National Transportation Safety Board

Washington, DC 20594

Response to Petition for Reconsideration

Date: July 2, 2014

Mr. Henry F. Hughes (et al.)
"The TWA 800 Project"
[redacted]

In accordance with 49 *Code of Federal Regulations* (CFR) 845.41, the National Transportation Safety Board (NTSB) has reviewed the June 19, 2013, petition for reconsideration and modification of the findings and probable cause in the accident involving Trans World Airlines, Inc. (TWA) flight 800, a Boeing 747-131, N93119, on July 17, 1996, near East Moriches, New York.[1] Also, at the request of and as a courtesy to the petitioners, on January 10, 2014, the NTSB general counsel, deputy managing director, and other managers and staff were audience to a listening session and presentation provided by the petitioners' representatives, who included an eyewitness, in support of the petition for reconsideration.[2] On the basis of its review of the petition for reconsideration, the NTSB hereby denies the petition in its entirety.

About 2031 eastern daylight time, the airplane crashed in the Atlantic Ocean. TWA flight 800 was operating under the provisions of 14 CFR Part 121 as a scheduled international flight from John F. Kennedy International Airport (JFK), New York, New York, to Charles de Gaulle International Airport, Paris, France. The flight departed JFK about 2019 with 2 pilots, 2 flight engineers, 14 flight attendants, and 212 passengers on board. All 230 people on

[1] National Transportation Safety Board, *In-flight Breakup Over the Atlantic Ocean, Trans World Airlines Flight 800, Boeing 747-131, N93119, Near East Moriches, New York, July 17, 1996*, AAR-00/03 (Washington, DC: National Transportation Safety Board, 2000). The report can be accessed from the "Investigations" link on the NTSB's website at www.ntsb.gov.

[2] The meeting was held at the request of the petitioners' representatives who expressed their belief that the information described in the petition for reconsideration required an oral presentation, graphics, and animations to be fully understood. Prior to and during the meeting, the NTSB general counsel advised the petitioners' representatives that the listening session content must focus exclusively on the information contained in the petition for reconsideration and that any new information must be submitted to the NTSB and the parties to the investigation in accordance with 49 CFR 845.41. Following the meeting, no new information was submitted in accordance with the regulation. An official transcript of the January 10, 2014, meeting (which includes the eyewitness' descriptions of objects that he saw and their movements in the sky) and copies of the presentation are provided in the public docket associated with this petition response, which can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

board were fatally injured, and the airplane was destroyed. Visual meteorological conditions prevailed for the flight, which was operated under an instrument flight rules flight plan.

Twenty-five findings were adopted on August 23, 2000, including finding 8, which stated the following:

> The witness observations of a streak of light were not related to a missile, and the streak of light reported by most of these witnesses was burning fuel from the accident airplane in crippled flight during some portion of the postexplosion preimpact breakup sequence. The witnesses' observations of one or more fireballs were of the airplane's burning wreckage falling toward the ocean.

The probable cause adopted on August 23, 2000, was as follows:

> The [NTSB] determines that the probable cause of the TWA flight 800 accident was an explosion of the center wing fuel tank (CWT), resulting from ignition of the flammable fuel/air mixture in the tank. The source of ignition energy for the explosion could not be determined with certainty, but, of the sources evaluated by the investigation, the most likely was a short circuit outside of the CWT that allowed excessive voltage to enter it through electrical wiring associated with the fuel quantity indication system.
>
> Contributing factors to the accident were the design and certification concept that fuel tank explosions could be prevented solely by precluding all ignition sources and the design and certification of the Boeing 747 with heat sources located beneath the CWT with no means to reduce the heat transferred into the CWT or to render the fuel vapor in the tank nonflammable.

According to the petition, the petitioners are "investigators from the original [NTSB] investigation, family members of crash victims, former airline crash investigators, and concerned scientists." The petitioners claim that the NTSB's probable cause determination is "erroneous and should be reconsidered and modified accordingly." The petitioners also claim that NTSB finding 8 is "erroneous and does not fairly summarize witness observations."

To support their claims, the petitioners provide "two new analyses" of Federal Aviation Administration (FAA) radar data, which they assert show that aspects of the NTSB's findings are erroneous. They also provide 20 eyewitness interview documents from the Federal Bureau of Investigation (FBI) "not previously available to the NTSB." The petitioners' analyses and witness documents are discussed in this letter in the sections that follow. Many of these issues were previously raised in a May 20, 2002, petition for reconsideration submitted by Dr. Thomas F. Stalcup (a member of the current group of petitioners). That petition was denied in its entirety on June 19, 2003.[3]

[3] Dr. Stalcup's petition for reconsideration and the NTSB's response are available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

The petitioners also express concerns that are outside the scope of a petition for reconsideration [4] because the claims either are not supported by new factual evidence and/or rely on analysis that is based on unsupported or inaccurate assertions. These include claims that the NTSB investigation did not account for a grouping of "spike-tooth" fractures and that explosives residue was detected in multiple locations throughout the airplane; various concerns about the investigative process, including questions about the validity of the debris-field database and the NTSB's relationship with the FBI; a claim about a lack of NTSB analytical reports; an assertion that the simulations of the accident flight are inaccurate; concerns about the witness group chairman and witness-related discussions during the August 23, 2000, Board meeting; and a concern about the still-pending manner-of-death determinations for the victims. Although these claims and concerns are outside the scope of a petition for reconsideration, they are addressed in an attachment to this letter.

New analyses of radar data

The petitioners assert that the NTSB's probable cause "rests on the determination of a low-velocity overpressure event that resulted in the failure of the [CWT] at the forward aspect" with forces "directed longitudinally forward with respect to the airplane" and that their analyses refute the probable cause. Specifically, they claim that their analyses show that "a far more powerful and sideways projected explosion...occurred simultaneously with the loss of the aircraft's electrical power, which sent debris perpendicular to the accident aircraft's flight path, traveling approximately 1/2 mile due south." They claim that the NTSB's final report and public docket contain no account for "this high-speed debris."

To support their claim, the petitioners provide no new data but rather offer their own analyses of some of the radar data that the NTSB used during its investigation. They apply various calculations to the radar data and conclude that debris tracked by multiple FAA radar sites "moved too far, too fast, and in the wrong direction to have resulted from…[a] fuel-air deflagration." The petitioners state that the NTSB's radar and trajectory studies could not account for significant pieces of light debris located between 1/3 and 1/2 nautical mile (nm) south of the explosion about 8.5 seconds after it occurred.

The petitioners are not specific as to which FAA radar data they used when performing their calculations. It appears that the petitioners' analyses focus on six primary[5] radar returns recorded by the Long Island MacArthur Airport (ISP) ASR-8 facility immediately following the

[4] Title 49 CFR 845.41 states that petitions for reconsideration or modification of the NTSB's findings and determination of probable cause "will be entertained only if based on the discovery of new evidence or on a showing that the Board's findings are erroneous." Claims for which no new factual evidence is provided, general disagreements with the NTSB's findings, and concerns about the investigative process do not meet these criteria.

[5] Primary radar returns are reflected from an object that is within radar coverage (about 60 nm for airport surveillance radar [ASR] facilities) and that can reflect radio signals. This can include aircraft, birds, weather, buildings, terrain, debris, etc. However, primary radar cannot positively identify a target or provide altitude information; aircraft identification when only primary radar returns are available is usually based on a logical and consistent ground track and ground speed.

loss of secondary[6] radar returns from the accident airplane (the loss of secondary radar returns coincided with the time of the CWT explosion and the resulting loss of electrical power on the airplane). The mathematical principles that the petitioners wish to apply (that is, their chosen equations for ground speed calculations, vector analysis, and ballistics analysis) would be appropriate if the desired input data were of sufficient quality to enable such calculations. However, the petitioners' stated presumption that the flight and debris positions and times "can be obtained either directly or extrapolated from the raw radar data" is inaccurate. Limitations in the radar data preclude the mathematical determination of such positions and times, and the petitioners misinterpret these data.

For example, in their "Error Analysis," the petitioners incorrectly apply a measure of the resolution associated with the ASR-8 as a measure of position accuracy. (The resolution indicates the smallest increment an instrument can read but does not necessarily indicate the accuracy of the instrument. For example, a digital watch reads to the nearest second, so its resolution is ±0.5 second, but it is not necessarily accurate to within ±0.5 second.) As noted in the NTSB Addendum I to the Main Wreckage Flight Path Study, the azimuth resolution is ±0.044° for the ISP, JFK, and White Plains radar sites.[7] The petitioners mistakenly assume the azimuth uncertainty is equal to the azimuth resolution. For the ASR-8 radar facilities in service at the time of the accident, the azimuth uncertainty was no better than ±0.35° for primary radar returns and ±0.53° for secondary radar returns.[8] The actual azimuth uncertainty in the data is, therefore, about 10 times as large as the petitioners suggest. At each radar installation, primary and secondary radar returns are acquired by separate antennas and data acquisition systems, which accounts for the differences in performance. The petitioners are correct in quoting the range accuracy for secondary returns as ±1/16 nm, but the range accuracy for primary radar returns is ±1/8 nm. Figure 1 illustrates the concept of radar uncertainty for secondary radar returns.

[6] Secondary radar returns are based on the interrogation of on-board equipment referred to as a transponder. The transponder is "interrogated" by the ground station and responds with positive target identification, position, speed, and altitude.

[7] The azimuth angle around the radar site is divided into 4,096 slices, and the angle is calculated by counting the azimuth change pulses (ACP) as the radar sweeps around the circle. Each ACP is, therefore, equal to about 0.088°, so the resolution of the azimuth measurement is ±0.5 ACP or ±0.044°. The NTSB Addendum I to Main Wreckage Flight Path Study is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

[8] Azimuth and range uncertainty depend on the type of data acquisition electronics (digitizer equipment) installed at the radar facility, and this review of the petition for reconsideration could not determine which type of equipment was installed at each of the radar sites at the time of the accident. To ensure the most conservative estimates of uncertainty in this discussion, the azimuth and range uncertainty values discussed reflect the uncertainty for a later generation of digitizers (with smaller uncertainty values) than would have been available at the time of the accident. In other words, the actual uncertainty values at the time of the accident would have been even greater than discussed here. For more information, see Federal Aviation Administration, *Maintenance of Target Data Extractor (TDX)-2000 Digitizer Equipment*, JO 6350.25 (Washington, DC: Federal Aviation Administration, 2003), section 305, p. 3-3.

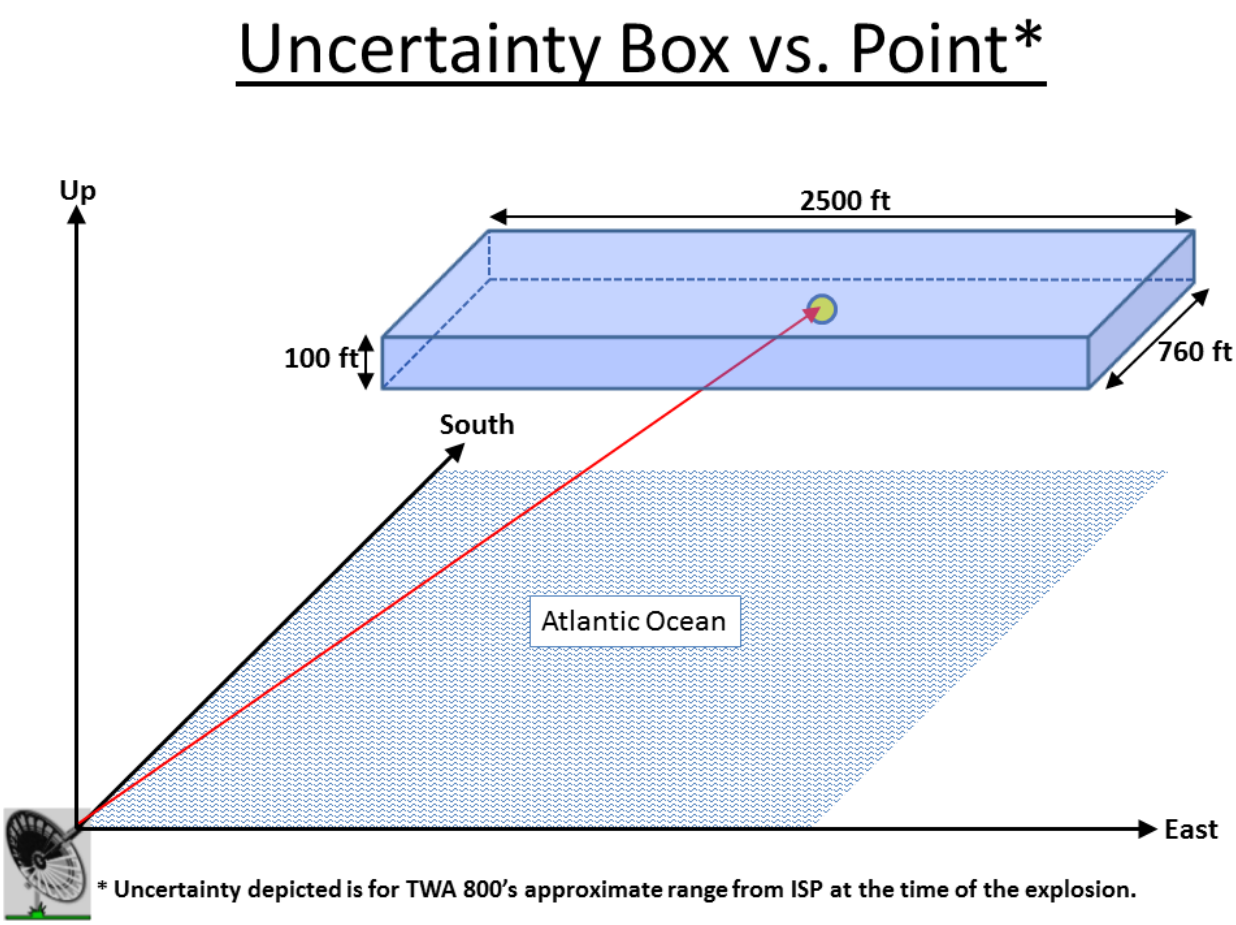

Figure 1. If it is assumed that the yellow circle represents a secondary radar data point for the airplane, then the actual position of the airplane could be anywhere within the blue shaded box, due to radar data uncertainty.

The petitioners are correct that the secondary radar returns from the ISP facility can be positively attributed to the accident airplane, which was transmitting transponder code 2633 to identify itself to the facility before the CWT explosion occurred. However, eight other radar facilities (in addition to the ISP) captured secondary returns from the accident airplane before the explosion, and, due to the accuracy limitations (uncertainty) associated with each facility, some of these returns are as far as 1/2 nm from the secondary returns painted by ISP radar (see the red lines banded by the green arrows in figure 2). Such scatter in the secondary returns shows that any radar-based location of the airplane is not nearly as precise as assumed by the petitioners.

Primary radar returns are subject not only to uncertainty but also other limitations that the petitioners did not adequately consider. Unlike secondary returns, which can be attributed to the airplane by its transponder code, primary radar returns can represent anything that can reflect radio waves, and the chaotic nature of an in-flight explosion and breakup could lead to errors in the calculated radar positions as the radar energy is reflected from more than one object. The fragmentation of the structures during the breakup sequence makes it impossible to determine if primary returns represent the same object tracked over time; yet the petitioners' debris position and velocity calculations assume that, following the explosion, the primary radar returns

represented individual objects tracked as they fell to the ocean. Such an assumption is inappropriate.

Regardless, even if it were possible to assume that the primary returns represented the same piece of debris over time, any returns that appear to be located less than about 1/2 nm apart (in two sequential returns) overlap in their areas of uncertainty. In figure 2, the scatter in the north–south position data for these secondary returns alone is similar in size to the north–south span of the entire cluster of primary returns that the petitioners attempt to use in their calculations as representative of postexplosion debris (see the orange circle in figure 2). Contrary to the petitioners' claims, the precise location and movement of the pieces of debris cannot be accurately determined within the areas of uncertainty.

The petitioners' attempts to perform distance calculations between a secondary radar return and a primary return are also problematic. The CWT explosion and in-flight breakup of the accident airplane was a rare and violent event that transformed a single airplane into multiple scattered plumes of debris. In turn, the radar data showed the discontinuation of altitude-encoded secondary radar returns (known to be the accident airplane) followed by the proliferation of numerous primary radar returns. Because the primary and secondary radar data are acquired by different antennas, there are likely to be discontinuities in the transition from secondary radar returns to primary radar returns after the breakup.

The petitioners' ballistics analysis, which attempts to estimate a range of possible exit velocities for wreckage debris, also suffers from a lack of accurate input data to enable such calculations. The previously discussed radar data limitations apply. The NTSB's Trajectory Study[9] describes the data limitations, sources of error, and other considerations for performing such an analysis. Contrary to the petitioners' claim, the NTSB did account for pieces of wreckage that may have traveled at high velocity and landed in the ocean farther along the airplane heading line than the rest of the wreckage; these included a section of the right wing and a portion of the front spar on the far left side of the CWT.

The NTSB Trajectory Study concluded that these two pieces did not behave in a purely ballistic manner. The study found that the right wing piece was of a weight and shape such that it likely generated some degree of lift. The study also found that it is possible that the front spar piece departed the airplane with significant angular momentum, such that the rotation generated aerodynamic force. These types of "flyers," that is, debris that can produce lift and, as a result, develop significant velocity, would be expected in a CWT explosion and with the amount of associated debris. The high velocities are the result of the initial velocity (due to the breakup) and the aerodynamic forces that can develop from lift and rotation.

[9] The NTSB Trajectory Study (Exhibit 22A) is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

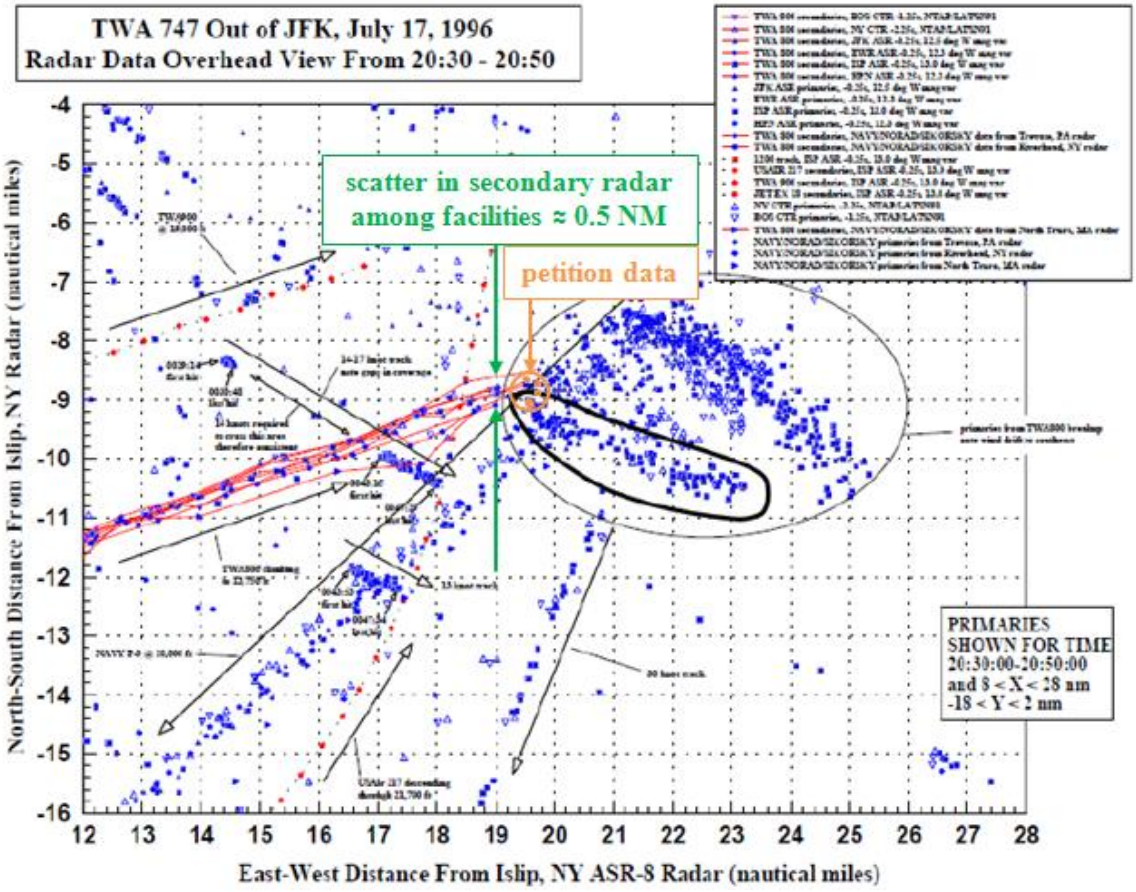

Figure 2. This image from the petition (the original for which appeared on page 91 of the NTSB final report)[10] depicts secondary radar returns for TWA flight 800 as blue points connected with red lines (each red track represents data from a separate radar site). Primary radar returns (shown in blue without red lines) captured after the CWT explosion are within the large, thin-lined oval. The thick black line was added by the petitioners to denote the band of debris of interest to them. Added by NTSB staff for the purpose of this discussion are the green arrows, which show the width of the north–south variation of the secondary returns from TWA flight 800, and the orange circle, which shows the cluster of primary returns upon which the petitioners based their distance and velocity calculations.

As stated previously, due to the limitations of radar data, the petitioners' conclusions with regard to debris positions and velocities are invalid. Therefore, their claims about a powerful and sideways-projected explosion that expelled debris at great speeds over great distances are unpersuasive.

[10] No high-resolution copy of this image was available. Although much of the original labeling is illegible here, the added green arrows illustrate the respective scatters of secondary radar returns relevant for this discussion, and the orange circle indicates the general position of the primary radar returns discussed in the petition.

New eyewitness documents

To support their claim that finding 8 is erroneous, the petitioners provide 20 additional FBI eyewitness interview summaries, some of which "contain descriptions of rising streaks of light and other observations that do not corroborate the official crash sequence determined by the NTSB." The petitioners assert that these new documents, along with "an important grouping of witnesses among the 670 summaries that the FBI ultimately provided to the NTSB during the investigation," show that finding 8 is erroneous.[11]

The interview summaries provided by the petitioners were reviewed and considered as 20 unique new sources, even though it is not clear whether each summary represents a new witness.[12] Of the 20 summaries, 8 include mention of a light ascending in the sky, and 3 of those 8 indicated that the light came from the ground, horizon, or ocean (5 of the 8 did not provide a point of origin). The NTSB's final report discusses statements from 736 witnesses, 258 of whom saw a streak of light. Of those 258 witnesses, 25 indicated that the streak of light originated from the surface or the horizon. When the 20 new summaries (8 of which described a streak of light ascending, 3 of those 8 described a surface or horizon point of origin) are considered as new, unique witnesses, the percentage of witnesses who saw a streak becomes 35.2 percent (originally 35 percent) and the percentage who saw the streak originate at the surface or horizon becomes 10.5 percent (originally 9.7 percent).

The review of the 20 new summaries determined that the general locations for each witness did not provide any new, unique vantage points when compared with the locations of witnesses referenced in the investigation's public docket or final report. Further, the information provided in the 20 summaries does not differ substantially from the information contained in some of the other witness summaries that are discussed in the NTSB's final report and contained in the public docket and does not substantially affect the witness totals. For example, if it can be assumed that each of the 20 summaries provided represents a new witness, then the total percentage of known witnesses whose summaries included references to a streak of light and/or a light originated from the horizon would increase a fraction of 1 percent.

The petitioners' assertion that a grouping of witness summaries does not corroborate the official crash sequence is not new information: the NTSB's final report discusses this category of witness summaries at length. The report states that summaries that describe a streak of light

[11] The petitioners also claim that an eyewitness gave the FBI photographs of lights in the sky. In the petitioner-provided witness interview summary labeled "806," a witness states that he may have taken photographs of a ball of light and that he would give the film to the FBI. Because the interview summary is deidentified, it is possible that this witness is the same witness who provided photographs that showed images of what was later determined to be a ground-based lighting fixture. The NTSB has requested that the FBI provide copies of any photograph or video evidence it may have. As of this writing, the response from the FBI is pending.

[12] Because the summaries are deidentified, it was not clear if some of the summaries represented information from new witnesses, followup interviews with witnesses whose initial statements are already part of the public docket, or duplicate or partial information. For example, summary 804 indicates a first interview on July 20, 1996, and a followup interview on July 26, 1996. It is not clear if the information provided in this summary is from both interviews. Summary 812 is missing a continuation page (the last line stops midsentence). Summary 813 appears to be a continuation of a statement but does not appear to be a continuation of any of the 20 statements provided by the petitioners.

ascending vertically (or nearly so) and/or originating at the surface or from the horizon seem to be inconsistent with the accident airplane's calculated flight path and other known aspects of the accident sequence and, therefore, cannot be readily explained. The report describes that, in an attempt to reconcile these witness summaries with the calculated accident sequence, the NTSB considered the effect of potential deficiencies in the interviewing[13] and documentation[14] process (which the petitioners also note) and of errors in witness memory and/or perception. Further, more recent research notes that "memory is malleable. [Witnesses]…pick up information from other sources; they combine bits of memory from different experiences. A growing body of research shows that memory more closely resembles a synthesis of experiences than a replay of a videotape."[15] This research also states, "…when people experience some actual event—say a crime or an accident—they often later acquire new information about the event. This new information can contaminate the memory. This can happen when the person talks with other people, is exposed to media coverage about the event, or is asked leading questions."[16]

As described in the NTSB's final report, the Witness Group Factual Report, and the Witness Group Study, these types of issues factored into the NTSB's decision to not re-interview the witnesses when the FBI provided witness identity information about 21 months after the accident. The Witness Group Study describes how NTSB investigators immediately began organizing the summaries for review and explains the considerations behind the witness group's decision to rely on the original FBI documents as the best available evidence of the observations initially reported by the witnesses.[17]

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[13] According to the Witness Group Study, several aspects of the witness documents made it difficult to extract accurate and reliable information, including possible interviewer and/or interviewee bias (for example, an initial assumption that a missile was used against the airplane), potentially flawed distance and direction information, multiple witness reports summarized in a single account, recording of witness speculations and conclusions, imprecise or vague language, conflicting information, and errors concerning the origin of the streak of light. The Witness Group Study is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

[14] The Witness Group Factual Report states that the documents provided by the FBI are summaries of some of the information provided to FBI agents by witnesses during the FBI's criminal investigation. No verbatim records of the FBI interviews were produced. The documents were 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 the criminal investigation, and FBI agents frequently included only information that appeared relevant to this purpose. A witness document was prepared later by reference to these notes, sometimes by the agents, other times by other typists (by reference to handwritten drafts); and, in some cases, 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 avoided referring to the FBI witness documents as "statements." The Witness Group Factual Report is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

[15] Loftus, Elizabeth. "Our Changeable Memories: Legal and Practical Implications." *Nature Reviews Neuroscience* (March 2003): pp. 231–234.

[16] Loftus, Elizabeth. "Memory Faults and Fixes." *Issues in Science and Technology* (Summer 2002): pp. 41–50.

[17] The Witness Group Factual Report is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

It is very important to note that finding 8 was not based exclusively on the information contained in witness summaries. The NTSB's final report explains that the conclusion, "witness observations of a streak of light were not related to a missile," considered the physical evidence of the investigation, including studies of the wreckage damage characteristics and the locations of wreckage pieces in the debris field zones. Further, studies and testing conducted specifically to evaluate various missile and explosives scenarios yielded no evidence of such an event. Because the witness summaries provided by the petitioners are unremarkable in their content in that they provide no new information that differs substantially from the information discussed in the context of the entire investigation in the NTSB's final report, the petitioners' claim that finding 8 is erroneous is unpersuasive.

Conclusions

The petitioners believe that a detonation or high-velocity explosion struck down TWA flight 800. It is important to note that the NTSB exhaustively considered such scenarios when it pursued what became the largest investigation of a transportation accident in our nation's history. All of these considerations are discussed in the NTSB's final report, which is supported by even more comprehensive factual data detailing these and other aspects of the investigation, all of which is contained in the NTSB's accident docket and available to the public for review. The NTSB's determination of the probable cause and the content of finding 8 were developed in consideration of the investigative evidence as a whole, rather than select facts in isolation. Although uncertainties in radar data and conflicting summaries of witnesses' descriptions of phenomena that are difficult to explain add complexity to the analysis of this terribly tragic accident, all of these issues are described fully in the NTSB's final report and were considered within the context of a massive investigation that found no evidence of an external detonation, such as a missile. As detailed in the final report, no sequence of radar returns intersected TWA flight 800's position at any point around the time of the explosion, no radar returns consistent with a missile or other projectile were found traveling toward the airplane before the explosion, and no wreckage damage patterns were consistent with the airplane having been struck by a missile or affected by detonation of a high-energy device, such as a proximity-fused weapon. Careful analysis revealed a pattern of fractures indicative of an overpressure event originating in the CWT. The pattern of wreckage recovered was consistent with the sequence of structural failures deduced from the fracture patterns. Based on numerous studies and analyses of all the available data with all inherent limitations considered, the airplane's explosion is consistent with a low-velocity, fuel/air deflagration event within the CWT.

The goal of any NTSB investigation is to determine the probable cause of an accident and to make recommendations to prevent such an accident from occurring again. This accident once again highlighted the potential danger of an explosive fuel/air mixture in the fuel tanks of transport-category aircraft. The NTSB's final report identified an additional 25 documented fuel tank explosions or fires and found that there was a fuel tank explosion somewhere in the world about once every 48 months, extending to the December 8, 1963, accident involving Pan Am flight 214, a Boeing 707-121 that crashed in Elkton, Maryland, after being struck by lightning, fatally injuring all 81 people on board. As a result of the TWA flight 800 investigation, and with the additional evidence provided by the other similar accidents, the NTSB recommended to the FAA that it require the development and implementation of design or operational changes to preclude the operation of transport-category airplanes with explosive fuel/air mixtures in the fuel

tanks, with significant consideration given to the development of fuel tank inerting systems. In July 2008, the FAA issued a final rule requiring that all transport-category aircraft (newly designed, newly manufactured, and existing in-service) be equipped with a system that reduces to a safe level the explosive potential in the fuel tank during critical phases of flight. In addition, the FAA developed the Enhanced Airworthiness Program for Airplane Systems that introduced new maintenance, inspection, and design criteria for airplane wiring to address conditions that put transport airplanes at risk of wire failures, smoke, and fire. The regulation also required the development and use of maintenance and inspection requirements for airplane wiring systems.

After review of the analysis and evidence provided by the petitioners and of the NTSB investigative materials, the petition for reconsideration of the NTSB's probable cause and finding 8 in connection with the aviation accident involving TWA flight 800, a Boeing 747-131, N93119, on July 17, 1996, near East Moriches, New York, is denied in its entirety.

A discussion of the petitioners' other concerns (which either are not supported by new factual evidence and/or rely on analysis that is based on unsupported or inaccurate assertions and, therefore, are outside the scope of the provisions of 49 CFR 845.41) is included in the attachment to this letter.

Acting Chairman HART and Members SUMWALT, ROSEKIND, and WEENER concurred in the disposition of this petition for reconsideration.

Attachment

Responses to Claims and Concerns Outside the Scope of 49 CFR 845.41

Attachment: Responses to Claims and Concerns Outside the Scope of 49 CFR 845.41

Claim that a grouping of "spike-tooth" fractures is unexplained

The petitioners note that the National Transportation Safety Board's (NTSB) Structures Group Factual Report states that "spike-tooth characteristic[s] are indicative of a very rapid strain rate produced by a high-energy event." The petitioners claim that their analysis of the more than 100 items exhibiting spike-tooth fractures "highlights a grouping…that remain unaccounted for in the official scenario. This grouping of fractures was found on wreckage items that landed in the earliest debris field and hit the water at relatively low velocities." The petitioners claim that in the NTSB's proposed crash sequence, there is no mention of any high-energy event, and they request that the NTSB conduct the necessary analysis to determine the minimum energy and velocities required to generate spike-tooth fractures on wreckage landing in all three debris fields and to show which segment of the crash sequence contained sufficiently high energy to create these fractures throughout the airplane.

The petitioners provide no new factual information to support their claim and request, and they are nonspecific as to how many or what nature of items constitutes the "grouping" to which they refer. During the NTSB's investigation, the presence of spike-tooth fractures was documented separately by both NTSB investigators and Dr. Barry Shabel, a metallurgist retired from Alcoa, Inc., who was serving as a consultant to the Federal Bureau of Investigation (FBI). Two pieces of wreckage recovered from the red zone, the earliest debris field, had spike-tooth fractures,[1] and both of those pieces were from the center wing fuel tank (CWT).

At an NTSB hearing on December 8, 1997, Dr. Shabel described his motivation and efforts to count and document spike-tooth fractures. As part of his testimony,[2] he stated, "[W]e wanted to look for those kinds of features [spike-tooth fractures] and see if they were clustered, for example, in a particular area or something like that, because that might be a feature of either an explosion or, in a way, a high rate of deformation kind of behavior." With regard to the locations of the spike-tooth fractures, Dr. Shabel commented that, "[W]e did find some in the [CWT] area, but we found it – in fact, most of the ones we found, I think 90 out of the 117 were actually found on just stray pieces off hangar and off reconstruction and elsewhere in a variety of

[1] The red zone was one of three debris fields labeled during the investigation from which the accident airplane's wreckage was recovered. This zone was located farthest west (closest to John F. Kennedy International Airport [JFK], New York, New York) in the wreckage distribution. A relatively small amount of widely dispersed debris was recovered from the red zone.

[2] Dr. Shabel's December 8, 1997, hearing testimony is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

locations. So, we didn't see that these were unique to the [CWT], or, you know, any particular area, in that sense."[3] Dr. Shabel also stated the following:

> [T]he features occurred in both the 2024- and 7075-type alloys over a range of thickness in a variety of circumstances. So, from that type of evidence, I was led in a sense to speculate or partly conclude that the spike feature was not as unique an indication of an explosion type of phenomenon as might have been inferred from some of those earlier papers, which only tested the appearance and the presence of an explosion.

When NTSB investigator James Wildey asked Dr. Shabel to clarify whether the presence of spike-tooth fracture features throughout widely dispersed portions of the airplane factored into his conclusion that "this is not a feature that can only be created by a high-order explosion, such as a bomb or missile," he responded that he "felt that the prevalence – because, again, there were so many different parts, and then each of those parts then was in so many different locations around the aircraft that it didn't seem…to fit with the hypothesis of a site being the focus of a – of such an event."

In summary, Dr. Shabel concluded that, if the spike-tooth fractures had been clustered in a single location, they might have been indicative of an initiating explosive event. The fact that they were not clustered indicated that, although those fracture features were caused by high strain rates, they were not indicative of any particular initiating event.

During the same hearing, Mr. Richard Bott, an aerospace engineer from the Naval Air Warfare Center, and Dr. Shabel each described the types of metallurgical features that are known to be present on wreckage when a bomb or missile had been the initiating event. They also described their efforts to document whether such features were present on the airplane. In short, bomb or missile explosions are known to produce high-velocity projectiles that pierce and pit the airplane skin, leaving metallurgical features indicative of a high-energy event. Mr. Bott, Dr. Shabel, and NTSB investigators all examined the airplane for evidence of a high-energy explosion, and none was found.

Because this testimony and analysis was considered in the NTSB's investigation, and because the petitioners provide no new factual evidence to refute any NTSB findings related to the subject, the petitioners' claim that the NTSB failed to account for or adequately analyze a grouping of spike-tooth fractures that landed in the earliest debris field is unpersuasive. The NTSB is not aware of any specific grouping of spike-tooth fractures (the fractures were widely dispersed throughout the wreckage, as indicated above), and the petitioners provide no specificity regarding such a grouping. Further, because the spike-tooth fractures are not indicative of an initiating event, and features that are known to be indicative of a bomb or missile explosion as an initiating event were absent on the airplane, the petitioners' claim that the NTSB must further study the conditions required to produce spike-tooth fractures is unpersuasive.

[3] The "reconstruction" refers to a portion of the fuselage and CWT reconstructed by the NTSB. It extended from approximately the nose landing gear to behind the CWT. It included fuselage and CWT wreckage recovered from the red zone, wreckage recovered from the yellow zone (the smallest debris field from which wreckage was recovered and that was contained within the red zone on its northeastern side) was at the front of the reconstruction, and wreckage recovered from the green zone (the debris field located farthest east [farthest from JFK] in the wreckage distribution) was at the aft end of the reconstruction.

Claim that additional wreckage items tested positive for explosives

The petitioners claim that they have "determined that there were approximately 100 or more explosives detections" on wreckage items. The petitioners claim that PETN (pentaerythritol tetranitrate) was found on the right wing and on at least one floor board and that RDX (cyclotrimethylenetrinitramine) was detected on a canvas cargo bay curtain. The petitioners also claim that they have determined that an exercise to train explosives-detecting dogs did not occur on board the accident airplane. The petitioners provide no factual information to support their claims but rather ask that the NTSB "request all evidence and information from the FBI regarding these [explosives] detections" and "carefully review all documents pertaining to the 'dog-sniffing' exercise."

As discussed in the NTSB's final report, only three separate pieces of wreckage (a piece of canvas material and two pieces of floor panel) were found to contain trace amounts of explosives residue. This information is consistent with an FBI report[4] that documented the presence of RDX and PETN on a floor panel, nitroglycerine on another section of floor panel, and RDX on a sheet of canvas-like material. According to the FBI report, these three pieces were the only pieces on which trace amounts of explosives were detected during the FBI's testing of more than 115 pieces of wreckage submitted by the NTSB. The FBI report documented no characteristics of blast damage on any of the pieces examined and no evidence of explosives residue on any of the right wing pieces recovered. In the absence of any factual evidence submitted by the petitioners, their claim that explosives were detected on more than 100 pieces of wreckage is unpersuasive.

With regard to the dog-training exercise, the petitioners provide no factual information to support their claim that the exercise did not occur on the accident airplane. The NTSB's final report and docket contain the factual information that supports the NTSB's finding that such an exercise took place on board the accident airplane about 5 weeks before the accident.[5] The final report states that it is possible that explosives residue may have been deposited on pieces of the airplane during this exercise; however, nowhere does the report conclude that this exercise was the source of any explosives detected on the wreckage.

As explained in the NTSB's final report and docket, very few airplane items were recovered during the first 2 days after the accident; the wreckage field was surveyed using sonar for several days before most of the wreckage was recovered. The Federal Aviation Administration (FAA) conducted a study[6] that involved exposing aluminum and cloth airplane

[4] The FBI report, file 265A-NY-259028, has been added to the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

[5] See section 1.16.4.8 of the NTSB's final report (which can be accessed from the "Investigations" link on the NTSB's website at www.ntsb.gov) and the Hazardous Materials–Security Group Chairman's Factual Report, which is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

[6] The study exposed the airplane parts to explosives residue by manually depositing explosives and by exposing them to an actual explosion. See section 1.16.4.8.1 of the NTSB's final report (which can be accessed from the "Investigations" link on the NTSB's website at www.ntsb.gov) and the FAA report "Immersion Studies of Aircraft

parts to both RDX and PETN, then immersing the parts in sea water. The study found that, after 2 days, no detectable levels of the explosives were present. The NTSB's final report states that it is very likely that the pieces on which the explosive residues were found were immersed for considerably more than 2 days before they were recovered. As explained in the final report, it is possible that the trace amounts of explosives residue detected on wreckage pieces from the accident airplane were deposited during or after recovery operations.[7]

Concern about validity of debris-field database

The petitioners claim that an NTSB project coordinator was observed changing wreckage recovery location data (in what was known as the "tags" database) for various wreckage debris items without informing the NTSB group chairman responsible for that wreckage. The petitioners claim:

> The NTSB group chairman and several group members complained to NTSB management and a meeting was ultimately held to rectify the situation. According to the Group Chairman and the group members who attended this meeting, none of the location changes were satisfactorily justified.

The petitioners provide no factual information about a meeting, no statements from any investigators claiming to have been left dissatisfied with the justification for the changes, and no specificity regarding what changes were made that were supposedly not justified. The petitioners claim that the changed locations remain in the database, and they request that the database be revalidated.

A review of the original investigative materials reveals that the petitioners are correct that wreckage recovery location data were changed and that such changes usually did not involve the investigative group chairman. However, these changes, which were made as part of the data validation process, are explained in detail in the Data Management Report[8] in the public docket. According to the report, the data management team consisted of NTSB employees, representatives from the various parties to the investigation, and outside staff who were contracted for the work. During the 9-month recovery operation, data were continuously entered into the database, and more than 4,600 items were logged. Several global validation efforts were undertaken, including two complete paper-to-electronic audits and multiple ad hoc and hangar

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Parts Exposed to Plastic Explosives" that is appended to the Hazardous Materials–Security Group Chairman's Factual Report and available in the public docket for this accident. The report can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

[7] The NTSB's final report discusses that the military personnel, ships, and ground vehicles used during the recovery operations had come into frequent previous contact with explosives. Trace amounts of those substances could have been transferred from the surfaces of the ships or ground vehicles, or from clothing and boots of military personnel, onto wreckage pieces during the recovery operations or through subsequent contact with the pieces in the airplane hangar, where the airplane wreckage was later assembled and laid out.

[8] The Data Management Report can be found in the NTSB public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

floor audits. In many cases, these audits found errors and omissions, and corrections were made to the database in an effort to provide the best possible information to the investigative groups.

According to the Data Management Report and the documented procedures set up by the data management group, any location changes involved multiple people from the NTSB, the parties to the investigation, and the contractors. The procedure to change information was well documented and was based on available factual evidence from sonar records, video tapes, diver logs, and wreckage recovery logs. Such changes were based on a numeric audit of the data, not on theories or engineering analyses concerning the accident sequence, and did not require input from the group chairman or other investigative groups.

The petitioners provide no information about the meeting to which they refer. However, a review of the original investigative materials found documentation of meetings to resolve questions about database changes. Appendix 17[9] to the Data Management Report details meetings between the FBI, the cabin interior group, and the data management team to "discuss tagging matters that were of concern." If the petitioners are referring to one of these meetings, then the appendix provides extensive information detailing the actions taken as a result of the meetings. Based on the documented information about the meetings and the database validation activities, the petitioners' assertion that the database needs to again be revalidated is unpersuasive.

Concern about investigative process with regard to the FBI

The petitioners claim that, "[c]ontrary to legal directives set forth in the *Code of Federal Regulations* [CFR], the NTSB allowed their investigation to be superseded by the FBI's investigation." The petitioners assert that, during the initial investigation, NTSB and party investigators were denied the opportunity to interview eyewitnesses or to review the FBI's eyewitness summary documents. The petitioners claim that the NTSB's "failure to provide investigators access" to this information in the early stages of the investigation was "unprecedented in that it violated well-established NTSB policy and customs" and that "[s]uch a denial of data has never occurred prior to or since the TWA flight 800 investigation." The petitioners also claim that, within 2 weeks of the crash (and after interviewing hundreds of eyewitnesses), "FBI investigators were finalizing a report that concluded there was a 'high probability' that a missile caused the crash."

Regarding the NTSB investigation's priority over any investigations by other federal agencies, 49 CFR 831.5, states the following:

[9] Appendix 17: Summary of Meetings with Representatives of the FBI and the Cabin Interior Group is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

> Any investigation of an accident or incident conducted by the [NTSB]…has priority over all other investigations of such accident or incident conducted by other Federal agencies. The [NTSB] shall provide for the appropriate participation by other Federal agencies in any such investigation, except that such agencies may not participate in the [NTSB's] determination of probable cause of the accident or incident. Nothing in this section impairs the authority of other Federal agencies to conduct investigations of an accident or incident under applicable provisions of law or to obtain information directly from parties involved in, and witnesses to, the transportation accident or incident, provided they do so without interfering with the [NTSB's] investigation. The [NTSB] and other Federal agencies shall assure that appropriate information obtained or developed in the course of their investigation is exchanged in a timely manner.

This language (and language in related statutory authority[10]) has remained substantially unchanged since before the time of the TWA flight 800 accident, and the petitioners are technically correct in their implied assertion that the NTSB investigation should have had priority over the investigation being conducted by the FBI. Nonetheless, to claim that the NTSB "allowed" its investigation to be "superseded by the FBI's investigation" somewhat oversimplifies the interaction between the two agencies against the backdrop of a large-scale, multifatality event that, initially, was widely thought to have been the result of foul play (similar to what the petitioners are positing now). Considering this context (and given the massive size of the FBI and its resources compared to those of the NTSB), it is understandable that the FBI affected the investigation, given its mission areas. The petitioners are correct that "[d]uring the initial investigation, the NTSB investigators as well as parties to the investigation were denied the opportunity to interview eyewitnesses or to review FBI form 302 eyewitness summary documents." This did create problems for the witness group investigation, and these issues are discussed in detail in the NTSB Witness Group Factual Report and the Witness Group Study.[11]

In fact, the NTSB found that its experience during the TWA flight 800 investigation highlighted the need for a more detailed protocol for investigative authority in the aftermath of an event that cannot immediately be defined as an accident or a criminal act. As a result, the NTSB sought and secured in its reauthorization bill language to clarify the issue in 49 USC 1131(a)(2)(B), which was amended in 2000 to state the following:

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[10] Title 49 *United States Code* (USC) 1131(a)(2)(A), states that, "an investigation by the [NTSB] has priority over any investigation by another department, agency, or instrumentality of the United States Government. The [NTSB] shall provide for appropriate participation by other departments, agencies, or instrumentalities in the investigation. However, those departments, agencies, or instrumentalities may not participate in the decision of the [NTSB] about the probable cause of the accident."

[11] The Witness Group Factual Report describes the process of obtaining, sorting, and numbering the summaries and mapping the witness locations. The Witness Group Study describes the varying levels of detail in the summaries, interviewer and interviewee bias, ambiguous clock-point and angle references not generally used in aviation, potentially flawed distance estimates and direction information, combined witness accounts, reporting of witness speculation and conclusions, imprecise or vague language, internal inconsistencies, and changes in interview statements across interviews. The report and study are available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

> If the Attorney General, in consultation with the Chairman of the [NTSB], determines and notifies the [NTSB] that circumstances reasonably indicate that the accident may have been caused by an intentional criminal act, the [NTSB] shall relinquish investigative priority to the [FBI]. The relinquishment of investigative priority by the [NTSB] shall not otherwise affect the authority of the [NTSB] to continue its investigation under this section.

The NTSB also entered into a Memorandum of Understanding (MOU) in 2005 with the FBI that states that, "[i]n the immediate aftermath of a transportation accident, the NTSB is the presumptive lead investigative agency and will assume control of the accident scene." Consistent with other statutory language, the FBI may still conduct a criminal investigation, but the NTSB investigation has priority over the FBI investigation. Under the MOU, when investigative priority remains with the NTSB, the FBI will coordinate in advance with the NTSB investigator-in-charge, "all FBI activity on-scene as well as any FBI fact-finding activity elsewhere." This authority includes interviewing witnesses. The MOU states that: "[t]his procedure is intended…to ensure that neither NTSB nor FBI investigative activity unnecessarily complicates or compromises the other agency's investigation." The addition of the pertinent statutory language and implementation of the MOU has improved coordination between the NTSB and FBI since the TWA flight 800 accident.

The petitioners claim that "[t]he failure of the NTSB to provide investigators access to all of this [witness] data in the critical early stages of the investigation was unprecedented in that it violated well established NTSB policy and customs regarding data availability. Such a denial of data has never occurred prior to or since the TWA Flight 800 investigation." This statement inaccurately implies that the NTSB actively decided to withhold information that it had in its possession from the parties to the investigation. This was not the case: neither the NTSB nor the parties had access to certain information collected by the FBI, and this was not a deliberate decision by the NTSB. Also, there have been significant instances (both before and since the TWA flight 800 investigation) in which the NTSB has been denied access to investigative information. Although most of these instances have been with state and local law enforcement agencies, there has been at least one significant issue with federal prosecutorial authorities since the TWA flight 800 investigation. Despite these instances, the NTSB feels confident that the statutory language added after the TWA flight 800 investigation regarding the NTSB's investigative priority has averted many problems.

The petitioners provide no documentation to support their claim that, within 2 weeks of the accident, the FBI was finalizing a report that concluded that a missile was likely involved. The petitioners claim that the report was based on information from hundreds of eyewitnesses. Although it is not possible for the NTSB to review the report (assuming that such a draft existed) or to determine what level of technical staff may have authored it or been involved in its review or approval, such a review is not necessary. Following the tragedy, the FBI began an investigation (parallel to the NTSB's safety investigation) to determine if the accident was the result of a criminal act, and, clearly, it subsequently suspended the criminal investigation after finding no such evidence. Although the NTSB has no insight into the FBI's report development process, any draft report from any source that may have attempted to draw definitive conclusions about the cause of the crash of TWA flight 800 based on the factual information gathered 2 weeks into the investigation would have done so without the benefit of the bulk of the NTSB's

investigative fact-finding, including the wreckage examination and various explosives and missile-scenario tests.

Claims about the purpose and accuracy of flight path simulations

The petitioners claim the following:

> In an apparent attempt to match the official crash sequence to eyewitness observations, the NTSB generated simulations of the aircraft climbing in crippled flight. However, these simulations diverge from the radar data precisely when the climb begins, indicating that no such climb occurred. There are also unexplained control surface manipulations that appear to be more an effort to make the accident aircraft climb than to factually establish the aircraft's post-explosion flight path.

The petitioners' assertions about the development and purpose of the simulations are incorrect. During the investigation, the NTSB performed simulations of the main wreckage flight path and associated trajectory studies to better understand the breakup sequence and to provide information that might aid in finding additional wreckage. A simulation uses a physics-based model that includes aerodynamics, engine thrust, and gravity to calculate the behavior of an airplane. For the portions of the flight that followed the breakup, the behavior of the airplane had to be estimated by trying to match the flight path to radar data because the flight data recorder had stopped operating. As documented in the NTSB's petition response letter (to which this document is attached), the uncertainty in the radar data is substantially larger than that assumed by the petitioners. Also, again note that at each radar installation, a different antenna and data acquisition system is used to acquire primary and secondary radar data, so there is the possibility of a discontinuity in the radar path at the time of the breakup, even for data from the same radar site. Given the actual uncertainty in the radar data, the simulation shown in the NTSB's final report provides a very good match to the data. Figures 28a through 28e in the final report provide several different cross plots showing position, altitude, and time, which allow for a thorough evaluation of the simulation.

Boeing provided estimates of the changes in the weight, weight distribution, and aerodynamic coefficients (for lift, drag, and pitching moment) that resulted from the separation of the nose section of the airplane. These parameters were used to calculate the airplane flight path after the breakup. As stated in the NTSB's final report, the simulation did not include control surface manipulations after the breakup because there were no recorded data to follow. Initial simulations allowed the airplane to move only forward and change its pitch angle and its altitude as dictated by the changing aerodynamics. At the time of the breakup, the flight was cleared to an altitude of 15,000 feet and was climbing through 13,760 feet; accordingly, the airplane was pitched up and trimmed for a climb, and the engines were set to generate a high level of thrust. Simulations were run with thrust ranging from idle to full, with little effect on the trajectory. Once the nose section broke off, the weight of the airplane decreased, so the lift generated by the wings was substantially greater than the weight of the airplane, causing it to climb at a faster rate. The center of mass of the airplane would also have shifted aft, causing the airplane to pitch up, which would increase the tendency to climb even farther. One radar study based on data from the long-range air route surveillance radar located in North Truro,

Massachusetts, includes altitude estimates and indicates that the airplane continued to climb after the breakup. The study also notes that the uncertainty for this altitude estimate is ±3,000 feet.[12]

For more detailed simulations that attempted to follow the radar data, there were still no flight control manipulations, but the simulated airplane was given a bank angle to follow the radar track; the bank angle caused the airplane to turn left or right. Bank angle was not added to make the airplane climb; banking the airplane directs some of the lift vector sideways, reducing the lift available to climb. Nevertheless, the simulations developed using the data provided by Boeing showed that the airplane would still climb. The bank angle applied was not very large until the airplane reached the apex of the climb, when the airplane simulation entered a spin as it descended rapidly to the final crash site.

The physics underlying a simulation facilitates the placement of bounds on the possible behavior of the airplane. The simulation provides guidance and a continuous curve that can be fit to the radar data while recognizing the inherent uncertainty in those data. It is inappropriate to connect the dots in a radar track and suggest that the airplane followed such an erratic, jagged path.

Although the petitioners further claim that the Central Intelligence Agency (CIA) produced an inaccurate animation without consultation from Boeing, this concern is irrelevant to the NTSB investigation. The NTSB was aware of the CIA's work but worked independently of the CIA on its simulation and animation studies. No NTSB analyses were based on any CIA simulation. All of the NTSB simulation studies were carried out in conjunction with Boeing in its role as a party to the investigation using airplane performance data provided by Boeing.

Concern that analytical reports were not required

The petitioners claim that the NTSB did not require certain investigative groups to provide analyses of their findings and request that the NTSB immediately order that these necessary analysis reports be produced. Although compiling analysis reports is a common NTSB investigative practice, the petitioners are incorrect in their assertion that protocol requires such reports; the respective group chairmen may or may not be asked to develop them during the course of an investigation. The petitioners do not specify which analyses in the NTSB's final report are of concern; therefore, it is not possible to provide further information about the analyses in question. Because much of the analyses in the final report are based on studies, the supporting information can be found in the studies themselves in the public docket for this accident.

Concern about the witness group chairman and NTSB Board meeting

The petitioners claim that, during the NTSB Board meeting on August 23, 2000, the witness group chairman "misrepresented the observations of important eyewitnesses, omitted

[12] For more information, see Study of Radar Data from United States Air Force's 84th Radar Evaluation Squadron (exhibit 13E), which is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

important details from the accounts of airborne military witnesses, and significantly understated the number of witness accounts that conflicted with the official crash sequence." The petitioners specifically reference the FBI summary document from one witness ("witness 649") and present excerpts from the NTSB interview of another witness (whom the petitioners claim provided "expert testimony" and "very compelling evidence of a missile strike") and claim that the NTSB witness group chairman failed to fully inform the Board members of the contents of these documents.

To address the petitioners' concerns, it is important to discuss the reasons for and the functions of the Board meeting, which is generally the culmination of the investigative process, at which time, the Board members convene formally as a group. Unlike an investigative hearing, which is an investigative tool used to gain more factual information during an ongoing investigation,[13] an NTSB Board meeting is the formal presentation of what the investigation has revealed. Contrary to the petitioners' claim, the Board meeting presents no "testimony." The staff's presentation of the draft accident investigation report at the meeting is not expected to be a detailed repetition of what is contained in the draft report or public docket. Both the draft accident investigation report and the contents of the public docket are made available to the Board members weeks in advance of the Board meeting, and each Board member can meet individually with staff during the weeks before the meeting to discuss any issues or concerns. Therefore, the Board meeting presentations are intended to summarize some of the key issues contained in the draft report to facilitate the Board's deliberation on the draft report in open session. Following the discussions and deliberation, the Board members vote on the acceptance of the accident report, including the findings, the determination of the probable cause or causes of the accident, and the issuance of safety recommendations.

The petitioners claim that the witness group chairman incorrectly stated that witness 649's horizontal view of the accident was limited to just a few degrees between "two flagpoles" and that the group chairman used this incorrect information to conclude that the witness could not have seen the initiating event. The petitioners claim that witness 649 referenced only a "telephone pole" and "never cited an adjacent telephone pole as a limit of his observations nor did he describe any significant visual obstructions." A review of the witness group docket items found a drawing made by the FBI when its agents accompanied witness 649 to his viewing area, and he reenacted the events. In the drawing are two symbols, each labeled "telephone pole," with a bracket between them and the writing, "what happened between telephone poles."[14] During the Board meeting, the witness group chairman stated that witness 649 "provided some fixed reference points, two flag poles, I believe, that could be used to bound his visual observation."[15] The group chairman's statement, "I believe," in reference to the flag poles, indicates his awareness that he may not have been correct on the type of poles. Although the witness summary

[13] An investigative hearing was held for this accident December 8–12, 1997.

[14] For more information, see page 251 of Appendix H: Documents Pertaining to Witnesses 600-699, which is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

[15] For more information, see the video tape records of the Board meeting, which are available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

does not indicate that witness 649 stated his view was obstructed, witness 649 did reenact the events he saw for the FBI, and the drawing was based on the reenactment.

The petitioners also state the following:

> [C]ritically, from witness 649's perspective, the structures were on a line of sight between 196 degrees and 209 degrees magnetic, and flight 800 lost electrical power on a bearing line of approximately 197 degrees magnetic. Clearly the witness group chairman misspoke and/or misconstrued the evidence, and witness 649's FBI file should not have been excluded from consideration.

NTSB docket materials document that "the magnetic bearing to the left side of the observations indicated on [the agent's] hand held magnetic compass was 185 degrees. The magnetic bearing to the ride [right] side of the observations indicated on [the agent's] hand held magnetic compass was 187 degrees."[16] This information is not consistent with the petitioners' claims, and the petitioners provide no factual documentation for the different magnetic heading information that they propose.

With regard to the witness that the petitioners describe as "uniquely qualified to identify the type of explosion(s) that caused the crash" and "who provided very compelling evidence of a missile strike," a review of the NTSB interview transcript showed that the witness neither described himself as an expert nor reported having ever seen anything similar to what he saw on the night of the accident. The petitioners focus on select statements from this witness, failing to mention that the witness himself stated that he was recalling 20–25 years (with regard to his experience witnessing explosions) and that he stated in the interview, "I said, 'I didn't say it was a missile…I said I saw a streak of light.'" He added, "Did it look like a missile? In some respects; yes. In others, not."[17] The witness described that, unlike a missile, the streak of light he saw appeared to have a steady flight path and did not have a smoke trail.

The NTSB witness group chairman's presentation of summarized information at the TWA flight 800 Board meeting was appropriate for the scope of the meeting and consistent with the analysis presented in the final report. The FBI summary document for witness 649 and the NTSB interview transcript for the other witness were available to the Board for review in advance of the meeting; there is no evidence that any information was withheld from the Board members. The NTSB witness group chairman's statements were not testimony, and any conclusions he presented represented the collective efforts of the investigative groups (in consideration of all the investigative evidence) and were subjected to repeated rounds of internal review by investigative staff and management. At the Board meeting, when asked how it can be

[16] For more information, see page 272 of Appendix H: Documents Pertaining to Witnesses 600-699, which is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

[17] For more information, see pages 7 and 43–45 of Appendix O: Interview Transcript Maj. Frederick Meyer, which is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

determined if witness accounts are accurate, the witness group chairman stated, "the only way I know to do so is to compare what witnesses said with the physical evidence and other recorded data."[18] As stated previously, the physical evidence does not support any external explosion or missile scenario.

Concern about manner-of-death determination for victims

The petitioners claim that, because the NTSB "never met" with the Suffolk County Medical Examiner to discuss the NTSB's findings or probable cause, "the manner of death for all 230 victims is still pending." However, the petitioners are mistaken in their presumption that the respective authority of the NTSB and that of the presiding medicolegal jurisdictions (including state, county or local coroner, and medical examiner systems) overlap.

According to 49 USC 1131, the NTSB "shall investigate or have investigated…and establish the facts, circumstances, and cause or probable cause of…an aircraft accident the Board has authority to investigate… ." Death investigation and certification, however, are carried out in accordance with state law. Each state designates a process for the determination of the cause and manner of natural death (resulting from known illness or disease) and unnatural death (such as those that are unexpected or the result of intentional or unintentional injury).

Article 17-A, Section 671(1) of the *County Laws, New York Code* (which applies to the TWA flight 800 victims) states that "…[t]he coroner, or if he is not a physician duly licensed to practice medicine in this state, the coroner and a coroner's physician, together, or in counties in which the office of coroner has been abolished, the medical examiner…shall make inquiry into unnatural deaths within his county as prescribed by law." *County Laws, New York Code*, Section 677.2, further states that "[t]he report of any autopsy or other examination shall state…the cause and means or manner of death. The person performing an autopsy...shall enter upon the record the pathological appearances and findings…and append thereto the diagnosis of the cause of death and of the means or manner of death."

In short, the NTSB was responsible for determining the probable cause of the accident,[19] while the presiding medicolegal jurisdiction (in this case, the Suffolk County Medical Examiner's Office) was responsible for determining the cause and manner of death for the victims. Dr. Charles Wetli, the Suffolk County Medical Examiner at the time of the accident,

[18] For more information, see the video tape records of the Board meeting, which are available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.

[19] As part of its investigations, the NTSB receives and uses the factual information provided from the presiding medicolegal jurisdiction regarding the deaths of individuals involved in aviation accidents. During its accident investigations, the NTSB does not typically meet with a presiding medicolegal jurisdiction (or any other outside entity) to discuss analytically derived findings or the probable cause determination. Once the NTSB's investigation is completed and the final report is adopted by the Board, this information is publically released. Although outside entities do not participate in the NTSB's analysis of factual information or in its determination of probable cause, a designated party to the investigation may propose findings, probable cause, and safety recommendations to the NTSB, in accordance with 49 CFR 845.27. However, medicolegal jurisdictions are not appointed as parties to NTSB investigations because they do not provide technical expertise that would assist in the investigation.

testified at the NTSB hearing on December 8, 1997, that the manner of death for the victims would be left as pending "until the actual cause of the crash is officially determined."[20]

When the Board adopted the NTSB's final report on August 23, 2000, its determination of the probable cause of the accident became official. In accordance with the Government in the Sunshine Act, the 2-day Board meeting resulting in the adoption of the probable cause was open to the public, and the full NTSB report detailing the investigation and the probable cause is publicly available. Dr. Wetli's decision not to finalize the official manner of death before or after the NTSB released its findings is a topic that must be referred to him for clarification. The task of finalizing the death certificates for the accident victims remains solely under the authority of the Suffolk County Medical Examiner's Office.

[20] See page 220, lines 24–25, of the NTSB hearing transcript for December 8, 1997, which is available in the public docket for this accident and can be requested from the Request for Information Product page on the NTSB's website at www.ntsb.gov/investigations/dms.html, using the accident identification number DCA96MA070.