTS:** Used to document reports of in-flight airframe/component separations, with the following subcategories identifying the part, where applicable:

PRE: Part Right Engine
PRW: Part Right Wing
PTL: Part Tail
PFS: Part Fuselage
PLE: Part Left Engine
PLW: Part Left Wing
PMC: Part Miscellaneous¹⁸
PWU: Part Wing Undefined
PEU: Part Engine Undefined
NoP: No Parts

The witnesses and potential witnesses were sorted into sections alphabetically with their respective sources of information. A witness group member then reviewed all the information pertaining to the individuals in a given section and after it was determined that the individual was indeed a witness, the witness group member noted the respective category/subcategory code(s), which were applicable. The section of witnesses was then re-reviewed and verified by a different group member.

¹⁴ The “Noise” category was difficult to subcategorize due to many different descriptions used by the witnesses. As a general rule, the noise code (NL) was utilized in all descriptions, which included reported in-flight sound. The “explosion” code (NE) was added if the sound(s) were described as an “explosion,” “boom,” or “loud pop,” not related to the “SST” or “Concorde”.

¹⁵ Motion was coded as a function of direction (climb/decent) and/or pitch of the airplane (airplane nose pitched or pointed up/down.)

¹⁶ Motion Wobble (MW) included, but was not limited to observations of: “dipping or turning” from “side to side” and “left and right.”

¹⁷ Motion Spinning (MS) included, but was not limited to observations of: “corkscrewing” or “cart wheeling.”

¹⁸ Part Miscellaneous (PMC) included, but was not limited to observations of: “paper like” objects falling, “luggage,” and unidentifiable debris.

The witness group identified approximately 354 individuals who reported observing the accident airplane in-flight and provided a sufficient level of detail to document. As a general rule, any individual who could not be reached via mail and/or telephone, and reported more than “saw a plane crash” or “saw airplane come down” was considered a witness. For example, Witness 98 was documented by a police statement only, which read:

“saw plane overhead with left wing on fire and saw plane crash”

Only first person accounts were considered witnesses. If an individual reported observing the airplane while driving with a spouse and/or child, his or her statement was not considered a statement for the spouse or child.

To address information that conflicted between two or more accounts documented for the same witness, the witness group prioritized the sources of information, where a witness’s personal written statement was given priority over all other information and an interview summary conducted by a witness group member was given priority over FBI and police interview summaries, which were treated equally.

In some instances, conflicting information recorded or provided by the same witness made it impossible to definitively code a particular observation or series of observations. Two primary conflict types were identified. A “disagreement” conflict whereas an FBI interview summary may have indicated the airplane’s left engine separated (PLE), while a police department interview summary may have indicated a witness reported the airplane’s right engine separated (PRE); and a “direct” conflict whereas an FBI interview summary may have indicated the witness specifically observed a portion of the airplane separate, while a police interview summary may have indicated that the witness did not observe any portions separate¹⁹.

In many cases, an attempt was made by a witness group member to clarify the information via a follow-up telephone call; however, in lieu of any additional information (e.g. a written statement or witness group member interview), the information contained in police and FBI interview summaries was combined, unless the information was in direct conflict.

If the information was in direct conflict, a code was not documented for the specific category in question. If information disagreed between right and left locations, the “undefined” code was utilized (e.g. FRE (Fire Right Engine) and FLE (Fire Left Engine) would be coded FEU (Fire Engine Undefined)).

E. RESULTS

The following are the summed totals of the code category observations compiled by the witness group for the 354 witnesses identified. The percentages shown are expressed as percentages of the 354 total witnesses.

The information is not sequenced in any particular order, and does not relate to time or

¹⁹ Disagreement and direct conflicts also existed between statements from the same source (e.g. two or more police statements pertaining to the same witness.)

duration of observation. Additionally, while the information may appear to be very specific, it is intended to provide only a general account of the overall observations of witnesses' accounts from a statistical standpoint. It should be noted that because some observations were combined, there are almost certainly more overall specific observations than were actually observed. Additionally, in several instances a witness indicated multiple locations and/or multiple parts and/or multiple types of motion.

Sources

Approximately 58% of the witnesses were evaluated using either their first hand written account and/or an interview with Safety Board personnel. One hundred, thirty-eight witnesses (39%²⁰) provided written statements, while 66 (19%) were interviewed. The FBI provided interview summaries for 141 witnesses (40%), while local police provided information for 224 witnesses (63%).

Fire

One hundred, ninety-eight witnesses (56%) reported they observed the airplane or a portion of the airplane on fire at some point during their observation and 36 (10%) reported an explosion. Seventy-seven witnesses (22%) specifically indicated they did not observe a fire at any point during their observation. The witnesses who reported observing a fire provided the following location(s) in their accounts:

CODE	FRE	FRW	FTL	FFS	FLE	FLW	FMC	FWU	FEU
Reports	16	20	10	83	15	31	27	11	9
%	5%	6%	3%	23%	4%	9%	8%	3%	3%

Smoke

Eighty-two witnesses (23%) reported they observed smoke emanating from the airplane at some point during their observation. Seventy-four witnesses (21%) specifically indicated they did not observe smoke at any point during their observation. The witnesses who reported observing smoke provided the following location(s) in their accounts:

CODE	SRE	SRW	STL	SFS	SLE	SLW	SMC	SWU	SEU
Reports	6	10	5	25	7	3	32	3	1
%	2%	3%	1%	7%	2%	1%	9%	1%	--

Noise

One hundred, seventy-six witnesses (50%) reported sound(s) associated with the airplane during their observation, with 47 witnesses (13%) reporting an explosion.

Motion

At some point during their respective observations, 279 witness accounts (79%) included

²⁰ All percentages were rounded to the nearest whole number and are expressed as a percentage of the 354 total witnesses identified.

downward motion, while 69 (19%) included spinning, corkscrewing or cartwheeling.

Sixty-seven witness accounts (19%) included a left bank or turn, while 27 (8%) included a right bank or turn. Twenty-nine witness accounts (8%) included a climb, while 47 (13%) described the airplane as wobbling, dipping, or rocking in a left/right motion.

Parts

Two hundred, twenty-five witnesses (64%) reported they observed at least something separate or fall from the airplane at some point during their observation. Thirty-nine witnesses (11%) specifically indicated they did not observe any portion of the airplane separate at any point during their observation. The witnesses who reported observing parts separate or fall from the airplane provided the following part identification(s):

CODE	PRE	PRW	PTL	PFS	PLE	PLW	PMC	PWU	PEU
Reports	26	14	39	5	37	12	126	19	31
%	7%	4%	11%	1%	10%	3%	36%	5%	9%

F. ADDITIONAL INFORMATION

Sun Position

According to United States Naval Observatory astronomical data obtained for the New York, New York, area²¹ at the time of the accident the sun was positioned about 22.5 degrees above the horizon, bearing about 142 degrees true (155 degrees magnetic²²).

Witness Accounts

Eight witness accounts are paraphrased and/or excerpted in this section to provide a small sample of the accounts received. All witness accounts, with their respective sources of information, are contained in Appendices B through H of this report²³

Witness 166 observed the airplane from JFK, which was located about 5.5 miles northeast of the accident site. In written statement, he said:

“We were sequenced to follow behind two American Airlines flights, an Airbus A-300 and a Boeing 767.... The Boeing 767 was cleared for takeoff and shortly thereafter we were given position and hold [Runway] 31L. It was during this time that I noticed an aircraft beginning a rapid nose-over from a normal flight path. I noticed about a mile behind the aircraft some small amount of debris floating toward the ground. I looked for signs of an

²¹ Sun position obtained was based on a location of 73 degrees, 55 minutes west longitude and 40 degrees, 44 minutes north latitude.

²² Magnetic variation for the accident site area was approximately 13 degrees west.

²³ The information provided for each witness is complete with the exception that the witnesses' home address, date of birth, email address, social security number, telephone numbers, and drivers license numbers were redacted due to privacy concerns. The numbers written on the lower right hand corner of each page of information indicates the associated witness number.

explosion or smoke coming from the aircraft, but did not see any significant amount of smoke.... I never saw any sign of explosion on or around the aircraft....By now [the airplane] was pretty much in a vertical dive. The 'top' of the aircraft was now facing east toward the sun. As it dove vertically, the aircraft rolled to the left, which allowed me to view the 'top' profile of the aircraft. I am 99% sure that both main wings were intact. The aircraft appeared to be mostly structurally sound. I observed something not correct on the empennage. There seemed to be something missing or not right.... The aircraft impacted the ground vertically...."

Witness 156 also observed the accident airplane from JFK airport. He stated the airplane was rolling right and left and it looked like the flight crew was struggling to keep the wings level. He observed a small fire coming from the first inboard third of the right wing. The flame appeared to be coming from the upper surface of the wing and was estimated to be about 7 to 9 feet in diameter based on his observation of the size of the airplane. He said right after he saw the airplane, the flight path angle was about 80 degrees nose down. The airplane continued to the ground "almost fluttering." He did not see any debris or smoke coming from the airplane.

Witness 62 observed the airplane while driving about 1.8 miles west-southwest of the accident site, near the Marine Parkway Bridge. He reported he observed the airplane traveling in an easterly direction in "level normal flight," with the exception being that the airplane seemed to be flying lower than it should have been. He further stated:

"...I saw a puff of white smoke come from the right side of the plane's body where the right wing meets. Within 2 to 3 seconds, an explosion occurred. The plane, from wings to back became fully enveloped in flames and dark black smoke. The plane proceeded in the same direction and was descending. It veered to the right, with the right wing perpendicular to the water. At that point, I observed pieces of debris falling from the aircraft through the black smoke. The debris continued to drop as it proceeded over land. From my point of observation, the wings seemed to have folded somewhat at that point. I never lost sight of the airplane. I saw the impact in Rockaway. This all occurred within 10 seconds, more or less."

Witness 138 observed the airplane while walking about a half-mile east of the accident site. In a written statement, she reported:

"...I noticed the airplane coming from my right, it appeared normal at first glance. A moment later the airplane began to rock moderately a few times from side to side as it was descending for several seconds in the horizontal position. During that time I heard a whirring sound and a long, soft, low booming sound. Several seconds later the airplane ceased rocking and descending; it straightened out and burst into flames from the belly up behind the wings, engulfing the airplane from behind the wings almost to the rear of the airplane. The fire and flames were very large reaching upward and outward. The airplane flew in flames for several seconds in the horizontal position continuing in the same direction. The airplane then turned toward me on its left wing, turned nose downward into a slight spiral with its belly facing me and disappeared out of my vision..."

Witness 154 was about 3 blocks east-northeast from the accident site when she observed an airplane directly north over Beach 128th Street, between and Newport and Cronston Avenues. The airplane was "extremely low over the houses," and heading southwest.

She further stated:

“...As I looked at the plane, the left engine fell off the wing and smaller pieces of metal (that looked like floating papers) came off with it. I saw no smoke or flames anywhere on the plane. After the engine fell off, the plane turned onto its right side and began to dive down towards the ground. As far as I can tell, this all happened in the course of a few seconds....”

Witness 163 was walking about 2 miles east-northeast of the accident site when he looked up and observed an airplane acting “peculiar.” He further described the airplane as “fish-tailing or struggling.” He observed the tail section of the airplane separate, which was followed by other pieces separating from the airplane. Approximately one or two seconds later, he observed smoke and “something ignite near the left engine.” The airplane then banked to the left about 60 to 75 degrees and entered a dive. The airplane disappeared behind a building and he observed smoke rising.

Witness 346 observed the airplane from Beach 113th Street and Beach Channel Drive, about 1 mile east-northeast of the accident site. He heard a “loud pop, or explosion” and observed the airplane’s left engine on fire. He also noticed what he believed was the top portion of the airplane’s tail falling from the airplane. The airplane continued straight for 2 or 3 seconds and the left engine then separated. At that time, the airplane’s right wing rose, and the airplane’s nose went “straight down.” He further stated that the airplane made 2 or 3 spirals to the left, and “couldn’t have been more straight up and down” when the airplane disappeared from his view. He further stated that he did not observe any fire present anywhere on the airplane except from the area of the left engine. He also did not observe any other parts separate from the airplane.

Witness 134 observed the airplane from the corner of Beach 108th Street and Beach Channel Drive, about 1 mile east-northeast of the accident site²⁴, while working from a lift-device 20 feet above the ground. He heard a “muffled boom” and heard the sound of aircraft engine noise similar to the Concorde. He observed a “puff of smoke” near the tail, followed by the separation of the vertical stabilizer in a “front to back motion.” He noted that the rudder and vertical fin initially separated as one piece, followed by the rudder detaching from the stabilizer. He also observed a “dozen smaller pieces that looked like you threw a bunch of newspapers up in the wind.” He observed the stabilizer and other pieces fall toward the bay. The airplane remained stable for a second and then rolled to the left. The right engine separated, the airplane pitched down, and then left engine separated. The airplane then disappeared behind houses and he observed a large fireball and smoke. He estimated that he observed the airplane for about 10 to 15 seconds, and at no time did he observe any evidence of an in-flight fire.

Maps

The witness group plotted the general position of approximately 340 witnesses, using approximately 256 points to depict the distribution of witnesses. Some witness positions were estimated based on available information, while others were grouped together²⁵. Additionally, in some instances it was assumed that the witness observed the airplane

²⁴ About 5 blocks separated witness 346 and witness 134.

²⁵ Many witnesses observed the accident from the same or similar points (e.g. Marine Parkway Bridge).

from his or her place of residence.

All maps depict the approximate position of the main accident site²⁶. Maps 1, 3 and 4, also depict the approximate positions where the left engine²⁷ and right engine²⁸ came to rest.

Airport Surveillance Radar from JFK for the accident flight was plotted and overlaid on the maps. The radar targets were numbered 1 through 20, and the information associated with the targets is displayed in the table below²⁹.

Target	ATC Time (HRMM:SS)	Mode C Recorded Altitude (ft)
1	0914:34	0
2	0914:39	300
3	0914:43	500
4	0914:48	700
5	0914:53	900
6	0914:57	1100
7	0915:02	1200
8	0915:07	1300
9	0915:11	1300
10	0915:16	1400
11	0915:20	1400
12	0915:25	1500
12	0915:29	1600
14	0915:34	1700
15	0915:38	1800
16	0915:43	2100
17	0915:48	2300
18	0915:52	2500
19	0915:57	2700
20	0916:01	3300

Fractional seconds have been truncated from ATC time for this table.

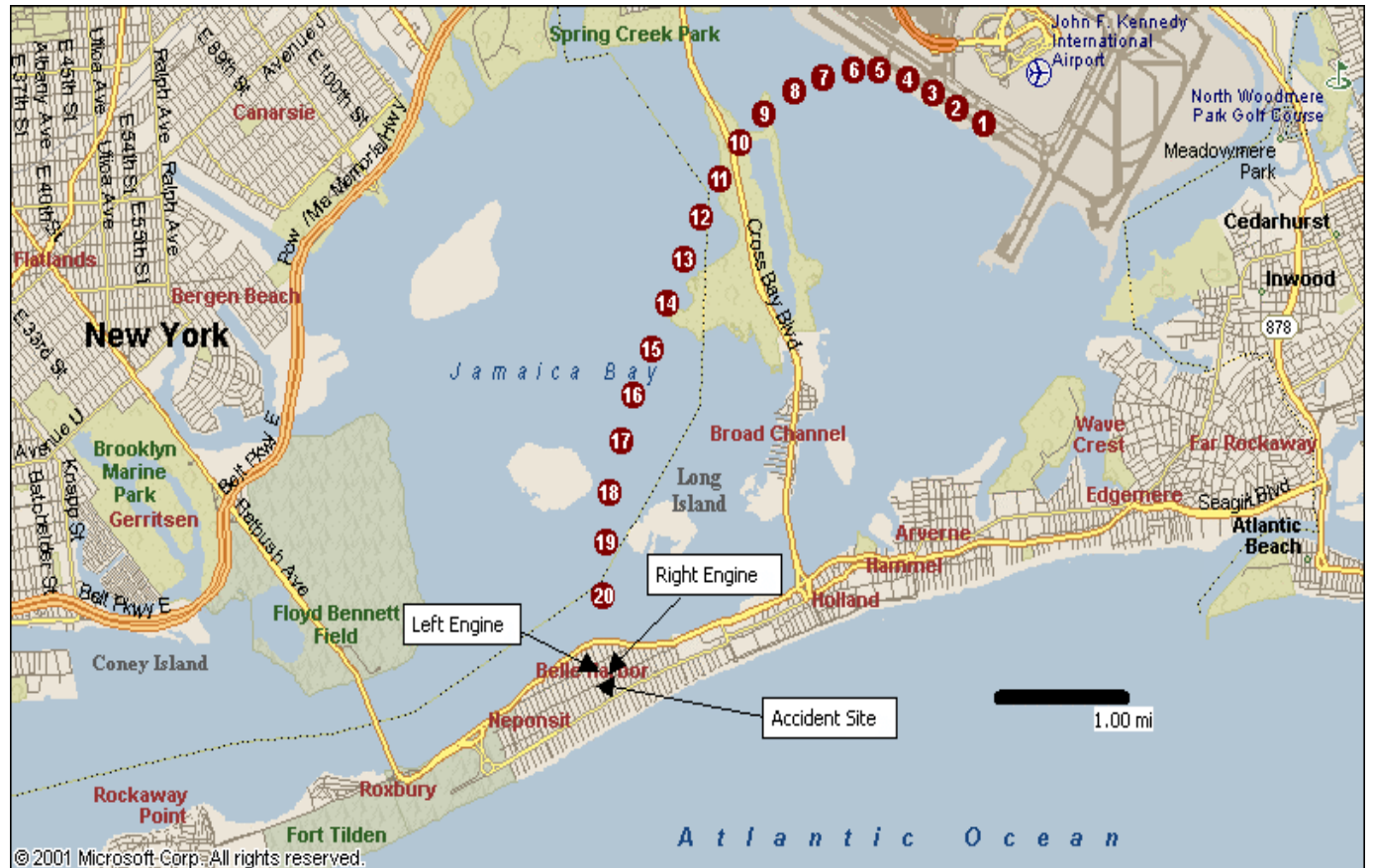
²⁶ The main accident site was plotted at about Beach 131st Street and Newport Avenue.

²⁷ The location of the left engine was plotted at 441 Beach 129th Street.

²⁸ The location right engine was plotted at 414 Beach 128th Street.

²⁹ For specific radar positions, including timing and altitude, refer to the Aircraft Performance Group Factual Report.

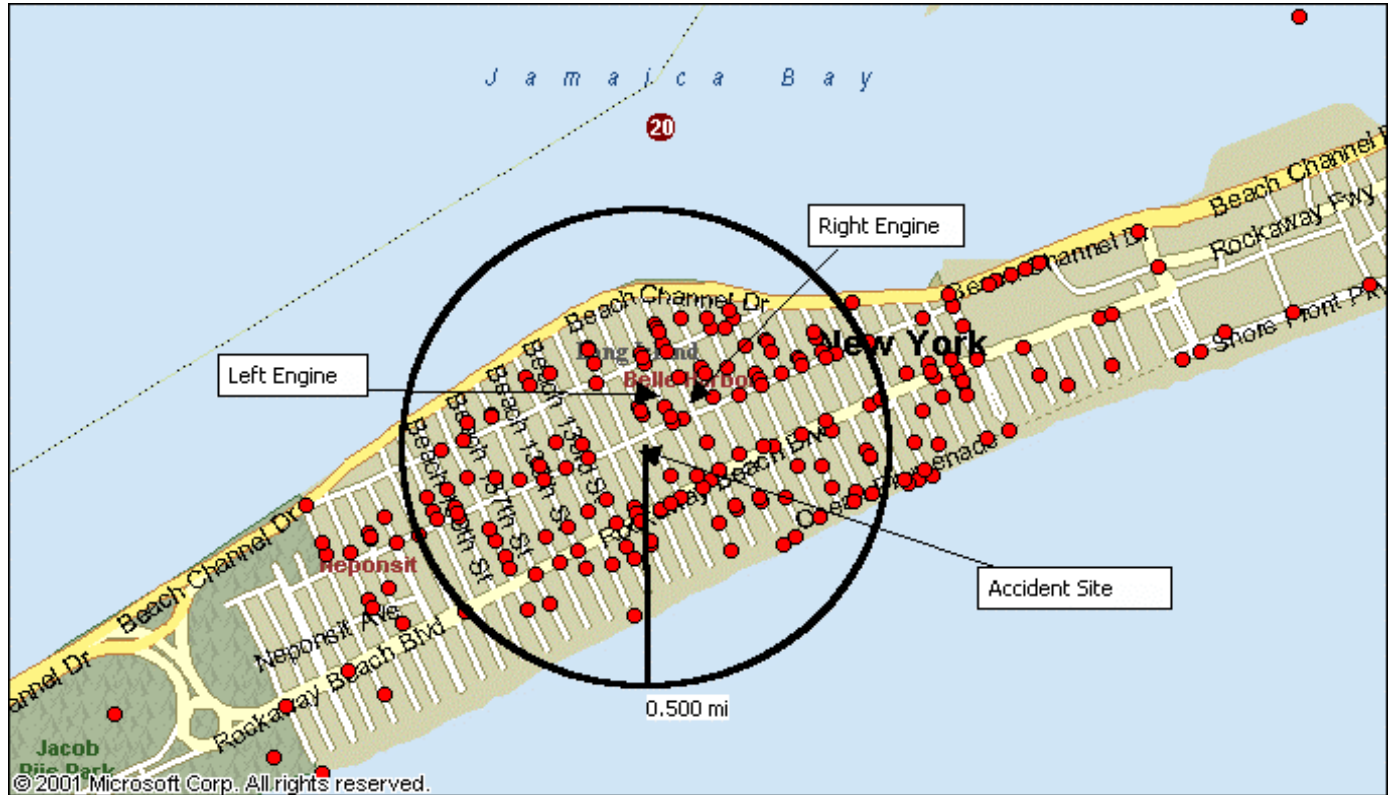
Map 1: Airplane Radar Track Overview



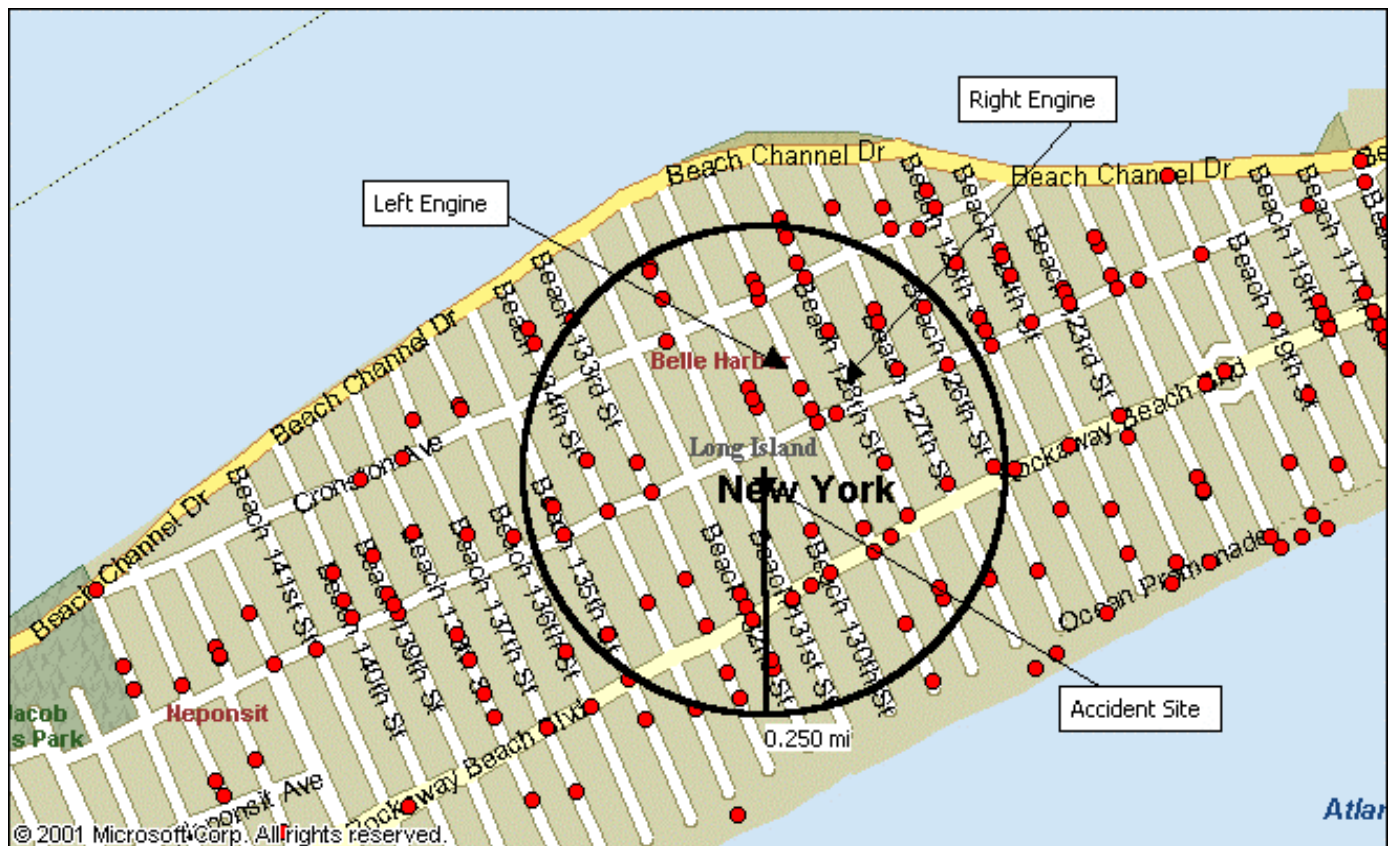
Map 2: Witness Distribution Overview



Map 3: Witness Distribution (Half-Mile Radius Circle)



Map 4: Witness Distribution (Quarter-Mile Radius Circle)



G. ATTACHMENTS

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Luke Schiada
Witness Group Chairman