

**National Transportation Safety Board**

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

**February 9, 2000**

**WITNESS GROUP CHAIRMAN'S FACTUAL REPORT**

**DCA96MA070**

**A. Accident**

**Location:** East Moriches, New York

**Date:** July 17, 1996

**Time:** 2031 Eastern Daylight Time (EDT)

**Airplane:** Boeing 747-131, N93119  
Operated as Trans World Airlines (TWA) flight 800

**B. Witness group**

David L. Mayer                      National Transportation Safety Board  
Chairman                              Washington, D.C.

Douglass P. Brazy                      National Transportation Safety Board  
Washington, D.C.

Heather Knapp                      National Transportation Safety Board  
Washington, D.C.

Dana Sanzo                      National Transportation Safety Board  
Washington, D.C.

James M. Walters                      Air Line Pilots Association  
Herndon, Virginia

Dennis Rodrigues                      Boeing Commercial Airplane Group  
Seattle, Washington

Joe Manno                      Federal Aviation Administration  
Washington, D.C.

Fred Liddell International Association of Machinists  
and Aerospace Workers  
Kansas City, Missouri

Bob Young Trans World Airlines  
St. Louis, Missouri

**C. Summary**

On July 17, 1996, at about 2031 EDT, a Boeing 747-131, N93119, crashed in the Atlantic Ocean, about 8 miles south of East Moriches, New York, after taking off from John F. Kennedy International Airport (JFK). The airplane was being operated on an instrument flight rules flight plan under the provisions of Title 14 Code of Federal Regulations (CFR), Part 121, on a regularly scheduled flight to Charles De Gaulle International Airport (CDG), Paris, France, as Trans World Airlines (TWA) flight 800. The airplane was destroyed by explosion, fire and impact forces with the ocean. All 230 aboard were killed.

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## Overview

This factual report describes the activities conducted to organize and prepare the eyewitness accounts of the TWA flight 800 accident for study. It is intended to provide sufficient factual documentation concerning the eyewitness accounts to facilitate an analysis of them. This report is not intended to serve as that analysis.

This report describes the Safety Board's attempts to learn about the eyewitness accounts in the days following the accident, and it also describes the activities of the original witness group, which was formed in November 1996, and concluded its activities in April 1997. In April 1998, the Federal Bureau of Investigation (FBI) released hundreds of pages of redacted witness documents to the National Transportation Safety Board (NTSB), and the Board formed a new witness group to review these documents. This report details the efforts by that group to organize the FBI documents, locate witness accounts in the documents, assign unique "witness numbers" to each witness, and map the positions of these witnesses at the time that they made their observations. A companion report, the *Witness Group Study Report*, has been prepared to explain the methods used by the witness group to study the eyewitness accounts and to report the findings of the group. That report has also been placed into the public docket.

The witness documents provided by the FBI are summaries of some of the information provided to the FBI agents by witnesses during interviews conducted as part of the FBI's criminal investigation. The witnesses themselves were not asked to review or correct the documents, and no verbatim records were made of the interviews. Because of this the witness group avoids referring to the witness documents as "statements." Detailed information about the nature of the witness documents is provided in the *Document organization* section of this report, which begins on page 14.

The witness accounts were reviewed as a routine part of the Safety Board's accident investigation, but they were a major reason for the initiation and duration of the FBI's criminal investigation. There are a large number of witnesses, many of whom have received media attention. Nonetheless, it is the opinion of each of the members of the witness group, that no study of the eyewitness accounts alone can prove or refute the contention that the crash of TWA flight 800 was due to any particular cause.

## Prior investigative activities

### Initial activities

On July 19, 1996, NTSB investigator Bruce Magladry arrived in Long Island. He was originally assigned to investigate airport issues at John F. Kennedy International Airport (JFK), and reported there along with NTSB investigators Larry Roman, Burt Simon, and Tom Lasseigne. Late in the day on July 19, 1996, senior NTSB staff decided

to convene a witness group and Mr. Magladry was withdrawn from the team at JFK and directed to serve as the group chairman of the witness group.

On July 20, 1996, at the Board's second investigative progress meeting, Mr. Magladry announced his intention to form a witness group to interview eyewitnesses to the accident, and he asked the parties to the investigation to assign appropriate staff to the new group. However, FBI Supervisory Special Agent Robert Knapp informed Mr. Magladry that the FBI was concerned about the formation and function of the witness group.<sup>1</sup> This concern arose from a fundamental difference in the way the FBI and NTSB generally handle investigative information: the majority of information obtained by the NTSB during the course of an investigation is made available to the public, but the FBI usually restricts the release of the evidence that it gathers during a criminal investigation.

Agent Knapp said that the FBI was willing to share existing and future witness information with the NTSB, provided that this information was not shared with the non-governmental parties to the Safety Board's investigation. If the Safety Board permitted all of the parties to its investigation to participate in the witness group that Mr. Magladry planned to form, representatives of the non-governmental parties would obviously be aware of the information developed by the group by virtue of their own direct involvement in this process. Further, Agent Knapp expressed the FBI's concerns about the Safety Board conducting its own interviews of witnesses, even without party participation, because the Board allows public access to the information that it gathers. Finally, Agent Knapp said that the FBI did not want the NTSB to re-interview people who had already been interviewed by the FBI because multiple interviews of the same witness could lead to prosecutorial difficulties. Because of these prohibitions, which are counter to the NTSB's procedures, Mr. Magladry initially declined the FBI's offer to share witness information with the Safety Board. Consequently, the FBI did not supply any witness information on July 20, 1996.

On July 21, 1996, at the NTSB's evening progress meeting, Lewis D. Schiliro, FBI Assistant Director in Charge, and Valerie Caproni, Criminal Division Chief, United States Attorney's Office, Eastern District of New York, reiterated to Mr. Magladry the same points raised by Agent Knapp the day before. They offered to allow Mr. Magladry to read documents that FBI agents had prepared from the interviews that had already been conducted, with the stipulation that the information in these documents not be shared with the non-governmental parties to the Board's investigation. They also insisted that Mr. Magladry not interview or re-interview any witness.

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<sup>1</sup> The FBI conducted a sixteen-month criminal investigation into the crash of TWA flight 800. On November 18, 1997, FBI Assistant Director in Charge James K. Kallstrom held a press conference to announce that the FBI had found no evidence that the crash was due to a criminal act. In a December 1997 letter to Chairman Hall, Mr. Kallstrom stated that the FBI had placed its investigation into a "pending inactive" status, and not a closed status, because of the remote possibility that new evidence could be discovered during the Safety Board's investigation. This letter was previously placed in the public docket under the title, "Correspondence between FBI and Chairman Hall (Letter dated 12/3/97)."

On July 22, 1996, after conferring with NTSB supervisors in Washington, D.C., Mr. Magladry accepted the offer to review witness documents, with the attendant prohibitions, because this was the only way for the Safety Board to gain access to information gathered by the FBI. This was communicated to the parties, and no witness group was formed.

Operating from an office trailer at Coast Guard Group Moriches, Mr. Magladry was given unrestricted access to the witness documents. By this time, hundreds of interview documents had been prepared, and another two hundred or more were being prepared each day.<sup>2</sup> Mr. Magladry was given unrestricted access to these documents, and he began reviewing as many of them as he could read. The eyewitness documents that he reviewed consisted of the information received during interviews that were being conducted daily by approximately 80 FBI agents. After conducting interviews, the agents prepared handwritten documents that were gathered at an FBI office trailer adjacent to Mr. Magladry's trailer. From there, the documents were forwarded to the FBI's New York offices in Manhattan for typing and processing.<sup>3</sup> By July 25, 1996, Mr. Magladry had concluded that the witness accounts of the accident were generally similar to one another, and related this, along with a verbal summary of the accounts, to the Safety Board's investigator in charge and to other appropriate NTSB investigators. He then returned to Washington.

### **Later activities**

As the investigation progressed, the Safety Board decided to more fully address the accounts of the eyewitnesses. Accordingly, on November 12, 1996, the original witness group<sup>4</sup> was formed. The original group members were Norm Wiemeyer, group chairman, NTSB; Lou Burns, Air Line Pilots Association (ALPA); John Desmond, International Federation of Flight Attendants (IFFA); Charles Hale, International Association of Machinists (IAM); Terry Stacey, TWA; Kevin Darcy, Boeing Commercial Airplane Group; and Joe Manno, Federal Aviation Administration (FAA). The original witness group convened at Calverton, New York, on November 12, 1996, and conducted a variety of activities through April 6, 1997.

During the time that the original witness group was in session, the FBI loaned to the NTSB redacted versions of documents pertaining to eyewitness interviews and of

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<sup>2</sup> All of these documents were handwritten interview notes and summaries, as opposed to the typed witness documents that were received by the Safety Board in April 1998. The witness documents received in April 1998 are described in *The documents* section, which begins on page 14.

<sup>3</sup> Later in the investigation, the FBI set up a data processing unit at the Coast Guard station to handle the enormous volume of paperwork being generated.

<sup>4</sup> To prevent confusion with the second witness group that was formed in April 1998, the first group is referred to in this report as the original witness group.

interviews with some other witnesses of interest to the operations group. The documents were redacted in that personally-identifying information had been blacked out of them. The group reviewed the documents and returned them to the FBI.

From January 11 through January 30, 1997, about 6 months after the accident, some members of the original NTSB witness group interviewed New York Air National Guard (NYANG) personnel who were on duty at the time of the accident. Transcripts of these interviews were produced, and these transcripts have been entered into the public docket. On January 11, 1997, the group interviewed the crew members of a NYANG HH-60 helicopter. The personnel interviewed were Capt. Christian Baur (Appendix N), Maj. Fredrick Meyer (Appendix O), and MSgt. Dennis Richardson (Appendix P) who all witnessed the accident. Additional personnel interviewed on this date were Maj. Michael Noyes (Appendix Q) who said that he witnessed the aftermath of the accident from the HH-60 and Maj. C. David Ruvola (Appendix R) who said that he hypnotized Capt. Baur about a week after the accident at Capt. Baur's request in an attempt to enhance his memory. On January 13, 1997, group members interviewed Sgt. Craig Johnson (Appendix S) who said that he witnessed the aftermath of the accident from the HH-60.

On January 11, 1997, the group also interviewed crewmembers of a NYANG C-130 that was flying in the vicinity of TWA flight 800 at the time of the accident. Personnel interviewed were Maj. Michael Weiss (Appendix T), Capt. Charles Palmer (Appendix U), and TSgt. Michael Spindler (Appendix V). On January 15, 1997, TSgt. Charles Ramirez (Appendix W) and TSgt. Antonio Ramos (Appendix X) of the C-130 crew were interviewed. On January 30, 1997, Col. Charles Stueve was interviewed (Appendix Y). Col. Stueve interviewed some of the HH-60 and C-130 crewmembers after the mission.

On March 10, 1997, the FBI provided additional witness documents to the NTSB. The original witness group reviewed these documents, and returned them to the FBI.

On March 24, 1997, accompanied by FBI Special Agent Richard Karniewicz, the original witness group chairman traveled to the U.S. Naval Air Station at Brunswick, Maine, to interview the crew of a U.S. Navy P-3 Orion airplane that was flying in the vicinity of TWA flight 800 at the time of the accident.<sup>5</sup> The crew members interviewed were AW2 Russell Balmer, Lt. Duane Oaks, AW3 Shawn Betas, AW1 Philip Dunn, Lt. John Browne, AT1 Jeffery Hayes, Lt. Ted Schewman, and AT3 Michael Aikens. Four additional members of the crew, Lt. Ray Ott, Lt. Richard Van Deorstyne, AE1 Bradley Baca, and AEC Manuel Yarberry, were unavailable because they had been transferred in normal tour rotation and were not interviewed on this date.<sup>6</sup> The aircraft was examined,

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<sup>5</sup> The FBI also interviewed some of the crew members of the P-3. FBI documents pertaining to these interviews appear in Appendix M.

<sup>6</sup> Both pilots of the P-3 were previously interviewed by the FBI, and these documents appear in Appendix M.



and a copy of the flight schedule for the time of the accident was reviewed. At the time of the flight 800 accident, the P-3 was being operated with an inoperative transponder, so maintenance records relating to a transponder failure on the evening of the accident were also reviewed.<sup>7</sup> An interview summary prepared by the original witness group appears as Appendix AA, along with the flight schedule and transponder maintenance records.

The NTSB also interviewed a crew member of a survey vessel who said that he witnessed the accident. A summary of this interview appears as Appendix BB to this report.

The FBI provided the original witness group with a copy of a photograph taken by Linda Kabot on July 17, 1996, between 2020 and 2040 EDT at Dockers restaurant, which is located on Dune Road in Westhampton Beach, New York, just over 11 nautical miles from the accident site.<sup>8</sup> A light spot was present in an upper corner of the photograph and an apparently small tubular object was present near this light spot. Further, what appeared to be the moon was present in the photograph. Because it was believed that the position of the moon could be used to determine the time and direction from which the photograph was taken, the original witness group traveled to Dockers on December 10, 1996. The original witness group members determined that the “moon” in the photograph was actually a spherical lamp on the deck of the restaurant. Further, they determined that the photograph was taken on an approximate magnetic heading of 030 degrees. The accident site was on an approximate magnetic heading of 200 degrees from the photographer, well beyond the camera’s field of view. The NTSB made no further study of this photograph.

After completing the activities described above, the original witness group ceased operation on April 6, 1997.

In November 1997, the FBI suspended its criminal investigation saying that it had found no evidence that a criminal act had caused the crash of flight 800. At a press conference on November 18, 1997, the FBI showed a video made by the Central Intelligence Agency (CIA) titled, *TWA Flight 800: What Did The Witnesses See?*. This

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<sup>7</sup> For more information about recorded radar data, refer to the public docket Exhibit 13A *Airplane Performance Study* and the *Witness Group Recorded Radar Study*, which is also in the public docket. For further information about the P-3 Orion, refer to pages 4 through 7 of the *Air Traffic Control Group Chairman’s Factual Report* in the public docket. The callsign of the P-3 Orion was VVAT450 on the day of the accident.

<sup>8</sup> One statute mile equals 5,280 feet; one nautical mile equals 6,076.1 feet.

video depicted the CIA's analysis of witness documents that were made available to the CIA by the FBI during the criminal investigation.<sup>9</sup>

A draft factual report was prepared by Mr. Wiemeyer just before the Safety Board's December 1997 public hearing in Baltimore, Maryland. That draft report was prepared during a time when the FBI was controlling information about eyewitness accounts; consequently, it was based on limited access to information about the witnesses. The Safety Board had planned to present information concerning the eyewitnesses at its public hearing; however, FBI Assistant Director in Charge James K. Kallstrom objected. Correspondence concerning this matter in December of 1997 between Chairman Hall and the FBI was placed in the public docket under the title, "Correspondence between FBI and Chairman Hall (Letter dated 12/3/97)." That early draft witness group factual report received some distribution, but it was an interim—and thus incomplete—document and was not placed in the public docket. This report and the *Witness Group Study Report*, which are based on significantly greater access to the witness documents, are the official NTSB reports concerning the witness accounts.

### **Current investigative activities**

In February 1998, the FBI agreed to release redacted witness documents to the NTSB for its study and ultimate inclusion in the public docket. A letter dated February 13, 1998, from FBI Assistant Director in Charge Lewis D. Schiliro confirming this agreement is included in Appendix EE. The Safety Board decided to form a new witness group to review these documents.

The documents were delivered on April 17, 1998, and Safety Board investigators immediately began organizing them for review. A witness group organizational teleconference was held after the documents were received, and the group agreed to delay its first meeting until Safety Board investigators had sufficiently organized the documents for group review. The organization project involved identifying witness documents, sorting them so that documents pertaining to repeat interviews could be easily located, and assigning a unique identifier (witness number) to each witness. The document organization project is explained in detail in the *Document organization* section, beginning on page 14.

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<sup>9</sup> This videotape has been placed into the public docket. To obtain a copy, call 800-877-6799 or 202-314-6551, or write to:

National Transportation Safety Board  
Public Inquiries Branch – RE-51  
490 L'Enfant Plaza East, S.W.  
Washington, D.C. 20594

Because of a number of unanticipated challenges, which are fully discussed in the *Document organization* section, sorting the documents required significantly more time than originally expected. Consequently, when the first informational meeting of the current witness group was held on August 26, 1998, the documents had not been completely sorted.<sup>10</sup> At this meeting, NTSB investigators briefed the parties on the process of sorting the documents and on the content of the documents. Group members reviewed sample documents, and learned about the nature of the redactions. A general discussion was held concerning strategy for continuing the sorting process and plans for reviewing the documents. At this meeting, it was clear that the group expected its work to require many months; however, no timeline was established because more project planning was needed.

At the August 26, 1998, meeting, the placement of the documents into the public docket was discussed. Each of the witness group members agreed that the witness documents themselves should not be placed into the public docket until a detailed factual report had been prepared to explain the process and provide a context for the documents.

The second meeting of the current witness group was held during the week of September 28, 1998. NTSB investigators briefed the parties on the progress of organizing the documents and provided a general review of their content. The group discussed overall plans and goals for the project, and developed a set of definitions and procedures for use in reviewing the witness accounts (see Appendix CC).

On September 29, 1998, the new witness group met with Norm Wiemeyer, the group chairman of the original witness group, for a day-long briefing and question-and-answer session concerning the work of the original group. On the next day, September 30, 1998, the new group met with Special Agent Ted Otto, one of the FBI special agents who directed the FBI's investigation into the possibility that a missile had been used against the airplane. This aspect of the FBI's investigation was largely motivated by the eyewitness accounts. Special Agent Otto was also one of the primary agents who interfaced with the CIA during its analysis of some of the eyewitness documents. The group discussed with Special Agent Otto the FBI's search for eyewitnesses and their interviewing of them, including the preparation of the eyewitness documents.

The document sorting process ended when the last witness number was assigned in December 1998. The witness group determined that a systematic and comprehensive review of the documents was needed, and the group also recognized that a sustained and time-consuming effort would be needed to accomplish this review consistently. Therefore, the group decided to enlist outside assistance to complete this project. The group met from November 2, 1998, through November 5, 1998, to develop and plan the document reading

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<sup>10</sup> NTSB investigator Douglas Wiegmann was initially assigned to chair the new witness group with assistance from David Mayer. Mr. Mayer assumed the chairmanship of the group upon Mr. Wiegmann's resignation from the Safety Board in December 1998.

project. This project, which was conducted in January 1999, is discussed in greater detail in the *Witness Group Study Report*.

The witness group held its next meetings from December 7, 1998, through December 10, 1998. NTSB investigators briefed the group on the status of software development and other logistics concerning the document reading project. The primary purpose of this series of meetings was to provide group members an opportunity to review each witness document.

On January 13, 1999, the group held a teleconference to discuss the progress of the document reading project.

The next meetings of the group were held from February 1, 1999, through February 10, 1999. At these meetings, the group performed a quality check of the work of the document readers. The group did not complete all required quality checks during this session, and members deferred some other quality control issues to Safety Board investigators. These quality control activities were completed during the following months.

On February 10, 1999, the witness group decided to interview the captain of an Eastwind Airlines Boeing 737 that was being operated as flight 507 on the night of the accident.<sup>11</sup> Eastwind flight 507 and TWA flight 800 were both under the control of the Boston Air Route Traffic Control Center (ARTCC), Sardi Sector. The captain of Eastwind flight 507 was the first airborne witness to report seeing an explosion to the Sardi Sector controller (for further information, see public docket Exhibit 3D, Air Traffic Control Transcript L). Further, the group believed that the position of Eastwind Airlines flight 507 relative to TWA flight 800 afforded the captain of flight 507 a very good vantage point, and that his experience as an airline pilot could enhance his ability to relate his observations to investigators. Consequently, the group decided to interview the captain of Eastwind flight 507 even though it had been two and one-half years since the accident. Further, the group agreed that there was no need for it to re-interview any other witnesses previously interviewed by the FBI.

On March 25, 1999, the group interviewed the **captain** of Eastwind flight 507 in Charlotte, North Carolina. A court reporter was present for this interview and a transcript was produced. The transcript appears in the public docket as Appendix Z.

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<sup>11</sup> The FBI interviewed the captain of Eastwind flight 507 multiple times. The earliest interview was on July 18, 1996. Witness documents pertaining to the interviews conducted by the FBI appear among the witness documents provided to the Safety Board in April 1998.

On April 30, 1999, representatives from the CIA briefed the witness group on its analysis of the eyewitness accounts.<sup>12</sup> CIA analysts described the information available for their study and the methods that they used to conduct their analysis. Although CIA analysts had conducted no independent interviews, the CIA had asked for as much information about the witnesses as the FBI was willing to provide. The FBI had provided witness documents to the CIA over a period of several months. Ultimately, the CIA was provided with documents pertaining to 244 witnesses. In addition to these documents, the FBI provided the CIA with the following investigative information developed by the NTSB: recorded radar data from air traffic control radar sites at Islip and Riverhead, New York; the last known flight parameters of the accident airplane; a map of the debris fields; meteorological data including winds aloft; basic information about the breakup sequence; and, basic information concerning the cockpit voice recorder. CIA analysts used this information, along with detailed maps of Long Island, DeLorme mapping software, and infrared data from a U.S. military satellite to study the accounts of the eyewitnesses. Analysts visited the specific vantage points where several witnesses were located when they made their observations, and they made several trips to the hangar in Calverton, New York, where the wreckage was being studied by the NTSB, FBI, and other Federal agencies.

According to the CIA, its analysts first concluded on December 30, 1996, that the eyewitnesses had observed only the burning aircraft in various stages of crippled flight, rather than a missile attacking the aircraft as some witnesses had thought.<sup>13</sup> Although this preliminary conclusion was provided to the FBI via telephone within 24 hours, the CIA continued to study the eyewitness accounts. On February 6, 1997, CIA analysts conducted a formal briefing concerning their analysis and conclusions for the FBI at the Calverton hangar.<sup>14</sup> On March 28, 1997, the CIA provided a written analytic assessment to the FBI.<sup>15</sup> According to the CIA, its analysts continued to work closely with FBI agents to refine their analysis, and ultimately the CIA produced the videotape that presents their study and findings. As discussed on page 9, this videotape was made public by the FBI at its November 18, 1997, press conference.

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<sup>12</sup> The CIA produced a transcript of this meeting, and provided it to the Safety Board. This transcript is in Appendix FF to this report along with a January 12, 2000, transmittal letter from the CIA's Executive Director, David W. Carey. During the meeting, the CIA briefers played the videotape that the CIA produced for the FBI. This videotape has been placed into the public docket. Refer to footnote 9 for more information.

<sup>13</sup> In personal communication that followed this briefing, the CIA's lead analyst told the witness group chairman that, as of December 30, 1996, the CIA had received 109 witness documents from the FBI.

<sup>14</sup> NTSB staff first learned about the CIA's conclusions concerning the eyewitnesses during a visit to the FBI's New York office that took place March 3-5, 1997.

<sup>15</sup> A copy of this document was not provided to the NTSB.

The Safety Board's study of the witness accounts has been a fully independent activity. However, to ensure that the witness accounts receive thorough study at an appropriate level of scrutiny, and to understand previous projects conducted by other government agencies, Safety Board investigators have had significant interaction with their counterparts at the FBI and the CIA. Group members were briefed by the representatives of these organizations and had an opportunity to ask questions and to discuss any concerns.

## Document organization

### The documents

The FBI provided the NTSB with a variety of documents pertaining to interviews conducted by FBI agents. The documents consist primarily of FD-302 forms, teletypes, and inserts. An FD-302 is a standard FBI form that is used to record the admissible testimony of an FBI agent.<sup>16</sup> In addition to FD-302s, interview results were also frequently summarized in teletypes or inserts, which are somewhat less formal investigative documents that also could be used as evidence. Although it is not technically correct to refer to all of the documents as "302 forms," for the purposes of the accident investigation, all of the documents are functionally equivalent. This report refers to FBI documents of any type pertaining to interviews as "witness documents."

These documents are *summaries* of some of the information provided to FBI agents by witnesses during interviews conducted as part of the FBI's criminal investigation. No verbatim records of the FBI interviews were produced. The documents are almost exclusively written in the words of the agents who conducted the interviews, and not in the words of the witnesses themselves. The documents were created to capture information relevant to its criminal investigation, and FBI agents frequently included only information that appeared relevant to this purpose. Witnesses were almost always interviewed by more than one FBI agent (or other law enforcement personnel), one of whom served as the note taker. A witness document was prepared later by reference to these notes. Although some agents typed these documents themselves, many were prepared by typists by reference to handwritten drafts. The agents reviewed the typed documents for accuracy. This review was often accomplished shortly after the interview, but due to the large number of interviews being conducted, a backlog developed, and sometimes several days or weeks elapsed before handwritten interview notes were typed and reviewed. The witnesses themselves were not asked to review or correct the documents. Because of these factors, the witness group avoids referring to the witness documents as "statements."

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<sup>16</sup> Information presented in this section concerning FBI forms and procedures is believed to be accurate, but should not be regarded as comprehensive. This information was developed from the meeting that was held on September 30, 1998 (see page 11) and from general interaction with FBI agents during the course of the parallel NTSB and FBI investigations.

## Organizing the documents

The NTSB received a package of documents from the FBI on April 17, 1998. The documents were not received in any useful order that could be discerned from a review of the package. As expected, personally-identifying information pertaining to the interviewees had been redacted from the documents, and document tracking serial numbers had been handwritten by the FBI on the documents.<sup>17</sup>

Also included in this shipment was a document catalog dated April 10, 1998, intended to identify repeat interviews of the same person, which would otherwise be impossible due to the redacted nature of the documents. The document catalog, which appears as Appendix J to this report, lists the serial numbers of the documents. The FBI annotated the list of serial numbers with hand-drawn brackets connecting groups of serial numbers. These brackets depict multiple documents that pertain to the same person.<sup>18</sup>

NTSB staff undertook a substantial project to organize and catalog each page of the witness documents. This process was a prerequisite to a systematic study of the witness accounts and was necessary to answer basic questions such as:

- How many witnesses were represented in the documents?
- Which witnesses were interviewed more than once?
- Which documents pertain to which witnesses?

Safety Board staff numbered each page of the document package and then photocopied the documents. Once the originals were checked against the copies to ensure that each page had been photocopied, the original documents were stored in a safe for future reference. Then, working with the copied set, investigators began sorting, inventorying, and reviewing the documents. The goal was to create a well-organized and easy-to-use set of witness documents.

### *Sorting the documents*

Frequently, the text of a single document obviously began and ended on the same page, however many documents were continued onto more than one page. Because the pages of multiple-page documents were not clipped or stapled together, nor were they

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<sup>17</sup> These serial numbers are actually composed of an alphanumeric prefix, a hyphen, and a numeric suffix. The FBI provided documents with prefixes “CC,” “CC1,” “CC2,” “CC3,” “CC4,” and “LL.” Numeric suffixes assigned to these documents range from 1 to 3 digits.

<sup>18</sup> Because one document was frequently used to capture the accounts of more than one witness, the FBI serial numbers pertain to documents, not to witnesses.

always found adjacent to each other in the document set, the initial challenge was to sort the individual pages into coherent documents.

Matching initial pages with any appropriate continuation pages was often difficult because the FBI document serial numbers were not usually written on these continuation pages. Although continuation pages were usually page numbered, the total number of pages was not indicated as part of the page numbering (*e.g.*, “Page 1 of 4”). Additionally, the end of each witness document was not clearly indicated. This made it difficult to determine whether any individual document was complete. However, available page numbering and context clues such as sentences continuing from page to page were used to collate pages into coherent documents.

When a page ended in mid-sentence, an appropriate continuation page could almost always be located among the documents. When a continuation page was found that ended mid-page, this was usually identified as the end of the document. However, some ambiguous cases were found in which the text extends to the end of a page ending in a complete sentence. Pages such as these were identified as the end of a given document, unless a higher-numbered continuation page with appropriate content could be located. This general logic was applied to each page until a set of coherent documents was created.

### *Inventorying the documents*

Because the document catalog was a list of FBI serial numbers corresponding to documents that should have been included in the document package, it was used as the basis for inventorying the documents received. However, looking up a serial number in this catalog was a time-consuming process because the catalog is 167 pages long and the serial numbers are not listed in alphanumerical order. To make this process more efficient, an electronic version of the document catalog was requested and obtained from the FBI.

Each document was inventoried against a sorted version of the electronic document catalog. During this process, it was noted that some duplicate documents with the same serial number had been received. As these were detected, the document with better print quality was retained for the document set. Some documents that had almost identical content to each other were also identified. When these documents were found, the one that was most recent or appeared to be most complete was retained for the document set. Some documents with the same serial numbers were noted to contain totally different content. Safety Board staff added alphabetic suffixes to the FBI-assigned serial numbers to permit these documents to be tracked individually. Occasionally, duplicate documents with *different* serial numbers were located in the document set. Unlike the previously described kinds of duplications, because personally-identifying information had been redacted, it was



difficult to locate these documents in the document set.<sup>19</sup> Nonetheless, when these were detected, the document with better print quality was retained.

Finally, some documents could not be inventoried because of illegible serial numbers or the lack of a serial number.<sup>20</sup> Because the serial numbers were often lightly hand-written on the original documents supplied by the FBI, they did not always remain legible on photocopies. When a partially-legible serial number was available, these were used to narrow down the possibilities so that the original documents stored in the safe could be consulted in hopes of locating a more legible version of the document. If the serial number was legible on a version of the document in the safe, Safety Board staff wrote the serial number on the copy. If the serial number was not legible, the document was removed from the set because it could not be inventoried.

When each document that had a legible serial number had been inventoried, a check showed that 210 documents listed in the catalog were not present in the document set. A list of these documents by serial number was created (see Appendix DD). It is likely that some of these “missing” documents were actually removed from the set of documents because they lacked legible serial numbers. Nonetheless, as is described in the next two sections, replacement documents for each of the serial numbers on this list were requested from and ultimately provided by the FBI.

### *Reviewing the documents*

A review of each inventoried document was conducted to ensure its legibility and completeness, and to determine if it was likely that any geographic information about any witnesses had been redacted.<sup>21</sup> It was noted that some documents were difficult to read or even totally illegible. Some had missing pages and others contained references to attachments (such as a drawings or maps) that were not provided. When these irregularities were encountered, the original document set stored in the safe was consulted as an attempt made to fix the problem. However, in most cases the original document suffered from the same irregularity.

During the review, a list of illegible documents, documents with missing pages, documents with missing attachments, and documents that appeared to contain redacted

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<sup>19</sup> This problem was ultimately resolved during the witness numbering process by reference to a set of unredacted documents loaned to the Safety Board by the FBI. Refer to the *Using unredacted documents* section that begins on page 24 for more information.

<sup>20</sup> Some “documents” that initially could not be inventoried because they had no serial numbers were later found to be duplicate continuation pages of documents that had been previously inventoried.

<sup>21</sup> This information was collected in anticipation of determining the locations of the witnesses at the time that they made their observations. For more information about mapping the witnesses, see the *Geographic information* section, which begins on page 25.

geographic information was prepared (this list appears in Appendix DD along with the list of documents not provided that was discussed in the previous section). On July 7, 1998, NTSB investigators provided these lists to the FBI asking for replacement documents and any redacted geographic information.<sup>22</sup> The FBI's response to these requests is discussed in the next section.

### *Additional materials*

On June 3, 1998, while investigators were still sorting the first shipment of documents, a second shipment of documents was received. The serial numbers of these documents were listed in a separate (paper and electronic) catalog dated May 18, 1998, (Appendix K) that accompanied the shipment. This document catalog depicted multiple documents pertaining to the same person only within the June 3, 1998, shipment. Because no cross reference to the original document catalog was provided, NTSB staff were unable to determine which documents in the new shipment pertained to persons referenced in the documents provided in the first package. Nonetheless, the electronic version of the new document catalog was merged with the previously-received electronic document catalog to create a master document catalog. Like the documents in the first shipment, NTSB staff page numbered and photocopied the originals before storing them in the safe. Then, the copies were sorted, inventoried, and reviewed to the extent possible without a means to link the two document catalogs.<sup>23</sup>

In response to the Safety Board's July 7, 1998, request for replacement documents (see previous section), the FBI provided more documents to the NTSB on August 31, 1998 (correspondence concerning this shipment appears in Appendix EE). The attachments to 47 documents were requested. Of these, 37 documents contained the account of at least one witness and received at least one witness number (see next section).<sup>24</sup> Fourteen attachments pertaining to these thirty-seven documents were received. Twenty-three

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<sup>22</sup> Specifically, NTSB investigators asked for replacement documents for 14 documents that had illegible pages, 10 documents that had missing pages, 47 documents with missing attachments, and geographic information that had been redacted from 181 documents. NTSB investigators also asked for 210 documents that had not been provided.

<sup>23</sup> The organizing of these documents was later completed during the witness numbering project by reference to unredacted documents. See the *Using unredacted documents* section, which begins on page 24.

<sup>24</sup> Additionally, six documents contained the account of at least one witness, but did not receive a witness number. These documents are duplicates of other documents having a different serial number (see the *Inventoring the documents* section, which begins on page 16). An attachment to one of these six documents was provided. Attachments to the other five documents (CC-307, CC1-201, CC3-123, CC3-143, and CC3-313) were not provided. Correspondence from the FBI (included in Appendix EE) stated that the FBI could not locate the attachments to these five documents.

attachments to these documents were not received.<sup>25,26</sup> Ten replacement copies for documents with missing pages were requested. Five replacement copies for documents pertaining to witnesses were not received, but the FBI advised that these documents were complete as originally provided.<sup>27</sup> Fourteen replacement copies were requested for illegible documents. Replacement copies for these documents were received, but these replacements were not always more legible. When replacement copies of documents were received, investigators compared the quality of the original document with its replacement. The copy of the document that was most complete, most legible, and least redacted was retained for the witness document set. Because of varying print quality, this decision was sometimes made on a page-by-page basis in which the best quality individual pages were selected and combined into one document. For a few documents with very poor print quality, both copies were combined into one document and retained for the witness document set.

In response to the Board's request for any geographic information that had been redacted from 181 documents, on August 31, 1998, the FBI also provided a catalog of addresses that appeared to be a list of home addresses of the witnesses that corresponded to the document serial numbers requested. No names were provided in this address list, but it

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<sup>25</sup> Correspondence from the FBI on August 25, 1998 (included in Appendix EE) lists the reasons why some of the requested attachments were not provided. The correspondence stated that there is no attachment associated with document CC-183, which pertains to Witness 337 and Witness 496. The correspondence also stated that the FBI could not locate the attachments to 21 documents: CC1-120 pertaining to Witness 21, CC-285 pertaining to Witness 45, CC1-647 pertaining to Witness 143, CC1-116 pertaining to Witness 223, CC-409 pertaining to Witness 229 and Witness 660, CC1-217 pertaining to Witness 264, CC1-216 pertaining to Witness 265, CC1-175 pertaining to Witness 285, CC1-165 pertaining to Witness 290, CC3-298 pertaining to Witness 337, CC3-249 pertaining to Witness 343, CC3-592 pertaining to Witness 385 and Witness 386, CC1-564 pertaining to Witness 396 and Witness 397, CC-461 pertaining to Witness 445, CC1-613 pertaining to Witness 474, CC1-287 pertaining to Witness 477, CC-357 pertaining to Witness 539, CC1-651 pertaining to Witness 541, CC1-186 pertaining to Witness 561, CC1-525 pertaining to Witness 569, and CC1-498 pertaining to Witnesses 129, 363, 641, 642, 643, 644, 645, 646, 647, and 648. The FBI did not provide the attachment to document LL-16a pertaining to Witness 692. No reason why this attachment was not provided was included in the correspondence from the FBI.

<sup>26</sup> Three documents, CC-5 pertaining to Witness 32, CC-80 pertaining to Witness 728, CC-112 pertaining to Witness 730, were requested because they were not provided by the FBI in the original shipment (see the *Inventoring the documents* section, which begins on page 16). These three documents were provided by the FBI in response to the Safety Board's July 7, 1998, request; however, these documents contain references to attachments that were not provided.

<sup>27</sup> Correspondence from the FBI on August 25, 1998, (included Appendix EE) states that documents CC-185 pertaining to Witness 63, CC3-32 pertaining to Witness 136, CC3-585 pertaining to Witness 379 and Witness 380, CC1-532 pertaining to Witness 558, and CC-95 pertaining to Witness 677 are only one page in length, and thus are complete as originally provided.

was indexed by document serial number.<sup>28</sup> This catalog is further discussed in the *Mapping the witnesses* section, which begins on page 25.

In response to the request for 210 documents listed in the document catalog that had not been previously provided, the FBI supplied 208 of the documents, and the FBI indicated in correspondence included in Appendix EE that two of the document serial numbers requested were erroneously included by the FBI in the document catalog because they do not pertain to witness accounts. Consequently, these two serial numbers were deleted from the electronic version of the document catalog.<sup>29</sup>

The August 31, 1998, package of documents also contained some documents that had not been previously provided to the NTSB nor listed in any previously-received document catalog. A third (paper and electronic) document catalog dated August 14, 1998, (Appendix L) listing only the serial numbers in this package was also received. This document catalog depicted multiple documents pertaining to the same person only within the August 31, 1998, shipment. Because no cross reference to the newly-created master document catalog was available, NTSB staff were unable to determine which documents in the new shipment pertained to persons referenced in the documents provided in the previous shipments. Regardless, the electronic version of the document catalog pertaining to the newly-received documents was merged with the master document catalog. Like previously-received documents, NTSB staff page numbered and photocopied the originals before storing them in the safe. Then, the copies were sorted, inventoried, and reviewed to the extent possible without a direct means to link the three document catalogs.<sup>30</sup>

The NTSB has received no further witness documents from the FBI since August 31, 1998.<sup>31</sup> However, on December 14, 1998, FBI Assistant Director in Charge Lewis D. Schiliro forwarded correspondence that the FBI received from one witness. This correspondence appears in Appendix EE.

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<sup>28</sup> At the request of the FBI, the address list is not being placed into the public docket because it contains personally identifying information.

<sup>29</sup> Note that the correspondence received from the FBI with the August 31, 1998, package (see Appendix EE) listed 8 typographical corrections for serial numbers that the FBI had erroneously listed in the previously-provided document catalog. The 208 documents provided on August 31, 1998, included 8 documents that corresponded to these corrected serial numbers. These serial numbers corrections were made in the electronic version of the document catalog.

<sup>30</sup> The organizing of these documents was later completed during the witness numbering project by reference to unredacted documents. See the *Using unredacted documents* section, which begins on page 24.

<sup>31</sup> Ultimately, at least one document corresponding to each serial number listed in the document catalog was received as part of the redacted document set. This is discussed in more detail on page 24.

## Numbering the witnesses

### *General strategy*

To facilitate study of the witness accounts, Safety Board investigators assigned a unique “witness number” to each witness, and the documents were filed in witness number order. Only documents that received at least one witness number (because they contained the account of at least one witness) were filed in the witness document set. A set of binders with divider tabs was dedicated to the project, so that any document(s) pertaining to Witness 1 could be filed behind tab 1, and any document(s) pertaining to Witness 2 could be filed behind tab 2, etc.

Using definitions previously agreed upon by the group (see Appendix CC), Safety Board investigators assigned witness numbers to persons who appeared to meet the definition of a witness; persons not meeting this definition did not receive witness numbers. The following definitions were used:

- **Witness.** Anyone who reported hearing a sound and/or seeing an event or object or objects (including smoke or fire) in the sky in the general vicinity of the accident site, on July 17, 1996, at the approximate time of the TWA flight 800 crash. It must be likely that the sound or object observed was related to the crash, and the report must not be a secondhand account.
- **Non-witness.** Anyone who is determined not to be a witness.

If a person was determined to be a non-witness, a second round of classification was done to determine if the person was an aftermath observer. Although aftermath observers are not eyewitnesses *per se*, investigators recognized the potential value of these documents, and created this category for them. Although no claim is made that all aftermath observers were located in the witness documents, the definition of this term is as follows:

- **Aftermath observer.** A witness to the search and rescue activities at the accident site shortly after water impact or in the days following the accident, but not the accident itself.

Fifty-one documents pertaining to aftermath observers were identified. These documents appear in Appendix M.<sup>32</sup>

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<sup>32</sup> These include the FBI documents pertaining to the crew of a United States Navy P-3 Orion that was being operated in the vicinity of TWA flight 800 at the time of the accident. The original witness group interviewed members of the P-3 crew (see page 8 for more information). The P-3 crew members did not witness the accident itself, but they observed wreckage burning on the water.

Investigators conservatively applied the definitions without reliance on any knowledge of the accident sequence developed by other investigative groups. For example, a person was deemed to be a witness if he or she described events that could be related to the crash, even if some of these events were known not to have actually occurred. Consequently, some persons who may not have actually been eyewitnesses to the flight 800 accident received witness numbers. Further, if the time or date of an observation was not reported in the document, he or she was considered to be a witness provided the other requirements of the definition were met.<sup>33</sup> If the reported observation did not take place on the day of the accident, or if it took place at the wrong time of day on the day of the accident (by more than about an hour), the person was classified as a non-witness, unless a typographical error was obviously to blame.<sup>34</sup> Persons who only provided the observations of another person (a secondhand account) were classified as non-witnesses.

### *Assigning witness numbers*

A unique number was assigned to each witness found in the document set. Before proceeding to more complex cases, witness numbers were assigned to witnesses who were interviewed individually and for whom only one witness document was provided. The master document catalog was used to locate these witnesses documents. The next paragraph explains how this was accomplished.

No personally-identifying information was included in the document catalog. However, because the serial numbers were not listed in order and because some serial numbers were observed to be listed in the catalog multiple times, the catalog was assumed to list individuals and the documents pertaining to them in alphabetical order by witness name. Consequently, each occurrence of a serial number in the catalog apparently represented an individual who was referred to in that document. Using the electronic version of the catalog, investigators determined the number of times that each serial number was listed in the catalog. This frequency count was believed to represent the number of individuals referred to by name in each document by serial number. A review of the witness documents confirmed this belief, and this frequency count was used to locate documents containing the accounts of only one witness. The document catalog was then used to verify that no reference was made to these witnesses in any other documents. In this manner, it was possible to locate witnesses who were interviewed individually and for whom only one document was provided.

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<sup>33</sup> Investigators noted that the date of the observation was not provided in the witness documents for about 100 persons who received witness numbers. Investigators also noted that the time of the observation was not stated in the witness documents for about 230 witnesses. This is relevant because the FBI interviewed a number of persons who reported observing flare-like objects on days other than the date of the accident. For example, several such observations were made during the month of November 1996. The Leonid meteor shower was active during November 1996.

<sup>34</sup> For example, according to document CC-202, Witness 58 was interviewed "8/7/86," but in all likelihood the interview took place in 1996. This document was classified as a witness document.

After witnesses who were interviewed individually and for whom only one witness document was provided were assigned witness numbers, investigators progressed to the more complex cases. These included documents pertaining to multiple witnesses (usually resulting from group interviews) and multiple documents pertaining to an individual witness (because he or she was interviewed more than once).

When a serial number was listed in the document catalog more than once, the document most likely pertained to multiple persons. However, the FBI documents pertained to both witnesses and non-witnesses by witness group definitions. To determine how many witnesses were referenced in a given document, the text of the document was evaluated. For example, document CC1-372 is listed in the document catalog 9 times. After evaluating the document, only 4 persons were determined to be witnesses. These witnesses were then assigned witness numbers 505, 506, 507, and 508. Five persons were non-witnesses by witness group definition.

Prior to assigning a previously-unused witness number, NTSB staff reviewed each document serial number to determine if it was part of a group in the document catalog. If so, at least one person mentioned in the document was also referenced to in another document.<sup>35</sup> Care was then taken to ensure that each witness who was referred to in multiple documents was assigned the same witness number each time. This was often accomplished by use of context clues across the documents, but was not always possible due to the redactions.

For documents pertaining to more than one witness, NTSB staff assigned a unique witness number to each witness. In some documents, the accounts of the witnesses were reported in separate paragraphs, but the accounts were intertwined in others. NTSB staff carefully evaluated the text of these documents, and where needed, annotated them such that, despite the redactions, a reader can determine which accounts have been assigned to which witness numbers.<sup>36</sup>

To create a useful, authoritative set of witness documents, it was critical that each witness be indexed by one and only one witness number and that any reader of the documents, especially those that refer to more than one witness, could readily determine which witnesses received which witness numbers. Although the majority of redacted documents was handled without difficulty, as witness numbering continued into the fall of

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<sup>35</sup> Cross-references were not available for the three documents catalogs that were merged to create the master document catalog (see the *Additional materials* section, which begins on page 18). Consequently, such a check could not be considered definitive, but this deficiency was later rectified (see the *Using unredacted documents* section, which begins on page 24).

<sup>36</sup> Some witness documents pertain to more than one witness, but provide a joint account that pertains equally to each of these witnesses. For these cases, the appropriate number of witness numbers were assigned, but no attempt was made to indicate which witness number was assigned to which witness.

1998, it became clear that this goal could not be fully realized without reference to a corresponding set of unredacted documents.

### *Using unredacted documents*

NTSB staff requested access to an unredacted set of documents, and the FBI loaned that document set to the NTSB in November of 1998. The November 16, 1998, transmittal letter from FBI Assistant Director in Charge Lewis D. Schiliro that accompanied the package appears in Appendix EE.<sup>37</sup>

Witness numbering was hampered by a variety of difficulties that were eventually resolved by using unredacted documents. Some documents that did not have legible serial numbers were inventoried and entered into the document set after their serial numbers were determined by reference to the unredacted documents, which were often more legible than the corresponding redacted documents. Once this was accomplished, the document inventory was completed. It was determined that at least one document corresponding to each serial number listed in the document catalog was received as part of the redacted document set and processed by NTSB staff using the procedures described in this section.<sup>38</sup>

NTSB staff also resolved other lingering difficulties with witness numbering by reference to the unredacted document set. Witness numbers were assigned to witnesses whose accounts were provided in documents containing multiple witnesses that had been too complex for witness number assignment without reference to the unredacted documents. It was found that the lingering issue of duplicate documents with different serial numbers had led to assigning more than one witness number to some witnesses because the documents had different serial numbers. This was resolved by using the unredacted documents to systematically verify that each witness was assigned one and only one witness number. When duplications were located, the documents pertaining to the witness were consolidated and assigned one witness number, and any duplicate documents were removed from the set.

This process also revealed that more than one witness number had been assigned to a few witnesses for other reasons. Specifically, it was found that the document catalog could not always be relied upon to locate persons who were interviewed more than once. For example, the documents pertaining to a few witnesses with hyphenated surnames, and to one witness who apparently changed her surname due to marriage between interviews, were not cataloged as belonging to the same person. Further, no cross-references among

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<sup>37</sup> In keeping with the provisions of Mr. Schiliro's letter, the unredacted documents were reviewed only by NTSB staff members directly working on the document organization project.

<sup>38</sup> Serial number CC3-452 is listed in the document catalog, but no redacted document with this serial number was ever received from the FBI; nonetheless, this document was located in the unredacted document set. NTSB staff determined that this document did not contain a witness account.



the three document catalogs received from the FBI were available (see the *Additional materials* section, which begins on page 18). However, these problems were resolved by systematically reviewing all of the witness number assignments using the unredacted documents.

Upon completion of this quality control check, witness numbering concluded in December of 1998. A total of 755 witnesses were identified and the documents pertaining to each of these witnesses are filed in witness number order.<sup>39,40</sup> The redacted witness documents set is being placed into the public docket as Appendix B, Appendix C, Appendix D, Appendix E, Appendix F, Appendix G, Appendix H, and Appendix I to this report.<sup>41</sup> The unredacted documents were retained until the conclusion of the witness mapping project, and were returned to the FBI on February 4, 2000.

## Geographic information

### Mapping the witnesses

To evaluate any eyewitness account, it is necessary to know where the witness was located at the time that his or her observations were made. The witness group wanted to determine the positions of the witnesses as accurately as possible so that distances and viewing angles could be calculated from the information. Consequently, in accordance with the procedural agreement that appears as Appendix CC, NTSB investigators began mapping the witness locations almost immediately after receiving the documents.

The general strategy employed was to read each document and determine the location of each witness. To facilitate automated witness mapping, commercially available maps and software were then used to determine the position (latitude and longitude) corresponding to each location.<sup>42</sup> One investigator determined the location, position,

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<sup>39</sup> Safety Board investigators assigned at least one witness number to 788 unique documents. Because the accounts of more than one witness were frequently included on the same document, cross-reference pages were initially used to avoid filing multiple copies of these documents in the binder set. Eventually, this proved cumbersome, and these cross references were replaced with actual copies of the documents. Consequently, a total of 906 witness documents (totaling 1,542 pages) are filed in the witness document set.

<sup>40</sup> These 755 “witnesses” are best regarded as *potential* witnesses. Each one was carefully reviewed during the document reading project, and the group determined that some did not meet the agreed-upon definition of a witness. This activity is described in detail in the *Witness Group Study Report*.

<sup>41</sup> The witness documents are being included in the public docket exactly as redacted by the FBI.

<sup>42</sup> In this document, the term *location* is used to mean an English language statement that describes where a witness was at the time of the accident (e.g., “Westhampton Beach Yacht Squadron,” “Smith Point Park campsite 12,” or “321 Main St., Ponquogue, NY”). The term *position* is used to refer to the latitude and longitude that corresponds to a given location.

situation (land, sea, or air), and the type of geographical information available for each witness, and a second investigator reviewed each of these determinations, and revised them as necessary for accuracy and standardization. Finally, to ensure the quality of the data, a third investigator reviewed a series of maps generated from the data, and some adjustments were made to the data. The following sections describe these activities in more detail.

### *Information sources and tools*

Many witnesses were at public places such as beaches, parks, marinas, yacht clubs, restaurants, and other commercial establishments, and this information was readily available in the documents. The locations of public places and commercial establishments were found by reference to telephone directories and maps. The Internet was also used to determine the locations of public buildings and businesses by reference to their own Web sites, the Internet Yellow Pages (<http://www.yip.yahoo.com>), or other useful Web sites.

The redacted state of the documents made it impossible to use them to determine the locations of the many witnesses who were located at private residences. Because personally identifying information had been redacted from the documents, street addresses and some other geographic information were generally not available for witnesses who were located at private homes. Consequently, reference was made to the address list that was provided by the FBI on August 31, 1998 (for more information, see page 19).

The address list was useful for documents that pertained to witnesses who were located at their own homes at the time of the accident. For example, Witness 165 observed the accident from his home. Consequently, the address given in the address list was used as the location for this witness. However, the address list could not be used to determine the location of a witness when he or she was not located at home at the time of the accident, because the list provided only the home address of the witnesses (*e.g.*, Witness 210 was at his mother's residence, but the address list contains his home address).

The address list also presents a problem for documents that provided the accounts of multiple witnesses who were at different locations at the time of the accident. This was represented in the address list as several addresses pertaining to a single document serial number. Because witness names were redacted from the list and from the documents, it could not be determined which address pertained to which witness. Consequently, for any witnesses whose location could not be determined from the redacted witness documents and the address list, unredacted documents were used.<sup>43</sup> For example, Witnesses 680, 690, and 691 were camping at Smith Point Park. The campsite number of each witness had been redacted, but these were retrieved by reference to the unredacted documents.

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<sup>43</sup> For more information about the unredacted documents, refer to the *Using unredacted documents* section on page 24.

Some witness locations simply could not be determined from the information provided in the documents because they contained no useful geographic information (redacted or otherwise). For example, Witness 2 was on his or her boat, but it cannot be determined from the information in the witness document if the boat was in the ocean, a bay, or a marina. The document pertaining to Witness 90 references some landmarks, but does not provide any geographic information concerning the witness.

Once the locations were determined, various tools were used (often in combination) to determine the corresponding geographic positions (latitude and longitude). These included DeLorme Simply Streets (1997 Edition) and DeLorme Map'n'Go (Version 4.0, 1998 Edition), which are commercially-available mapping software packages that can be used to determine the position of specific street addresses. Other tools included paper maps such as Geographia's Suffolk County Street Atlas (PageFinder Edition, Geographia Map Company, 1998) and Hagstrom's Suffolk County Atlas (Hagstrom Map Company, Inc., 1998). Nautical charts and airport diagrams were also used, when appropriate. Maptech's Chart Viewer software (version 2.1) was used to access and view electronic versions of the National Ocean Service's, National Oceanic and Atmospheric Administration, region 3 nautical charts.

Occasionally, maps on which a witness had marked his or her location were provided with the corresponding witness document. Sometimes, witnesses (especially those on boats) directly provided their positions to FBI agents, or provided approximate course, direction, and time data. Where positions were available, these were used directly. Where course data were provided, positions were estimated by plotting the course on nautical charts (however no wind or current data were available for correction). Use was also made of a special radar study that was conducted for the airborne witnesses (see the *Witness Group Recorded Radar Study*, which has been placed into the public docket).<sup>44</sup>

### *Site visit*

Although some locations were known with great specificity (for example, by reference to campsite numbers, street addresses, or fixed landmarks), they could not be plotted with great precision using available tools. For example, Smith Point Park can be located on maps of Long Island, but the individual campsites and buildings in the park are not depicted. Even on a map provided by the Suffolk County Parks Department, the campsites cannot be located to scale. Consequently, campsite numbers could not be used to determine the positions of witnesses in the campground. Further, on the barrier island

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<sup>44</sup> During the document reading project, the witness group determined that three of the airborne "witnesses" did not meet the definition of a witness (Witness 139, Witness 585, and Witness 703). These three witnesses appear in the *Witness Group Recorded Radar Study* because portions of the document reading project and the radar study were accomplished concurrently. The document reading project is discussed in detail in the *Witness Group Study Report*. The definition of a witness is found on page 19 of this report.

that forms the southern coast of Long Island, Dune Road stretches along almost the entire 15 nautical miles from Moriches Inlet to Shinnecock Inlet. Because house numbering is not depicted with much precision on the mapping software used for this project, these tools could not be used to determine positions for the many witnesses on Dune Road. Investigators identified 161 witnesses whose locations were known by reference to landmarks that were not accurately depicted on available maps.

In January 1999, NTSB investigators traveled to Long Island to collect these 161 positions using a Rockwell precision lightweight global positioning system (GPS) receiver (Model PLGR+96 FEDERAL). This GPS receiver can provide a positional accuracy of less than 26 feet by using the precise positioning service (PPS) of the Global Positioning System. Although the equipment is capable of providing such precision, the GPS readings were not necessarily taken at the precise location of the witnesses at the time of the accident. Investigators attempted to take measurements at the same locations noted in the witness documents; however, these documents did not always provide totally unambiguous references, and investigators did not enter any private property to use the GPS receiver. Positions for private residences and some commercial establishments were determined from the nearest public street or publicly-accessible access road or parking lot.

## Results

### *Witness situation*

As each position was determined, an attempt was also made to determine the *situation* of the witness—that is, whether the witness was situated on land, at sea, or was airborne at the time of the accident. Of the 755 potential witnesses, 469 were on land, 194 were on boats, 40 were in aircraft, and 10 were surfing or swimming. The situation of 42 witnesses could not be determined from the documents. Of the 469 land witnesses, 315 were outdoors, 66 were in buildings (often private residences near the shore), 60 were in vehicles (including 1 on a motorcycle). The specific situation of 28 of the land witnesses could not be determined.

### *Checking the map*

After witness positions were determined and verified by investigators, a third investigator reviewed a map of selected witnesses. Land witnesses, boat witnesses, and swimmer/surfer witnesses were mapped separately using ArcView GIS, version 3.1.<sup>45</sup>

Small sections of coastline around Long Island and surrounding coastlines were examined. The sections were magnified to examine individual witness locations.

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<sup>45</sup> ArcView GIS is a geographical information system (GIS). A GIS is a software package that permits computer-assisted mapmaking and provides a variety of tools for studying these electronically-generated maps.

Witnesses known to be on land were verified to be depicted on land. Likewise, boat witnesses were verified to be depicted in bodies of water, and swimmer/surfer witnesses were verified to be shown along the coastline. Where needed, small corrections were made to ensure accurate, appropriate depiction of the witnesses.

The coastline model used in all electronically-generated maps produced from the geographic information was obtained from the Department of Transportation, Bureau of Transportation Statistics, as parts of its 1997 collection of National Transportation Atlas Databases (NTAD97). This coastline model was the most accurate model available to investigators for mapping purposes, but readers are cautioned that the coastline of Long Island does change over time, so its precise location and shape will vary slightly from the maps produced.

### *Positional accuracy*

Each position was reported in decimal degrees with a precision of four decimal places; however, different types of geographic information were used to determine the positions.<sup>46</sup> Because of the varying specificity of the geographic information provided in the documents, and—to a lesser extent—because multiple tools were used to determine witness positions, the mapped positions of the witnesses have varying degrees of accuracy.<sup>47</sup> The type of geographic data used to determine each position was recorded in an attempt to characterize the positional accuracy of each. Categories were developed to capture the different types of geographic information used to determine the positions. These categories, which are roughly listed from the most to least accurate, provide some information about positional accuracy:

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<sup>46</sup> *Precision* is the degree of detail to which a value is reported. *Accuracy* is the difference between that reported value and the actual value.

<sup>47</sup> No attempt was made to assess the degree to which the locations described in the witness documents correspond to the actual geographic positions of the witnesses at the time of the accident. It is assumed that this kind of error is generally very small, but it is possible that errors were made when positions were reported by the witnesses or recorded by FBI agents. For example, Witness 229 and Witness 660 were driving in the same vehicle, but their witness documents provide different street and town names in giving their location at the time of the accident.

It was not always possible to determine which witnesses were at the same location at the time of the accident, especially when the accounts of such witnesses appeared in different documents. Consequently, investigators may have determined somewhat different positions for witnesses who were actually at the same location based on how this location was characterized in the documents. For example, consider two hypothetical witnesses who were at the same location at the time of the accident and who were interviewed separately. If one witness provided a street address, but the other only described the location by reference to a nearby intersection, it may not have been evident that these two witnesses were describing the same location. Consequently, different positions may have been determined for them.

- **Radar data.** Positions of airborne witnesses were determined by reference to recorded radar data.<sup>48,49</sup> This category was assigned to 31 witnesses. Refer to the *Witness Group Recorded Radar Study* for more information.<sup>50</sup>
- **NTSB GPS (point).** These positions were determined by a GPS reading taken at the witness's location. This category was assigned to 107 witnesses.
- **Street mapping of a point.** These positions were determined by reference to electronic maps and were determined by locating an appropriate landmark or street intersection. These positions are generally accurate to within a few hundred feet. This category was assigned to 34 witnesses.
- **Street mapping of a block.** These positions were determined by reference to electronic maps by locating the appropriate block of a street for a given address. These positions are generally accurate to a long city block. This category was assigned to 146 witnesses.

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<sup>48</sup> As they transited the airspace, many discrete positions were recorded for each of the aircraft for which recorded radar data were available. The position used for each witness aircraft was its position at the moment closest in time to the position of TWA flight 800 at the time of its last secondary radar return, which was received by the FAA's Trevoze, Pennsylvania, radar site at 2031:12.00 EDT.

<sup>49</sup> The difference between the time an aircraft's position was recorded and the time of flight 800's last secondary radar return at 2031:12.00 EDT (see *Aircraft Performance Study*, Exhibit 13A in the public docket) was calculated for each airborne witness aircraft. USA217's position at 21,700 feet above mean sea level (MSL) was recorded at 2031:11.52 EDT, which is 0.48 seconds before flight 800's last secondary radar return. VIR009's position at 14,700 feet MSL was recorded at 2031:10.93 EDT, which is 1.07 seconds before flight 800's last secondary radar return. BBE507's position at 20,500 feet MSL was recorded at 2031:11.08 EDT, which is 0.92 seconds before flight 800's last secondary radar return. AZA609's position at 15,400 feet MSL was recorded at 2031:12.4 EDT, which is 0.40 seconds after flight 800's last secondary radar return. PDT3112's position at 10,600 feet MSL was recorded at 2031:12.11 EDT, which is 0.11 seconds after flight 800's last secondary radar return. GRA507's position at 22,800 feet MSL was recorded at 2031:11.11 EDT, which is 0.89 seconds before flight 800's last secondary radar return. BTA3678's position at 13,000 feet MSL was recorded at 2031:14.32 EDT, which is 2.32 seconds after flight 800's last secondary radar return. N2084C's position at 3,100 feet MSL was recorded at 2031:11.37 EDT, which is 0.63 seconds before flight 800's last secondary radar return. Jolly14's position at 600 feet MSL was recorded at 2029:49.96 EDT, which is 82.04 seconds before flight 800's last secondary radar return. UNK3's position at 2,000 feet MSL was recorded at 2031:19.01 EDT, which is 7.01 seconds after flight 800's last secondary radar return. KING74's position at 2,000 feet MSL was recorded at 2031:11.23 EDT, which is 0.77 seconds before flight 800's last secondary radar return. UNK1's position at 1,200 feet MSL was recorded at 2032:40.33 EDT, which is 88.33 seconds after flight 800's last secondary radar return. N1182J's position at 8,000 feet MSL was recorded at 2031:10.79 EDT, which is 1.21 seconds before flight 800's last secondary radar return. For further information, see *Witness Group Recorded Radar Study*.

<sup>50</sup> During the document reading project, the witness group determined that three of the airborne "witnesses" did not meet the definition of a witness (Witness 139, Witness 585, and Witness 703). These three witnesses appear in the *Witness Group Recorded Radar Study* because portions of the document reading project and the radar study were accomplished concurrently. The document reading project is discussed in detail in the *Witness Group Study Report*.

- **NTSB GPS (vicinity).** Position was determined by a GPS reading taken near the witness's location. This category was assigned to 54 witnesses.
- **General vicinity.** These positions were determined by reference to paper and electronic maps and are generally accurate to within about 4,000 feet. This category was assigned to 120 witnesses.
- **Approximation.** These positions were determined by reference to paper and electronic maps and are generally accurate to about within about 2 statute miles. This category was assigned to 94 witnesses.

It is difficult to evaluate the accuracy of positional information that was provided directly in the witness documents; however, positions determined in this manner are characterized as follows:

- **Self reported position.** The latitude and longitude provided in the witness document was used as witness's position. This category was assigned to 13 witnesses.
- **Witness mapped position.** These positions were determined by reference to a witness-provided map indicating his or her position. This category was assigned to 4 witnesses.

Where positions could not be determined from available location information, the following categories were used:

- **Representational.** These positions were determined arbitrarily when only a minimal amount of geographic information was available. These positions are not assumed to be accurate. They merely serve as placeholders. Positions categorized as *representational* should not be used for calculations involving distance or direction. This category was assigned to 93 witnesses.<sup>51</sup>
- **Insufficient geographic information.** Positions that could not be determined, even representationally, from available information. This category was assigned to 59 witnesses.

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<sup>51</sup> Examples of witnesses plotted representationally include Witness 215, who was driving a car on Route 27, and Witness 375 who was sitting on the observation deck of a boat near Great Gun Beach. Witness 215 was plotted at an arbitrary point on Route 27, and Witness 375 was arbitrarily plotted on the Bay side of Great Gun Beach, although he or she may have been on the Atlantic Ocean side of the barrier island.

## Maps

A series of maps has been created using the geographic information. These maps appear in Appendix A. The maps show that no land witness was closer to the accident site than about 9 nautical miles, but about 139 were within 10 nautical miles of the site; the closest boat witness was about 6 nautical miles from the accident site, and about 51 boat witnesses were within 10 nautical miles of the site.<sup>52</sup> The closest airborne witnesses were aboard USAir flight 217, which was about 2.5 nautical miles laterally from flight 800 and about 7,950 feet above flight 800.

The maps were projected in Universal Transverse Mercator (UTM) zone 18 coordinates. None of the maps include witnesses with insufficient geographic information. Only Map 1 includes witnesses who were plotted representationally. Refer to the *Positional accuracy* section above for more information about these categories. Because many witnesses were at the same locations, a number of points directly overlie each other.

Airport runways are depicted on these maps to provide some general orientation; however, to minimize visual clutter, streets, bridges, and inland bodies of water do not appear on the maps. Consequently, the depiction of some witnesses on the maps may appear somewhat misleading. For example, Witness 571 was located on Beach Lane Bridge, Westhampton, New York. The bridge, which crosses over the water near Quantuck Bay, does not appear on the map, so the witness appears to be plotted in the water. Also, Witness 28 is located in a boat in Penny Pond near Ponquogue, New York, and Witness 398 is located in a boat in Penny Creek near Ponquogue, New York. These locations are small, inland bodies of water that are not represented on the maps, so both of these witnesses appear to be plotted on land.

- Map 1. All witnesses for whom any geographic information was available.
- Map 2. All witnesses within 100 nautical miles. This map includes a series of range rings about the last secondary radar return. The only witness excluded at this range is a witness who was in Eastern Massachusetts.
- Map 3. Witnesses on land within 25 nautical miles. This map is centered on the 25 nautical mile range ring, and uses a more detailed coastline model than Maps 1 and 2.
- Map 4. Witnesses who were surfing, swimming or on boats within 25 nautical miles. This map is centered on the 25 nautical mile range ring, and uses a more detailed coastline model than Maps 1 and 2.

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<sup>52</sup> For information about how distances were calculated, refer to the *Angle and distance calculations* section of the *Witness Group Study Report*.



- Map 5. Witness aircraft with their aircraft callsigns. Note that one witness aircraft located about 76 nautical miles west-southwest of TWA flight 800 does not appear on the map due to its limited range.

On Map 5, arrows depict the position and the approximate orientation of the witness aircraft. The arrows represent the approximate ground track of these aircraft. This track is not corrected for winds aloft.

The orientation of the approximate ground tracks was determined by reference to radar data recorded at the FAA's radar site at Islip, New York. The orientation of an imaginary straight line plotted between (1) the position of the witness aircraft closest in time to flight 800's last secondary radar return and (2) the position of the witness aircraft immediately before this position was used as the approximate ground track of the witness aircraft. However, there are two exceptions:

- The arrow symbol for flight 800 was rotated to approximately 082 degrees magnetic. This was the magnetic heading given for the accident aircraft at 20:31:11 EDT in the tabular data that appears as attachment 2 to the *Flight Data Recorder Group Chairman's Factual Report*, which appears as Exhibit 10A in the public docket.
- The position recorded for witness aircraft UNK1 that was closest in time to flight 800's last secondary return was the first point in the data for this aircraft. Consequently, the orientation of an imaginary straight line plotted between the position of UNK1 at the first and second points in the radar data was used as the approximate ground track for this aircraft.



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