407+1 = 408 pages
75
483 TOTAL

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UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

WESTERN DIVISION

H. RAY LAHR, Plaintiff, v. NATIONAL TRANSPORTATION SAFETY BOARD, *et al.*, Defendants.	No. CV 03-08023-AHM (RZx) SECOND DECLARATION OF TERRY N. BUROKER Date: October 31, 2005 Time: 10 a.m. Judge: Hon A. Howard Matz

UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

WESTERN DIVISION

H. RAY LAHR, Plaintiff,	
v.	No. CV 03-09023-AHM(RZx)
NATIONAL TRANSPORTATION SAFETY BOARD, et al., Defendants.	

SECOND DECLARATION OF TERRY N. BUROKER
INFORMATION REVIEW OFFICER
CENTRAL INTELLIGENCE AGENCY

I, TERRY N. BUROKER, hereby declare and say:

1. I am the Information Review Officer (IRO) for the Directorate of Intelligence (DI) of the Central Intelligence Agency (CIA). My official responsibilities and authorities as IRO are described in paragraphs 1-3 of my Declaration dated

June 20, 2005, which I hereby incorporate by reference.

2. I make this Declaration in support of Defendants' Motion for Partial Summary Judgment as to the CIA. The purpose of this declaration is to supplement the CIA's interim response. It addresses additional releases and concerns raised by counsel for Plaintiff in the course of "meet-and-confer" discussions with counsel for Defendants. I make the following statements based upon my personal knowledge and upon information made available to me in my official capacity.

3. As indicated in note 5 of my June 20, 2005, declaration, the focus of the CIA inquiry on TWA Flight 800 was to determine what the eyewitnesses saw, not what caused the aircraft to explode. Based on NTSB and FBI findings, TWA 800 suffered a central fuel tank explosion, which caused the destruction of the Boeing 747.

4. Relying principally on materials furnished by the FBI, including eyewitness reports, radar tracking data and certain NTSB observations regarding the cockpit voice recorder and flight data recorder, CIA analysts were able to reconstruct the approximate flight path of TWA 800 from the instant its recordings ended until the aircraft struck the water. As part of that effort, CIA analysts concluded that just after the aircraft exploded, it pitched up abruptly and climbed from its last recorded altitude of approximately 13,800 feet to a maximum altitude of approximately 17,000 feet. This conclusion was consistent with information provided by NTSB investigators and Boeing engineers, who determined that the front third of the aircraft separated from the fuselage within four seconds after the aircraft exploded.

5. The CIA analysts further concluded that about 20 seconds after TWA 800 exploded, a fireball erupted and the aircraft went into a steep and

rapid descent, producing an increasingly visible fire trail. About 42 seconds after it exploded, the aircraft's left wing separated, releasing unburned fuel which subsequently ignited in a dramatic cascade of flames, and approximately 7 seconds later the burning debris hit the water.

6. CIA analysts concluded that the eyewitnesses did not see a missile. The eyewitness sightings of greatest concern--the ones which originally raised the possibility of a missile--took place after the aircraft exploded. CIA analysts concluded that what these eyewitnesses saw was the Boeing 747 in various stages of crippled flight. This conclusion was incorporated into a video produced by the CIA and shown to the public by the FBI on November 18, 1997. CIA subsequently obtained additional data from the NTSB and continued to refine its analysis. However, since the CIA's conclusion--that the eyewitnesses saw the

burning aircraft and not a missile--remained unchanged, a final report was not issued.

7. Certain of the records responsive to the Plaintiff's October 8, 2003, request under the Freedom of Information Act (FOIA), 5 U.S.C. § 552, are records created by federal agencies other than the CIA. The CIA referred these records to the originating agencies for review and direct response to Plaintiff. One document, consisting of 124 pages and containing eyewitness observations of the explosion of TWA 800, was recently returned by the FBI to the CIA for response to the Plaintiff. This document is addressed in paragraph 18.

8. The CIA has responded to Plaintiff's FOIA request by releasing some records in their entirety, denying some records in their entirety, and releasing some records in part with portions withheld under FOIA Exemptions (b)(3), (b)(4), (b)(5), (b)(6), and (b)(7)(C). A true and correct copy of the records withheld in part, as released

to the Plaintiff, is attached hereto as Exhibit A. For purposes of clarity, these records bear the following identification numbers:

MORI Doc. ID No.	Doc. Index (DI) No.	DI Page No.
1176341	1147307	41
1176342	1147315	42
1176343	1147318	43
1176344	1147334	44
1176345	1147335	45
1176347	1147336	46
1176348	1147338	47
1176349	1147340	48
1176350	1147342	49
1176351	1147348	50
1176352	1147324	51
1176353	1147339	52
1176354	1147341	53
1175601	1080902	54
1175603	1080903	55
1215200	1215200	60
1215201	1215201	61
1215202	1215202	62
1215016	1215016	64
1215018	1215013	66
1215014	1215014	67
1215016	1215015	68
1215017	1215017	69
1215018	1215018	70
1232319	1232319	16 (2nd Bur. Decl.)

1232320	1232320	17 (2nd Bur. Decl.)

9. The CIA has withheld the names of CIA personnel pursuant to Exemption (b)(3). *See* Buroker Decl., June 20, 2005, ¶¶ 27-28. I understand that Plaintiff claims that the CIA cannot withhold the name of an individual identified as a CIA analyst in a December 5, 2003, *Washington Times* article. According to the article, "CIA recently declassified a once-secret report on eyewitnesses to the crash of TWA Flight 800". The article states that "the CIA analyst ... won an intelligence medal for his work on the crash." Bill Gertz and Rowan Scarborough, Inside the Ring, *Wash. Times*, Dec. 5, 2003, at A6. Even if the individual whose name appears in the newspaper article and whose name reportedly appears in the "once-secret" report may be among the CIA personnel whose names are withheld from responsive documents, the "once-secret" report is not among

the documents that are responsive to Plaintiff's request and the CIA is not precluded from withholding the name from different documents that are responsive to the request, if the name appears therein. Of all the responsive documents from which the CIA has withheld the names of CIA personnel, none of these documents have been previously released to the public. Consequently, the association of any of these CIA personnel with the specific information contained in the responsive documents has not been officially disclosed.

10. The CIA has withheld an intelligence method from Doc. Index Nos. 1147307, 1147324, 1147336, and 117340, not an "intelligence source and/or method." *See* Doc. Index at 41, 46, 48, 51. The intelligence method was not involved in that portion of the analysis relating to "the flight path climb conclusion" which is the subject of Plaintiff's request.

11. The "CIA organizational data" that the CIA has withheld from Doc. Index No. 1147334 is the acronym of a CIA component, "not filing. instructions of CIA internal components." *See* Buroker Decl. ¶ 31. The withholding from page 3 of Doc. Index 1147334 marked "(b)(3)" should also be marked "(b)(5)." Doc. Index No. 1147334 is a set of multiple analyst notes bearing the dates December 2-4, 1997, not merely the date December 4, 1997. *See* Doc. Index at 44.

12. The name of a "CIA employee/contractor" that the CIA has withheld from Doc. No. 1147338 is the name of an individual, not that of an entity. *See* Doc. Index at 47.

13. The "third party information (name and email address)" that the CIA has withheld from Doc. Index No. 1147340 is the name of an individual employed by a private company. *See* Doc. Index at 48. The assertion of Exemption 7(C) as to Doc. Index No. 1147340 should be disregarded. *See id.*

14. The Boeing employee whose name and telephone number has been withheld from Doc. Index No. 1215200 is the same Boeing employee whose name, facsimile number, and telephone number has been withheld from Doc. Index No. 1215013. *See* Doc. at 60, 66.

15. The "third party names and/or personal identifying information" withheld from Doc. Index No. 1215014 identified FBI personnel as well as eyewitnesses.

16. Doc. Index No. 1215197 has been withheld in its entirety, not withheld in part. *See* Doc. Index at 59. This document is a CIA analyst's handwritten notes containing intra-agency and inter-agency deliberations with NTSB, including the analyst's preliminary assessment, comments, and notations regarding select radar tracking data provided by NTSB.

17. Doc. Index No. 1215196 is 22 pages of

graphs and charts prepared by CIA analyst(s) containing intra-agency and inter-agency deliberations with NTSB, including analyst's selection of variables, assumptions, calculations, and graphical representations regarding analyst's preliminary analysis of radar tracking data provided by NTSB. *See* Doc. Index at 58.

18. Two documents, which also have been reviewed by the FBI, are released in part herewith (MORI Doc. ID No. 1232319 and 1232320). Information was redacted from these documents by both the CIA and FBI. The withheld information is the names of CIA personnel, an FBI special agent (No. 123319), and eyewitnesses (No. 123320). Attached are Document Disposition Index entries which further describe the documents and identify exemptions claimed.

* * * *

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed this 15th day of August, 2005.

Terry N. Buroker
Information Review Officer
Directorate of Intelligence
Central Intelligence Agency

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DOCUMENT INDEX

LAHR VAUGHN INDEX

FOIA/PA Request No.: ● F-2004-00078

Document Number: 1232319

Date of Document: UNDATED

Document Type: Memo

Classification: Unclassified

From/To:

Subject: Review of FBI Agent's Critique of CIA's TWA Flight 800 Analysis

Document Pages: 4

FOIA Exemptions:

- ☐ (b) (1)
- ☐ (b) (2)
- ☒ (b) (3)
- ☐ (b) (4)
- ☐ (b) (5)
- ☒ (b) (6)
- ☒ (b) (7) (c)
- ☐ (b) (7) (d)
- ☐ (b) (7) (e)
- ☐ (b) (7) (f)

Privacy Act Exemptions:

- ☐ (d) (5)
- ☐ (j) (1)
- ☐ (j) (2)
- ☐ (k) (1)
- ☐ (k) (2)
- ☐ (k) (5)

Disposition:

- ○ Denied in Full
- ● Partial Release
- ○ Released in Full
- ○ Referred to Third Agency

Document Description: Assessment of and comments addressing FBI employee's concerns and issues with specific aspects of CIA Flight 800 analysis. Information withheld: names of CIA employees and FBI special agent.

Case Number: CV 03-08023
Judge's Initials: AHM

LAHR VAUGHN INDEX

FOIA/PA Request No.: ● F-2004-00078

Document Number: 1232320

Date of Document: UNDATED

Document Type: Eyewitness Report

Classification: Unclassified

From/To:

Subject: Eyewitness accounts/reports.

Document Pages: 124

FOIA Exemptions:

- ☐ (b) (1)
- ☐ (b) (2)
- ☐ (b) (3)
- ☐ (b) (4)
- ☐ (b) (5)
- ☒ (b) (6)
- ☒ (b) (7) (c)
- ☐ (b) (7) (d)
- ☐ (b) (7) (e)
- ☐ (b) (7) (f)

Privacy Act Exemptions:

- ☐ (d) (5)
- ☐ (j) (1)
- ☐ (j) (2)
- ☐ (k) (1)
- ☐ (k) (2)
- ☐ (k) (5)

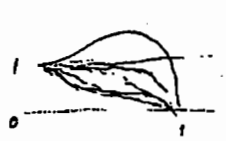
Disposition:

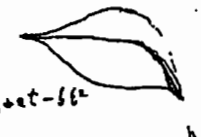
- ○ Denied in Full
- ● Partial Release
- ○ Released in Full
- ○ Referred to Third Agency

Document Description: Contains eyewitness accounts of the destruction of TWA Flight 800, including location, observations, and analysis regarding distance and direction of respective eyewitness at the time of the explosion and elapsed time for initial sound to reach the witness. Information redacted: names and initials of eyewitnesses.

Case Number: CV 03-08023
Judge's Initials: AHM

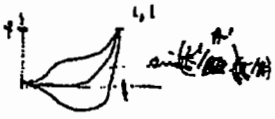
EXHIBIT A





9 Jan 98 RedTeam

1. Overview
   - Suggest joint DoD/IC report to Hill (b) (3)
   - Hill asked study on [redacted]
   - 3 areas C4I, aero systems, anti-SOI
2. MM Paper (b) (3) [redacted]
   - PN- imbalance bad countermeasure
3. C&C paper - [redacted] (b) (3)
   - Team - [redacted] (b) (3)
   - Goal - 1Q98
   - 9 investigations Search D/L, Nuclear, Nuclear C3
     Metrics study
4. BW Team
5. Have briefed several plans
   Will brief Hill soon
   Ques - how will this be untemplated?



22 Dec 97

1. Print Latest FORTS/9
   Plot - Lotus, Lotz, Fortst-4

$2.60 = a + b(24.2) + c\ 24.2^2$

$$A = \begin{bmatrix} 1 & -24.2 & 24.2^2 \\ 1 & -19.5 & 19.5^2 \\ 1 & -14.8 & 14.8^2 \\ 1 & -10.1 & 10.1^2 \\ 1 & -5.4 & 5.4^2 \\ 1 & 0 & 0 \end{bmatrix} \qquad R = \begin{bmatrix} 2.60 \\ 2.09 \\ 1.56 \\ 1.14 \\ 0.64 \\ 0.03 \end{bmatrix}$$

V_i	a
391	4
406	19
321	22
393	4
426	33
777	39

$$A^TA = \begin{bmatrix} 6 & \Sigma t & \Sigma t^2 \\ \Sigma t & \Sigma t^2 & \Sigma t^3 \\ \Sigma t^2 & \Sigma t^4 & \Sigma t^4 \end{bmatrix}$$

for linear

$\Sigma t = -74.0 / \Sigma t^2 = 1316.1 / \Sigma r = -8.03 / \Sigma rt = 141.733$

$$A^TA = \begin{bmatrix} 6.0 & -74.0 \\ -74.0 & 1316.1 \end{bmatrix} \quad A^TA^{-1} = \begin{bmatrix} 1316.1 & 74.0 \\ 74.0 & 6.0 \end{bmatrix} \begin{bmatrix} .5437^{04} & .0306^{571} \\ .0306^{571} & .00248^{28} \end{bmatrix}$$

$6.0 \times 1316.1 - 74.0^2 = 2420.6$

$-0.365\ 9.33$

$$[A^TA]^{-1}A^TR = \begin{bmatrix} .5437 & .0306 \\ .0306 & .00248 \end{bmatrix} \begin{bmatrix} -8.03 \\ 141.733 \end{bmatrix} = \begin{bmatrix} .05 \\ .1058 \end{bmatrix}$$

$\hookrightarrow 380.1$

Comp = -.03/-.60/-1.10/-1.60/-2.09/2.59

r = .03/-.04/.04/-.04/0/.01

rms = .031 nm

$9+16\times3+1 = 58/6 = 9.66$

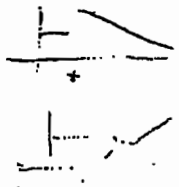
$\sigma_a = .73[\times.04) = .02 \quad \sigma_b = .038 \times .03 = .0015$

$\hookrightarrow 5.6$

3. NTSB#s Bernie [redacted] (secretary) (b)(6)

Questions

1. Speed of AC before explosion
2. Location of AC at time of explosion (data to input)
3. What can be said about the speed of the AC after the explosion - did it slow down, continue ~~to~~ on or did it speed up; ~~did it~~ slow down then speed up then slow down again? ~~first~~ then slow down
4. Did the flight path return to more the Constant azimuth or did it drift out of plane How to input
5. ~~Can~~ Do the data indicate whether the AC rose after the explosion?
6. How long from explosion to impact

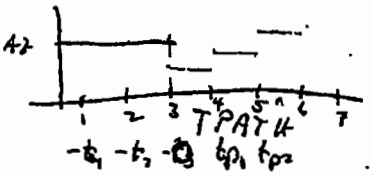


3 Alt tuck two

C1	-24.2	12.9	2.0	1.3
C2	-19.5	13.4	F.x	0
C3	-14.8	7.0	7.1	4.8
C4	-10.1	16.3	5.1	3.4
C5	-5.4	15.9	5.5	3.7
C6	0	14.4	6.7	4.5
C7	4.0	18.4	3.6	2.4
C8	8.7	17.0	3.6	2.4
C9	13.4	22.1	4.4	2.9
T0	18.1	15.4	2.5	1.7

4. Try two yaw rates

AZFPD2 , ~~AZFPD1~~ (APARAM61)



IF(TPATH(I). GE. 13.0 13.5)

AZFP = AZFP0 + AZFPD(2) * TP * COR

Solve code? RMS → .240

AZ0 = 30.1 / AZFP1 = 1.2 / AZFP2 = -.09

Redo - use quad - replace azfp1 b/c 13.0

*

Comb AZFP0 = AZFPN + solve quad

RMS → .625 → 90°

Quad to 30 sec RMS → .664 try other AZ

" " 35 sec RMS → .6635

Review

1. Calculation overspeed before explosion from range points — 380 ± 6 nm/hr
2. List of questions in possible writeup
3. Printout another "output" purchase
   - abrupt yaw at t=0, yaw rate after
   - some editing of 3D points
4. Tried more yaw models. Just was constant of AZFP0 to AZFPN, solve quadratic term to 35 sec, const Δz thereafter. See plot

~~UNCLASSIFIED~~

NOTE FOR: [redacted] (b) (3)

FROM:
DATE: 02-12-97 10:38:04 AM
SUBJECT: TWA800 Witness Questions

[redacted] here are some questions that should be put to the witnesses in some form or other. (b) (3)

(b) (6)
(b) (7) (c) 3) [redacted] - Direction that flare went... when witness says flare 'initiated from East' does this mean it was East of here or went East to West?

5) [redacted] - Timing and position of fireball... the end fireball should be seperated from the apex location by 4.6 degrees (b) (6) (b) (7) (c)

(b) (6)
(b) (7) (c) 6) [redacted] - Timing between initial observation and cascade of red/orange light

7) [redacted] - Which direction was 'smaller' aircraft traveling? Was aircraft coming 'from NE' traveling in NE direction? WHat elevation were each of the objects (high/low)? relative to each other? (b) (6) (b) (7) (c)

(b) (6)
(b) (7) (c) 8) [redacted] - How high up did flare start? Water level or in sky?

34) [redacted] determine direction of objects arch? (b) (6) (b) (7) (c)

(b) (6)
(b) (7) (c) 37) [redacted] - better description of objects, directions and size of events. (make a diagram?)

44) [redacted] - When witness claims 'flare ascending in the SE direction' does this mean in flare originated to SE or moved SE to NW? (b) (6) (b) (7) (c)

(b) (6)
(b) (7) (c) 54) [redacted] - describe loaction and direction of object moving West to East and its location relative to the explosion.

The following witnesses all report seeing an object rise and hit the aircraft. It is important that the witness report actually seeing the aircraft before the object hit it. It is possible that the plane moved upward trailing a small smoke trail, pitched over, and then suffered two more explosions. These explosions could be mistaken for the object striking an 'aircraft', which then proceeded down. If the witness saw an aircraft before the 'collision' then it is a missile. If they do not see an aircraft before the 'collision', then it could be only the aircraft.

47) [redacted] 54) [redacted] 58) [redacted] 61) [redacted] 68) [redacted] (b) (6) (b) (7) (c)
75) [redacted] 78) [redacted] 81) [redacted]

Get [redacted] drawing

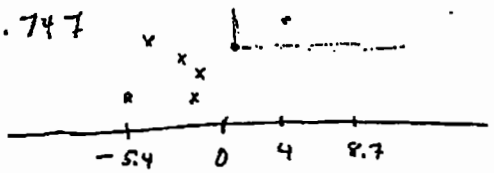
CC: (b) (6) (b) (7) (c)

APPROVED FOR RELEASE
DATE: FEB 2005

~~UNCLASSIFIED~~

4Dec 97

1. Note LSQSETUP. § has print t/f/te §
xyzsng. § has NPATHN = 0 - should be literals
No print t/f/te §
Comment o/l print
Set NPATHN = 1 / Solve R43
RMS → .747

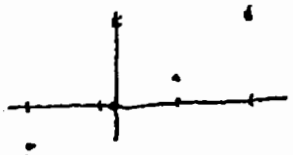


Can - include 1 negative shoe, ~~no shoe 1 neg node~~
1 neg node, no shoe 1 neg node

Try shoe neg node #31
RMS → .714
R_N = -1.2, 0, .06, .91

Try putting in all neg data
Set NOBSNT = ~~NOBSN~~ 6, 6, 5, 1,
Set NPATHN = 5 5*4.7 + 1.7 = 24.2
Shoe RP#1-5, 7-18
→ singular

Update/toler/2 history 2=0 3=4
Build 1 obs, 1 shoe (neg) (RP#1, 3-13



RMS → .747
R_N → -0.65, 0, .28, 1.13 ...
Up # obs to 6, 6, 5, 1 / Same shoe / NPATHN = 1 / R_N → -.57, .27, 1.04
Set NPATHN = 2 / Shoe 12.45, 7-14 / R_N → -.5, -1.0, .26

2

[redacted]

Shoe 5 DRS-71.13

DN → -2.71, -2.18, -1.72, -1.18, -0.65, 0.12, .91

.53 .46 .55 .52 .77

406 352 421 358 433 376

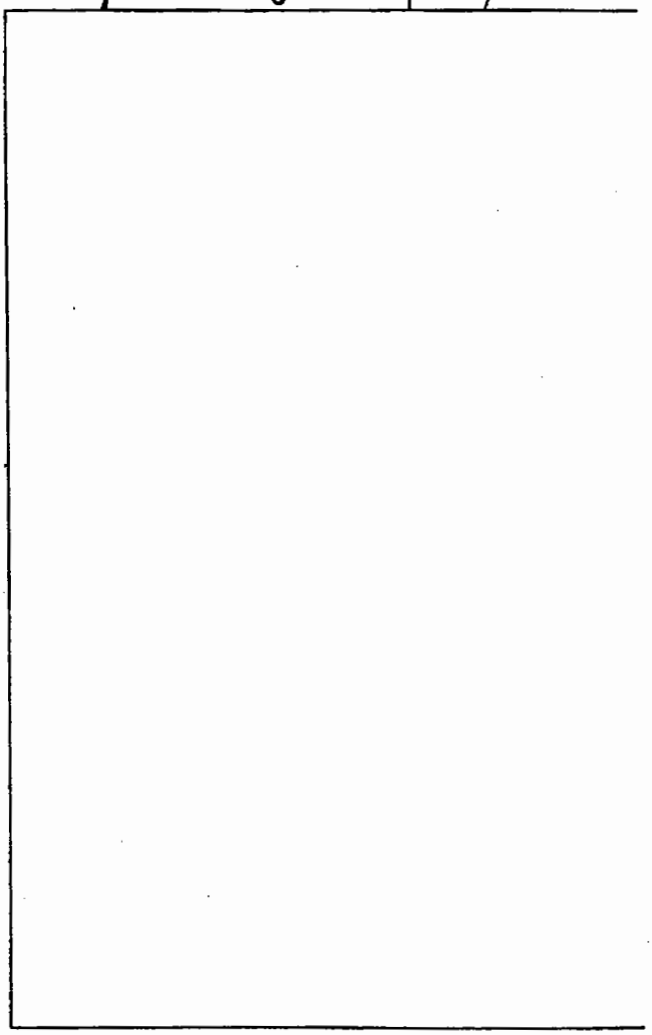
Flex hard neg / Flex hard

Reviews

1. Got prevent run to go.

~~Why did TWA the aircraft fire after it exploded?~~
TWA800 Analysis and the Science of Aerodynamics.

(b) (3)



3 Dec 97

1. Get files from Mike's dir
   ⇒ MIKE.TXT + CODE2633.CIA
   Last 8 pts end ⇒ 2633-jfk.cia
   2633-csp.cia
   2633-hpn.cia on radar.data
   Copy to output/ Fort.16, 17, 18
   For FORT.19 - dummy

9.5	14	180*(360/4096)^-1 = 2048
139.	15	170* " 1934

   Dave B 70175
   70035

2. Some dumps for negative data - No data
   Runs OK
   Putin setup & neg data w/o neg PATH
   RRS ⇒ .760 (slight blip) - (one type in old)

3. [redacted] 40.6008/72.6276 (b)(6) (b)(7)(c)

4. Put in code for neg modes
   - ~~2 R+/-(E)=0~~
   RRS ⇒ .747
   But core dump
   Bust from ZSQSETSJ

Reviews
1. Created files for neg time radar data.
2. Started dumps for neg time fit. Encountered core dump

2 Dec 97

1. Perturb dumps for pretty radar locations
~~Also re Azmuth bias~~ go to Fite2
Run - ~~trks~~ c/o altsend
Rms ⇒ .757

To plot. - remove
- 1st 2 pts in FT02
- 1st pt from FT54
- 1st pt from FTC4

Err - should be 4pts at t=0, 1pt at t=4c
[chTBias sign]

For λ1 plot, change subplot# for FT54 ⇒ 4pts
Subplot - ada/FORT.2/ cst 2,3

Files 50 = node λ1
2 = rdr λ1 at node times
9 = paper
51 = rdr λ1 at rdr times
61 = rms obs vs traj rms at rdr times

2 From FT08

t	Rms	σ			
0	0	0	32.2	2.28	.06
4.0	0.27	.06	36.9	2.42	.06
8.7	1.14	.07	41.6	2.45	.07
13.4	1.56	.07	46.3	2.55	.09
18.1	1.85	.06		2.50	.09

3. Plot range resid
   Could weed 2# to 15P vs 25
   ~~[illegible]~~

Review
1. Put in changes for printing packer loc, get node times
2. Setup support files for latlongplot + /or rngresidplot
3. Note – time bias sign diff from rng bias sign

11/26/97

1. Changes in DX - AZFP set at start of segment
   RMS → .401
2. Set SE=1 in Fix
   Range looks OK, error in A_3
   Reverse dset, neg R, in ROT neg R
   RMS → .403
   Add 4 alts RMS → .355
   Alt2 → 20kft, R_1 → .18
   Take out ALT2 RMS → .364

3. Data from O'Rourke
   Alt # 7429428
   send to [redacted] (b)(3)
   Will have correction

4. Compare bias vs mag off
   90 - AZ_n + mag_0 = $[A3_{T,M}]$ comp + bias
   comp + bias = obs
   comp = 90 - A_{ZM} + (mag + bias)
   -.27, 0.50, 0.58, -.41
   Biases = [redacted], [redacted], [redacted], [redacted]
   Mag_0 = -13 -13 -13 0
   [redacted]
   Mag_c = -[redacted], -12.85, -[redacted], [redacted]
   -13.27 -[redacted] -12.96 -12.42
   -[redacted], -[redacted], -[redacted]0, .41
   NTSP -12.5, -13.0, -12.3,
   Put NTSP's AZ biases in as 1st guess

Review
1. Tested changes for SE
2. Dot secondary data from NOR
3. Put in alt time biases.
4. Re-weight all data to 0.0625/0.2
5. Tried solve some alts. Could solve ALT 6.

5. Put in -.25 TB for 3 radars
   RMS → 3.79
   Change TB_4 → 2.5, RMS → 3.86
   [Where 2.8 from?]

6. Solve ALT 3-8
   - Judge A's, count
   Solve Alt 3-6
   Alt 6 → -27000 / -29000 ± 70000 (×4)

7. NOR data
   make.txt
   2633-HPN.CIA / 2633-ISP.CIA / 2633-JFK.CIA
   code 2633, CIA

8. Post XP
   HPN 9.69 53.34, 1483 (*360/4096) [= 130.34]
   Fort Drum 14.64 53.609, 129.53
   ISP 11.27 21.35 1445 (.08789) [=127.00]
   JFK 11.88 50.00 1161 (") [= 102.04]
   Curr RMS = 3.75
   Put in R/A data
   Wt → 0.2/0.0625, except #4
   [How?]
   Run - RMS → .412
   Set all to .0625/.2
   RMS = .72

9. Thy

24 Nov 97

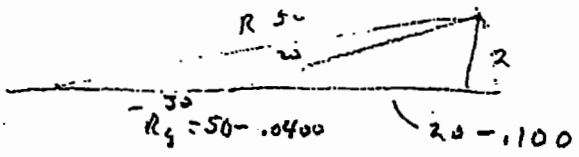
1. CP 3146569
2. Changes for prelim subs
3. W(3) → w turn rngs / W(1) .. / W(2) w tout A30,2
   Run RMS → .432. Store Post.8.1124.1048
4. Changes for DXDY subs
   [should AZFP(t) be at mode?]
   Run old code - OK [Atm speed → L13
   Run new code
   RMS → .432
   AZ0 = 45.1, AZFP0 → -1.14
5. No R Beams / solve alt2.5
   RMS → .65
   W R Beams RMS → .37
   σ_{ALL} → 5-8 kft (.4)
   [do cut this any?]
6. [No alt, 12 ranges (w 11)
   Get ROT RMS → .419
7. Changes for X2 RAZ to FE OK
8. Changes for RAH2X to FE-OK

Review

1. Try subs for (4) alts. Longer RMS w/ no R beams. Both R beams, σ → 2-4 kft.
2. Put in all changes for SE. Test subs w/ SE

11/23/47

Semi tandt



$\frac{\partial R_s}{\partial H}$

$R_s = 50$ $\quad e = 2.29$

$R_o = 20$ $\quad e = 5.$

For $H = 3$,

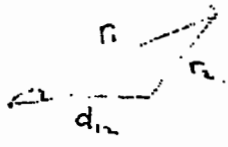
$R_s = 50 - .0100 \quad e = 3.43$

$R_s = 40 - .226 \quad e = 8.62$

For 24, 14

$r_2^2 = r_1^2 + d^2 - 2 r_1 d \cos e_1$

$\cos e_1 = \frac{r_2^2 - r_1^2 - d^2}{2 r_1 d}$



$\frac{\partial \cos e_1}{\partial r_2} = \frac{r_2}{r_1 d} = \frac{14}{22}\frac{1}{10} = .0636$

$\frac{\partial \cos e_1}{\partial r_2} = \frac{\Delta r_2}{r_1 d} = \frac{20}{50}\frac{1}{30} = \frac{.4}{30} = .0133$

$e_1 = 2.29$

$\cos e_1 = .99920$

$e_1 = 3/22 = 5.22$ R.

$\cos e_1 = .996 \quad 5.003$

$e_1 = [2.7, 6.8]$ [illegible]

$\frac{\partial \cos e_1}{\partial r_2} \Delta r_1 = .0133 * .05 = .0006$

$e_1 \to [1.14, 3.03]$

$H \to [1.0, 2.6]$

$d^2 = (r_1 \cos e_1)^2 + (r_2 \cos e_2)^2$

$r_1^2 \cos^2 e_1 = r_2^2 \cos^2 e_2 - d^2$

$\cos^2 e_1 = \frac{r_2^2 \cos^2 e_2 - d^2}{r_1^2}$

$\frac{\partial \cos e_1}{\partial r_1} = \frac{-2 r_1}{2 r_1 d} + \frac{r_2^2 - r_1^2 - d^2}{2 r_1 d}\frac{1}{r_1}$

$= -\frac{1}{d} - \cos e_1 \frac{1}{r_1}$

$= -\frac{1}{30} - \frac{1}{50} = -.0333 - .02 = -.0533$

$\sin^2 e_1 = H^2/r_1^2 \quad \sin^2 e_2 = H^2/r_2^2$

$r_1^2 \sin^2 e_1 = r_2^2 \sin^2 e_2$

$\sin^2 e_2 = r_1^2 \sin^2 e_1 / r_2^2 = 1 - \omega^2 e_2$

$\cos^2 e_1 = [r_2^2 (1 - r_1^2 \sin^2 e_1 / r_2^2) - d^2]/r_1^2 = [r_2^2/r_1^2 - \sin^2 e_1 - d^2/r_1^2$

2(Nov 97

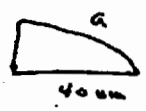
1. Run with all 4 as R/AZ
   RMS → .503
2. Split time

   $\cos a = \cos b \cos c + \sin b \sin c \cos A$

   $\cos a = \cos b \cos c$

   $= \cos 30' \cos 40' =$

   $a = .83333° = 49.9996$ min



   $30°/40° \rightarrow 48.44°$

   $= 50 - .75m$
3. Changes in AZFP$_0$ -
   Run RMS → .505°
   Show AZFPD → ~~[illegible]~~, -.27°/s
4. Changes for XOFRDR(3,5) - run OK

   RMS → .40

   .30, 1.21
   .070, .13

   .5[illegible], .5[illegible], .01, .72 | .01, .19 | .08, 1.2
   .055, .46 | .058, .17 | .048, .16

   But now can't do both FE
   doE in same run
   unless calculate w options

5. CP: 314 6569 X
6. Changes for MAGOFF RMS → .56°
   Reset all to -13 ~~RMS~~ → .40
   Changes for common subs w/o subs - RMS → .333398
7. Changes for Z_0^* (alt at least X²)
   X [no - don't know if xy is equiv to nonmonotonic]
8. Put in RCA=X

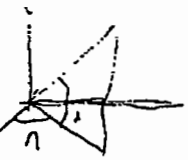
Review

1. Ran all four radars with R/AZ.
2. Put in changes for (simple) AZFP+ rate.
3. Put in other non-substantive changes

20 Nov 97

1. create ntsb.isp & RAZ
   Change in prompt & font for ISP-RAZ
   Run - PRS⇒.50
   create ntsb.lpm & RAZ
   Change in script+font

```
SUBROUTINE LLA2X (LAT, LON, ALT, XE)
IR*8 (A-H, O-Z)
DIMENSION XE(3)
REAL*8 LAT, LON
DATA RE/6440 0nc/
COR= 3.14159265D0/180.
R=RE+ALT
XE(1) = R * DCOS(LAT*COR) *DCOS(LON*COR)
XE(2) = R * DCOS(LAT*COR) *DSIN(LON*COR)
XE(3) = R * DSIN(LAT*COR)
RETURN
END
```



X2 RAZ

```
SUBROUTINE RNGAZ(X, LATo, LONo, KR, RNG, AZ)
IR*8 (A-H, O-Z)
COMMON/LOCRR/ XERDR(3,9), LATRDR(9), LONRDR(9) ---
                                  ← R*8 LATRDR(9), LONRDR(9)
DIMENSION X(3), XTMP(3), Xo(3), XTT(3), XM(3)
REAL*8 LATo, LONo
CORE 3.14159265D0/180.   ! CNMM = X/1852.
                                  ← DO 2 I=1,3
                                      XM(I) = X(I)*CNMM
CALL LLA2X(LATo, LONo, 0, Xo)
CALL ROT(X, XTMP, (90 - LATo)*COR, 1)
CALL ROT(XTMP, XTT, (270 - LONo)*COR, 3)
DO 1 I=1,3
    XT(I) = XTT(I) + Xo(I) - XERDR(I)
1 continue
CALL ROT(XT, XTT, (LONRDR(KR) + 90.)*COR), 3)
CALL ROT(XTT, XT, (LATRDR(KR) - 90.)*COR), 1)
RNG = DSQRT( XT(1)**2 + XT(2)**2 + XT(3)**2) / CNMM
AZ = DATAN2(XT(2), XT(1))/COR
RETURN
END
```

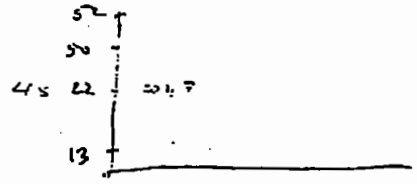
Diff from t3t to P0 CS

19 Nov 97

1. Look at bias search - 1X
   $\partial R_I / \partial B_{AZ1}$ = -1770 ?
   $\partial R_I / \partial B_{AZ2}$ = -1770
   F-up

2. Full search - RMS → .55
   Add $B_{JFK,R}$ → .54
   Note B_R = .07, -.31, -.33, -.30
   Remove $B_{R,RHO}$
   RMS → .68
   Subsequently B_{RSFK} RMS → .78

3. Range plots
   Plot plot histogram by
   25+42



Multi Flt pair format?

4. Create
   ntsb.jfk
   change script for jfk only
   RMS → .639 (vs .545
   - Note P_0 now decoupled
   If test P_0 (JFK) → RMS → .507
   Current input files - JFK - RAZ, ISP - XY rel ISP, HPN - YY rel ISP,
   RHO - RAZ (mag or true?)

Review
- Fixed error in bias partial calculation

18/Oct 97

1. ~~Range to RHO~~

Run w/ std RHO data

- not - best fit/Monster - change

RMS → 1.03

Put in solve run, bias, JFK

Dia - best 1.38

Do solve RBias JFK

TBias(4) = -2.8

RMS → .94

Solve TB.4 = code 54 → -3.8/+37

2. Range to RHO

t	t-2.8	R-obs
21.4	18.6	13.75
33.3	30.5	13.27
45.2	42.4	13.13
57.1	54.3	13.25

Rbet -

4.7
3.25

3. Get files from Colette to radar.data

Read Colette to

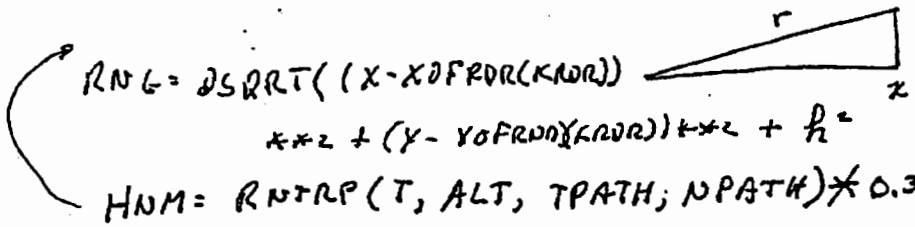
NTSB, etc

4. Further edits for AM plots - feb 50; 51, 52, 53, 54

Run w/o twin bias search

- XY scale
- reverse t (ms)
- Colette

5. Act adjustment



RRS→.73

Update

1. 40.6401/2.72.6711/3. 30.703
32.0.395/33. 4097/1.513/1.425/1.962/2.097/2.298/2.437/2.411/
2.654/2.636

RRS→.719

Schuchinsky

RRS→1.5 ?

Review

1. Run program with RHD data
   Tried range bias on all radars - diverged
   Put in time bias for RHD. Tried other - diverged
   (put wrong sign)
2. Put files (RAZ) from NTSB on TAZ
3. First attempt at pCat
4. Put in alt correction
5. Tried other biases only - still problem

17 Nov 47

1. All changes for general speed runs
(Note output field code 5 and)
↳ BASER not defined?
[do not use secondaries]
[LB - data continues]

2. Riverhead data R/AZ
From NVYALL1.CSV → file NVY44.~~CSV~~DAT

21.4	13.75	175.25
33.3	13.25	170.33
45.2	13.13	168.84
57.1	13.25	168.05
69.0	13.25	168.31

Make code changes for 4th radar
" script " " "
For input (1sq.inp),
Select R/A bias
Need to convert name of mtn DAs

Review
1. Made all changes for 3 radars [illegible]
2. Typed in input file for RHD (AZ/R)
3. TBD
- Review/get secondary data from NOR
- Plot range for RHD

(b) (6)

14/Nov 97

1. Charles P - Drug B [redacted]

Principles AE, R
HPN, JFK, ISP
2 men - 5 since

@ DDDZ
in NY transmitted
R/A JFK
+ guard book
+ text -

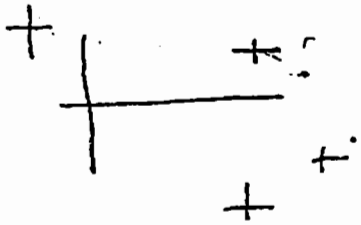
Review

1. Telcon with CP. Herold send A/R date for 3 rackets.

11/13/97

1. Put in changes for REF

2. HPN Data from CP xy rel ISP
SEN3.xyz



Pick out main offset
~~2, 3, 5, 12, 17, 18, 20~~
1 2 4 11 16, 17, 15

Check last XP from HPN
MO' → 46.93, -25.30 (r=53.315)
CP → 18.89, -16.14
ck file upst
temp print N, Y rel hpn for pt #1
to 9.94, 46.0006, -27.1693 = 53.42
→ wrong pt - no secondary
Back to MO's - but dont

Run
—
Take out HPN # 16 from Main

Reruns
1. Put in changes for general XY ref.
2. Put in HPN secondary data from CP. Doesn't have last transponder. Kept in MO'Rs last transponder, but downgraded because it is different ref from CP's

12 Nov 92

1. Make changes for HPN data no dbs
   Put in +to pts, 3 dbase bases

✓ 2. From CP got More HPN Primaris (up to ISP) / need R/A
   Dot progs to convert R/A to XY
   For R/A → ROTATET.for → XY, used zero alt
   For LL → LATSW91 → XY, used zero alt
   Note: center data will prob use closest (Riverhead)
   Dot locations of
   0 = RP43 = ZNYC = TREVOS = 40 08 03.40, 74 55 11.91 200'
   1 = RP44 = ZBWH = Riverhead = 40 52 47.8785, 72 41 15.6878 260'
   2 = RP47 = ZBWI = N. Truro = 42 02 02.40, 70 03 11.10 162'
✓ May need to adjust times.
■ ~~Dot~~
3. Make changes for data type #s — same — OK
4. Try plot run → rng res. 3pt. inp
X killed system

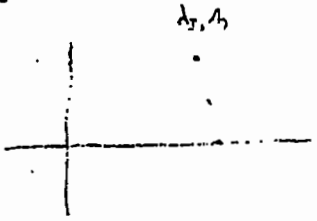
Review
1. Some changes to progs. Put in HPN data (from O'R)
2. Meet with Charlie
   - Dot more HPN (xy) data - need R/A
   - Dot locations of 3 Rad radars
   - Need to check time bases
3. Try plot system - debug work

10 Nov 87

1. Questions for DC, CD
   + ~~from~~ apparent beam-wave radar data behind rows; discuss
   + use of alt in convert r, az to x y for primaries only ✓
   + loc radars ✓
2. From radar files
   + need radar locs ✓
   + compare RT-N with DYCIRE.CSV - yes but not diff
   - get data - if any - from NVYALL.CSV
   - check transformation
   - note CP time diff

10/20/97

1. Run xyz rng. & with cos λ vs cos d_J
   NC RMS → 1.09
   Quest Δ_J obs → .4/.2
   RMS → .91 → worse



Put in Range bias - ISP
RMS → .50 (NC)

? Rev TBD
- Prog
  - more subs ✓ clean code
  - generalize to ref origin ✓✓ test
  + better code for To ✓
  - Rev all Ltbs inputs ✓✓ randoms ✓
  - More data - KPN/Center?/RH ✓
  - Print Δ_J, Δ_λ all pts/plot ✓
  - Use FAA code for X/form. or sphere
  + Ques re alt used for primaries - CP no
  - Try FAA code & compare to filt each
  + Print ✓ Label Chukiri data ✓
  - Ch OSP data
  - Pos bridge/primaries
  - Rev Sds
  - Better plots
  + Write notes - SR ✓

Views for CP for Wed
- alt ...

3. From CP's desk,
NVYPRI~1.XY → RP43PRI.XY
Print BOS_97LL.CSV, BOS_97.CSV, NY_97, NRDALL.,
NRD43., BOSPRI97., BOSPRI, NYCPRI, NYCPRI2., NYYALL1.,
RP43PRI.,

4. ISPTRF
27/40 vs 32/1.7

Review
1. Corrected syntax code for longitude → x using cos. Fit was worse. Downgrade ave obs to 0.4. Put in code for range bins for ISP. 5000 ft.
2. More rearrangement / subroutines

11/8/57

DOST

XXX = (90 - λ)/2

XX = tan[(90 - λ)/2]

SINDP = sin λ

COSDP = cos λ

YY = 1

TDP = XX = tan[(90-λ)/2]

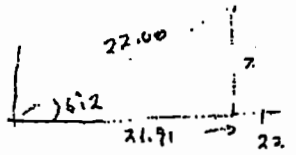
$\rho = r_a * F * [\tan[(90-\lambda)/2]]^{XN}$

THETADP = XN * (Λ - Λ₀)

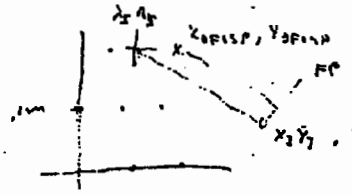
X = ρ sin (XN*(Λ-Λ₀))

Y = ρ₀ - ρ cos (XN(Λ-Λ₀))

!! with given λ, will put X_{FP} out / either



Ques



mm/long diff at higher d

For JFK vs ISP, 40.6362 vs 40.7940

11.1.1d0 3000S

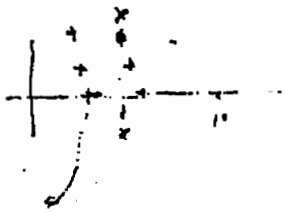
XOFISP (λ_{JFK}) = Δλ * 60 * cos λ_J

= (73.7769 - 73.7001) * 60 * .7589

= ~~52.7721~~ 30.362

XOFISP (λ_{ISP}) = (73.7769 - 73.1001) * 60 * .7571

= ~~52.846~~ 30.290



ΔX = 30.363 - 30.290 = ~~52.846 - 52.721~~

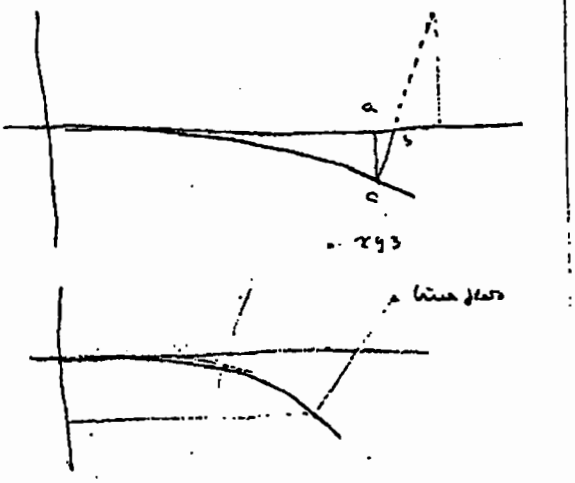
= .0727 nm = 437'

~~.125 nm = 760'~~

X → Lon use Rectpl + VV.

11/8/57

For zero alt, is X = a or b or c (PL)?



If X_G is PL to subsatellite,

In XY program,

Let $RA = RB = RE$

$E_2 = 0 \;/\; E = 0$

$XM_1 = \cos\lambda_1 \quad XM_2 = \cos\lambda_2$

$XXX_1 = (\varphi_0 - \lambda_1)/2$ rad

$XX_1 = \tan[(\varphi_0 - \lambda)/2]$

$YY_1 = 1$

$\Gamma_1 = XX_1 = \tan[(\varphi_0 - \lambda_1)/2]$

$$XN = [\ln(\cos\lambda_1) - \ln(\cos\lambda_2)] / [\ln(\tan[(\varphi_0 - \lambda_1)/2]) - \ln(\tan[(\varphi_0 - \lambda_2)/2])]$$

$$F = \cos\lambda_1 / (XN * \tan[(\varphi_0 - \lambda_1)/2]^{XN})$$

$$\rho_0 = r_a \frac{\cos\lambda_1}{XN * [\tan(\varphi_0 - \lambda_1)/2]^{XN}} \tan[(\varphi_0 - \lambda_0)/2]^{XN}$$

$$= r_a \cos\lambda_1 \frac{[\tan(\varphi_0 - \lambda_0)/2]^{XN}}{[\tan(\varphi_0 - \lambda_1)/2]^{XN}} \quad \frac{\ln[\tan(\varphi_0 - \lambda_1)/2] - \ln(\tan[(\varphi_0 - \lambda_2)/2])}{\ln(\tan[(\varphi_0 - \lambda_1)/2]) - \ln(\cos\lambda_1}$$

~~$= r_a \cos\lambda_1 e^{[\ln(\cos\lambda_1) - \ln(\cos\lambda_2)]}$~~

Review

1. XY may be ground distance
2. Count them OW's program for e.g. Little insight. Try to run?
3. Still quest- were attempts to calc $\Delta\Lambda$ of radar pts.
4. For ref to quest 6c, x of other headlines should have left of that pt. Need to do more progs

11/2/57

1. ryerson-f

$t = 4.4$, $x_0 = 0$, $y_0 = 0.5$, $\gamma = 2$, α

$\lambda_0 = 3.067$, $\Lambda_0 = 3.284$, $\lambda_J = 40.64$, $\Lambda_J = 73.77$

Obs type 3 = 50.43003

First Cut

$\Lambda = .58, .97, 2.1, 2.2, 2.4, 2.75, 2.75, 2.82, 2.87, 2.97, 3.12$

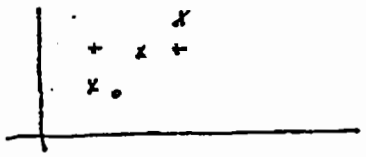
$\lambda_0 = 40.6428$ $A_0 = 72.6841$

2. Output

Print lat, lon - computed stat ✓

Print lat, lon of obs pt (max) ✓

Print lat, lon of all pts (?)



	obs	comp		obs	comp	
3. pts 3+4	50.67	50.585	-.115	22.01	22.16	-.180
result 5	50.25	50.243	.007	22.26	22.39	-.131
	50.50	50.4575	.042	22.42	22.55	-.131

Try nodes at $t = 0, 4, 8.7, \cdots$

Review

1. Not fit to work. Put in [illegible]/in "output." Plotted range from P_0; noted lines skip dump from pt 2 to pt 3. Why?

6 Nov 97

1. Put in code for LSQ fit
2. Trial - solve ATFP
   Let loc input
   From RT Plots 40.6632, 72.6238, t = 49

3. Initial location: ~~relegated~~
   Charlie: ISP → 19.60E, -8.65S rel ISP at 12.26
   [= last XP; adjust time?, any rotation?]
   Pilot: ISP – 19.50E -8.68S rel ISP at 11.27
   [~~Any diff coast~~?]

4. Dennis 202 314 65CY
   Charlie " " 6569

   " -W hour check
   - last ISP XP?

5. Is Charlie last XY as input?
   Δ pos = 0.1 nm @ lon, 0.03 nm lat
   = 607.6', 182' → rms = 634 ft (w/ sec)
   From Lee's, ~ 400 ~~kts~~ kt = 675 ft/s

   Check loc
   λ = λ_ISP – 8.65/60 = 40.7940 – .1442 = 40.6498 (vs CP = 40.6481) 649
   Λ = Λ_ISP – 19.60/60/cos λ = 73.1001 – .4309 = 72.6692 (" 72.6704) 670; 5471
   For last XP
   λ = λ_ISP – 8.68/60 = 40.7940 – .1446 = 40.6493
   Λ = Λ_ISP – 19.50/60/cos 40.71 = 73.1001 – .4287 = 72.6714

   Check for alt? corr for X

BOS-97LL.CSV — 3 radars R,V, NTAP proj; Hd, PA, Lat, Acad Trans MA

lat, lon alt, H, M, S, Lat, Lon

BOS-97

H, M, S, X, Y (rel WSP), MS alt/100, ISIO alt±00 → radar time; time → L; −1.25, −1.50 → used

radar time clock/process

NY-97 XY

(no alert lat, lon) Δ = 2.25

Det/Trans Data ~ same

NRDALL Radar − ~~Sept~~ Sampling − same 3 radars

RP43 − Trans PA, 44 − Riverh/47 Bradt

All times

NRD44 − strip out

HMS, code, rng, azimuth, alt/100, sweep#, time, NRD+75 sec

0 = 12RP43 Trans

1 = RH

2 = NT

col MSL alt adj, ±50'

BOSPRI97.LAT

Alt, H, M, S, λ°, λ',

BOS PRI2.XY converted to XY

H, M, S, X, Y, Alt, sec, corrected time (−1.25)

NYC PRI.ESO

Alt, H, M, S, λ°, λ', tot time

PRI2.XY

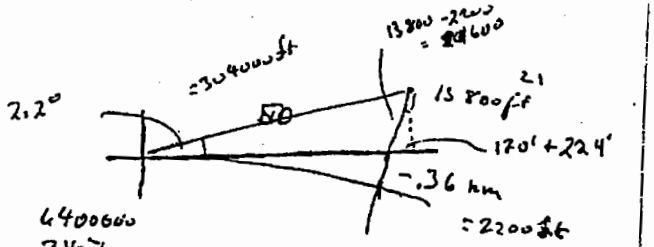
NVYALL1.CSU
HMS, alt, Rng, Az,
RP44PRI.XY
HMS, X, Y, t, t-correct
-26 sec
delta → BC time

RP44PRI
HMS, X, Y, t, # source, t-2.6

In what's above
All - must subtract from time to get BC time
BC 12.00
octa 13.25

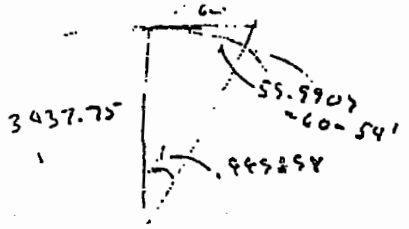
Review
1. Working on LSQ fit
2. Looked at inertial location. Charlie extrapolated doesn't appear to be consistent with what he gave us 1+1 at on 6/4. Need to check with Prime
3. Discuss with Charlie P. re files - need to print + label
4. Was alt used in conversion from Δ1 to XY
Was alt used to give Δ1 for printouts?

11/5/57



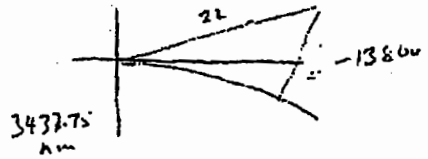
For zero elev, rng = 60,
X (Alt E) pos give 60 54' too/in
for rng = 50nm, alt at zero° = 2200 ft

For elev = 2.2°,
FE pos given are 170' too/on
+220
390'



60 nm + 54' = 1deg

For 22 nm,



1 deg = 60 nm

$$\frac{\sin \alpha_c}{22\text{nm}} = \frac{\sin(90 + \xi_e)}{3437.75\text{ nm} + 13800'}$$

$$d^2 = r_0^2 + r^2 - 2 r_0 r \cos \alpha_c$$

$$\cos \alpha_c = (r_0^2 + r^2 - d^2)/2/r_0/r$$

$= .364557°$ [slow c]

equiv → 21.675 nm

⇒ give pos 0.125 nm too long = 758'

$$\cos \alpha_c = \left(\frac{r_0}{r} + \frac{r}{r_0} - \frac{d}{r_0}\frac{d}{r}\right)/2$$

alt = 27 nm

d = 50, α_c = .832264

*60 = 49.935 = 50 - 3'90'

d = 22 α_c = .364750

*60 = 21.885 = 22 - 1'48'

alt = 0

Elev = 0
alt = .36 nm
50 - 21'

22.00

alt = 430'/.09
21.9998
= 22 - 1'

Review
1. Equations for correction for non Flat Earth + altitude

4/30/97 Brief NTSB

Question: Bernie: Anyone actually saw plane on fire
[Look at [redacted] data]

Have radar from 9 sites (b) (3)
Fire damage to rt wing
How many saw plane on way up -
- PP - prob ~6
Whether to use NTSB numbers?
Heading → ground track
Need to get from Chan + Dennis
RT - not everyone heard sound - poss preferential direction
(appears to correlate)
Using Riverhead (12 sec) not JFK
Nita Sweeney alt showed 21000 ft - may be inpact
Re Stringer B - change in elev is small
LB - video shows roll
"up to 17 k/ft"

Video
Com: Need to change ppoint

Disc
12.26 end of 12.50
Troose PA - ARSR

Boston voice tape

8 31 12.0 Travers PA ARBR 20° mi way ?

8 31 12.26

8 31 12.50

9 Radars

3 short range, 3 long range (1 2 10)

Use 1 (ISP) as control

Riverhead, 12.0 sec - is at 08.

± 1/2 mm
A2 - 2ACP
4096 ACP/360°

Make all lines up with "center" data

Round 2 ↑

Heading → Ground track → Direction-true

Best est mag offset - 13.3°

1960 E, -8.6 S of ISP - extrapolated 12.26 all BUT

11.51 T ISP -25 in 1 sec 11.26 extrapolation

= 40° 38' 56" / 72° 40' 17" (40.6489, 72.6714)

11/7 → 40 38 56.5 / 72 40 15.0 (40.6490, 72.6708

Boston Center & NY Center - diff = 1.00 sec

NY Center ahead voice 2.25

Review

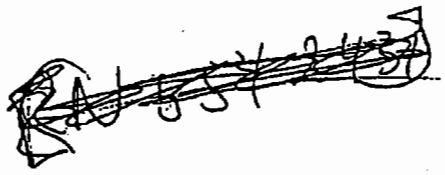
1. Notes from briefing to NTSB
2. Notes from discussion with Charlie
   - Accuracy of range as measurement

4/30/97

1. TBDs
   - Rev new mtg NTSB/gues - see note
   - Fit - see bullets/agm
   - Prep gues.

2.

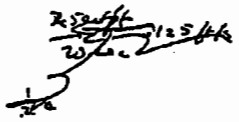
26Oct97 Running list



1. Type in faa_jfk1.dat (1st 4 twa)
   work/twa800

2. Type in xy2rng.f
   Create xy2rng.run.s
   chmod +x xy2rng.run.s
   Create compute.s
   Run xy2rng with faa_jfk1.dat

Review



1. On work/twa800 wrote program to convert x, y to range from radar (xy2rng.f). Typed in 1st 4 scans /r jfk from [redacted] FBI package.tar.Z

11/2/67

Equations for observations

Parameters

λ_0 pos at t_0

Λ_0 pos at t_0

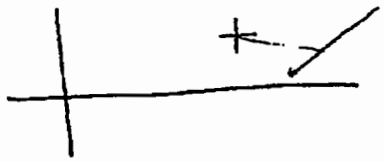
A_{FP} = flight azimuth rel initial position

$B_{A,JFK}$ = bias in JFK azimuth data

$B_{A,ISP}$ = " " ISP "

$\bar{R}(i)$ = range ~~rate~~ along flight path at time nodes; ~~i = 1, t = 0~~; i = 1, n at ~4.6 sec

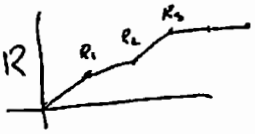
Δt = time between nodes



Calculate range along FP at time t

~~$R = \sum_{i=0}^{n} (\dot{R}_i + \dot{R}_{(i+1)}) \Delta t/2$~~

$R = R_{i=0} + (\dot{R}_{i=1} - \dot{R}_{i=0})(t - t_{i=0})/\Delta t$



i = ~~last~~ last time index $\le t$

Initial x_0 y_0 in N/E coordinates

~~$x_0 = (\lambda_0 - \lambda_{JFK}) \times 60$~~

$x_0 = (\Lambda_{JFK} - \Lambda_0) \times 60 / \text{cos}\, \lambda_{JFK}$

$x = x_0 + R \cos A_{FP}$

$y = y_0 + R \sin A_{FP}$

$a_J = \tan^{-1}(y/x) + B_{J,ISP}$ (rad)

$r_J^2 = x^2 + y^2$

$a_I = \tan^{-1}((y - y_{ISP}), (x - x_{ISP})) + B_{a,ISP}$ (rad)

$r_I^2 = (x - x_{ISP})^2 + (y - y_{ISP})^2$

$\lambda = \lambda_{JFK} + (y - \text{[illegible]})/60.$ (rad λ_{JFK})

$\Lambda = \Lambda$ [illegible] $x / \cos \lambda_{JFK}$

11/2/97

Angle measured/AC at ionic

α = (Hom ? = 120 ft) / $10^{-4} \times 6000$ = .002 = .11 deg

/~ 1" wobble, dist = 1/.002 = 500" = 41.6 ft

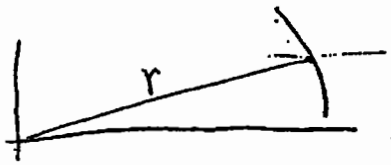
for 1/2" ~ 21 ft

4

10/31/67

1. TBDs
   - Range data to LB (upper) – / along path
   - Code
     - Mark ISP main obj ✓
     - RMS of plane pos ≠ → fail
   - Effect alt, earth
   - Uncert triangulation ✓
   + Add HPN
     - Compare ✓
     - solve? 5 pt soln ✗
   - Get + add 12 sec data? → disk
   - Question (NTSB/O'R)
     - Hourglass radius times ✓
     - Other radius? eg 1.1 R12 → disk
     - What in HP ✓
   - Time of last XP NTSB ✓
   - Pos bridge (Pr ~~dec~~ acq?)
   - Mtg at NTSB? ✓
   - Rev Eds, etc
   - Plots / presentation

2. Assign lat, calculation



$Lat_{JFK} = 40.6362$

Δ for 40.66

40.660 $\Delta y = 0.0238 \times 60 = 1.428$ nm

For 40.665, $\Delta y = .0288 \times 60 = 1.728$

40.655 $\Delta y = .0188 \times 60 = 1.128$

40.670 $\Delta y = .0338 \times 60 = 2.028$

$\Delta y = 1.128$ $\Delta y = 1.428$

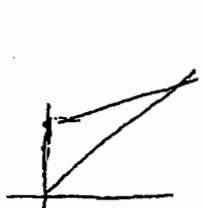
T	R_{JFK}	$\Delta\chi_{55}/\Lambda$	$\Delta\chi_{60}$
16.65	50.46	50.447/72.6587	50.440/72.6583

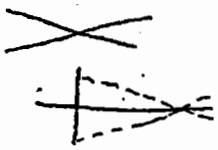
Lee has path length time

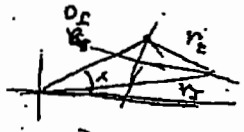
3. Code for HPN
Scriptist - 2 meters

to hpn ← 1

4. Uncertainty
~~Set FID = 0~~







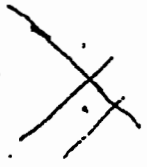
$$\chi = r_J \cos\left(\alpha - \cos^{-1}\left((d_I^2 + r_J^2 - r_I^2)/(2 d r_J)\right)\right)$$

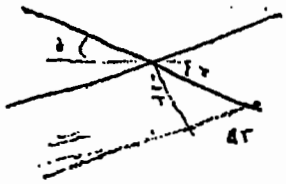
$$y_J = r_J \sin\left(\alpha - \cos^{-1}\left((d^2 + r_J^2 - r_I^2)/(2 d r_J)\right)\right)$$

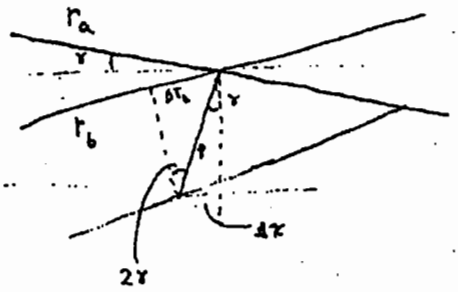
$$\frac{\partial \chi}{\partial r_J} = \cos\left(\alpha - \cos^{-1}(\cos\alpha_I)\right) + r_J \sin\left(\alpha - \cos^{-1}(\cos\alpha_I)\right) * \partial \cos^{-1}\left[(d_I^2 + r_J^2 - r_I^2)/(2 d r_J)\right]/\partial r_J$$

$\Delta\chi$ ~~= $\delta r \cos\chi$~~ = change

Δy = ~~$\delta r \sin\chi$~~







$p = \Delta r_b / \sin 2\gamma$

$\Delta x \quad p \sin\gamma = \Delta r_b \dfrac{\sin\gamma}{\sin 2\gamma}$

$\Delta y = p\cos\gamma = \Delta r_b \dfrac{\cos\gamma}{\sin 2\gamma}$

Compute γ for 1stpt

$d_y = \Delta\lambda \times 60 = (.7940 - .6362) \times 60 = 9.468$

$d_x = \Delta\lambda \times \cos\phi \cos\lambda = (.7669 - .1001) \times \cos 40.1 \times \cos 40.1 =$ [redacted] 30.363

$d = [d_y^2 + d_x^2)^{1/2} = 31.805$

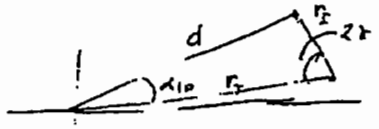
$r_{\text{Sun}} =$ ~~21.61~~ 21.60

$r_{II} = 50.46$

$\cos\alpha_{ID} = (d_x^2 + r_J^2 - r_I^2)/(2 d r_J)$

$= .9630$

$\alpha_{ID} = 15.6207$



$\alpha_I = \tan^{-1}(d_y/d_x) = \tan^{-1}(9.468/30.363) = 17.319$ short way

$\dfrac{\sin\alpha_{ID}}{r_I} = \dfrac{\sin 2\gamma}{d}$

$\sin 2\gamma = (d/r_I)\sin\alpha_{ID} = (31.805/21.60)\sin 15.6207$

$= .3965$

$2\gamma = \sin^{-1}(.3965) = 23.36$

$\gamma = 11.68$

$\sin\gamma = .2024$

$\cos\gamma = .9793$

$\dfrac{\partial\gamma}{\partial r} = \dfrac{\sin\gamma}{\cdot\cdot\cdot} = \dfrac{.2024}{\cdot\cdot\cdot} = .51$ $\quad \dfrac{\partial y}{\partial r} = \dfrac{\cos\gamma}{\cdot\cdot\cdot} = \dfrac{.9793}{\cdot\cdot\cdot} = 2.47$

If $\sigma(r) = 230$ m

$\sigma_x = 166$ m = 545'

$\sigma_y = 802$ m = 2634'

$\sigma_{AZ,5^{mo}} \sigma_y / R_J = 802/50/1652 = .0087 = .50°$

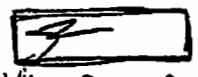
Revise

1. Calculate uncertainty

31 Oct 97

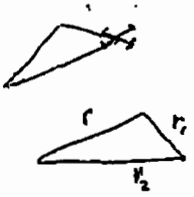
Mtg w NTSB (John Clark, Dennis Crouch) XP data - time align

1. Lees sim
   Solve:
   Boeing → extend to 160 C_N, C_A
   Var in CP → solve offset from Boeing / table
   Left engine on
   IC - ? NTSB - 358 gnd speed



1/2 x 5 = 2.5°
10 mm
2.5/57
.05 x 10 mm
.5 mm

2. Radar plot
   Disperse targets
   ± 0.1° / ± 1/16 mi - transponder
   Dynamic → ± 1/8 mi
   8/6000
   330 m / 6 | 1852
   16/25 = ± 760'



- Boot Center - VR - keep WWW
  Key all to ATC
  Note hooks -
  Cover CVR FDR → BC
  Both FDR - vs radar ATC
  50' radar resol
  Calculate time
  XP - 1/8 mi
  Calculated mag - 12.5 / 12.5 JFK reported 13.9
  12 Sec → NY Center

XP - how good mag - 12 sec data

- 6d vs 3d
  - get fit with roll w/o up
  - start putts before break

10/30/97

1. Changes for triangulator

2. TBDs

- Code
  - clean doc ✓
  - break main ✓
  - number ISD ✓ / multiISP
  - RMS of plane ~~data~~ position
  - print λ, P_0 ✓
  - effect alt + earth
- Add HPN
- Get track JFK 12 sec
- try other data track ✓
- time of first XP
- error ellipse triangulate

Position
impact
~~current pt~~
~~plotting~~
~~in top 72 rng & TSP + RMS~~
λ_0 P_0

- Questions
  - How close radar hits (0'121)
  - other radars, JFK's etc.
- Post bridge

3. Use 4/3 lowest pts for Δ

48.85	40.6657	72.6271
39.46	40.6687	72.6327
34.77	40.6641	72.6365
~~34.77~~	~~40.6720~~	~~72.6357~~ same
44.11	40.6656	72.6304

$\bar{X}_0$ = 40.6575, 72.7669 ✗

From RT map

P_0 = 40.6502, 72.6663

2 out 3 JFK pts (lower ↓ upper ↓)

Δr_1 from 2 & = .07 or .16 nm = .0015° or .0035°

Δr_2 from " .13 or .23 km = .0029° or .0051

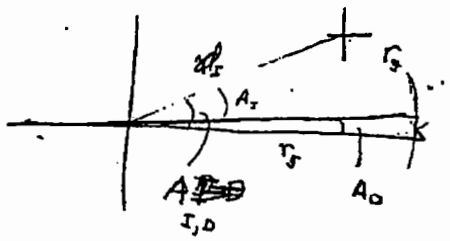
Δr_3 " .19 km = .0042°

Review

1. Plotted tri pts for last 4 pts
2. Marked runs from JFK for pts with no ISP
3. Typed in HPN in faa_Hpn1.dat
4. Mod program for triangulation

10/29/57

$$\cos A_{ID} = \frac{d_I^2 + r_J^2 - r_I^2}{2 d_I r_J}$$



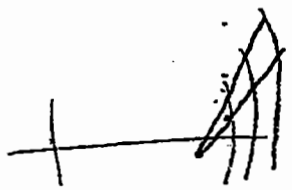
$$A_D = A_{IE} - A_{ID}$$

In xyzrns.f

10/29/97

1. Put in changes for magnetic offset
   Post wordgen OK

2. "MAIN" JFK point -
   1, 3, 9, 12, 14, 19, 23, 27, 31, 33, 37



3. Run w 19° W offset / 1.2° / 1.5° (pretty good)
   [do 10 alpha]

4. From RT plots
   Front = 40.6514, 72.6403
   Main = 40.6632, 72.6238
   Last pt JFK from calcs.
   40.6748 = 40 40 29
   72.6233 = 72 37 24

5. Type in prim input file transport

~~Orig LP~~

[Note prim AZJ] LNGFCR → -88.5

Left Reference = 1.0 m²

$L = q C_N A \rightarrow C_N = L/q/A$

$q = 2391$ lb/ft²

$C_N = L/q/A = 500000$ lb / 2391 lb/ft² / 10.8 ft²

$= 500000/25000 = 20$

Reverse

10/28/97

1. Landing position (lat + XP)

JFK – 50nm east of 73.7669

50 = .8333 ~~.8333~~ = ~~.6324~~ 1.0982

~~72.5336~~

72.6687

Lee's = 72.6806

Last XP = 72.6687

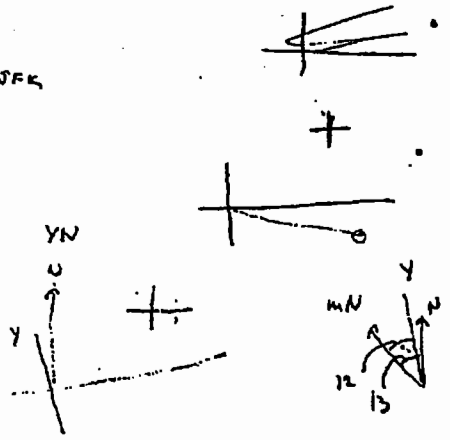
Δ = .012° east

= 0.54nm

2. Calculate lat, lon

$\lambda_{calc} = \lambda_{JFK} + y_{calc}/60$

$\Lambda_{calc} = \Lambda_{JFK} + x_{calc}/60/\cos\lambda_{JFK}$



3. Rotate x, y of JFK

Rotate all x, y to NE-x_N y_N

$x_N = x\cos\Delta\theta_N - y\sin\Delta\theta_N$

$y_N = x\sin\Delta\theta_N + y\cos\Delta\theta_N$

4. Pass LSASET

Data = rms from ISP (/MPN)

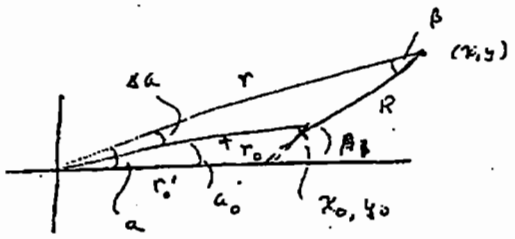
Calc x-calc, y-calc 1st time thru

Review

1. Compared last JFKXP pos to LBJ's was ~.54nm east
2. Equations for calculate lat + lon (flat earth)
3. Outlined pass LSASET setup.

10/28/57

1. Adjustment for Y_0



$a = A + \beta$

$\beta = \sin^{-1}\left(\frac{r_0'}{r}\sin A\right)$

$r_0' = x_0 - y_0 / \tan A$ $\quad \tan A = y_0/x$

$\beta = \sin^{-1}\left(\frac{\left(x_0 - y_0\frac{\cos A}{\sin A}\right)\frac{1}{\sin A}}{r}\right)$

$= \sin^{-1}\left(\frac{x_0 \sin A - y_0 \cos A}{r}\right)$ $\quad r = A - A$

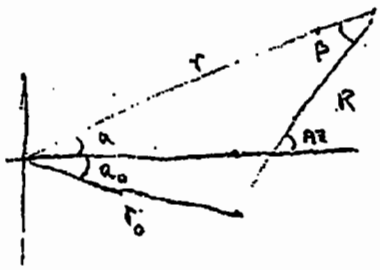
$a = 180 - (180 - A) - \beta$

$R^2 = r^2 + r_0'^2 - 2 r r_0' \cos(A - \beta)$

$a_0 = AZ2XP = \tan^{-1}(Y_0/X_0)$

$\Delta a = a - a_0 = (A - \beta) - a_0$

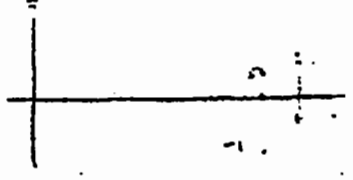
$R^2 = r^2 + r_0^2 - 2 r r_0 \cos(\Delta a)$



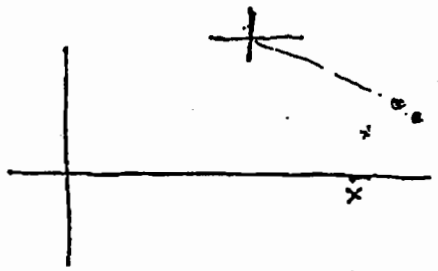
2. Trying $Y_0 = -1$

$RR_1 = .8069 \quad vs\ 5136$

$A_0 = a_0 = -1.18 \;/\; \beta_1 = 27.41 \;/\; \Delta a = A - \beta - a_0 = 26.8 - 27.41 =$



10/28/97 2



TBD

- ~~anchor TFKPT~~ ✓
- ~~print of ISP data~~ ✓
- ~~print #~~
- ~~rotate cs. (?)~~ ✓
- offset alt
- effect earth
- turn/limit XP each?
- 12 sec data / OIR?
- ~~cust Lat, lon~~ ✓
- where this? ✓

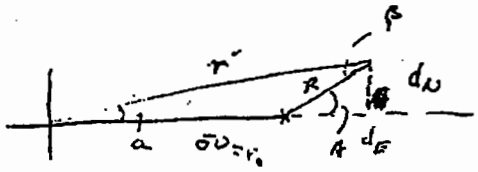
3. Modify file + script for ISP data

Review

1. Modified proj rig 2 orig.d to account for y offset at t_0.
2. put more points in both input files

27 Oct 97

1. From jfk



$A \sim \sin^{-1}(.5) \approx 27°$

$d_N = R \cos A = r \cos a$

$$\frac{r}{\sin A} = \frac{R}{\sin a} = \frac{50 = r_0}{\sin \beta}$$

$$\sin \beta = \frac{r_0}{r} \sin A$$

$$a = a = 180 - (180 - A) - \beta = A - \beta$$

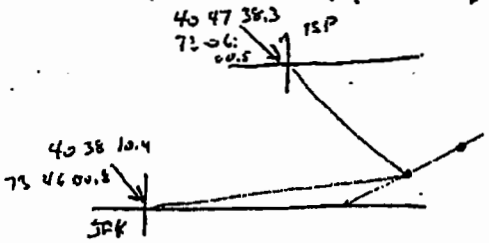
change grid r_0

$$R^2 = r^2 + r_0^2 - 2 r r_0 \cos\left(A - \sin^{-1}\left(\frac{r_0}{r} \sin A\right)\right)$$

2. ISP in OFK coord.

$\Delta\lambda$: 40 47 38.3
− 38 10.4
9:27.9

$\Delta\lambda$: 72 46 00.8
− 73 02 00.5
40 00.3



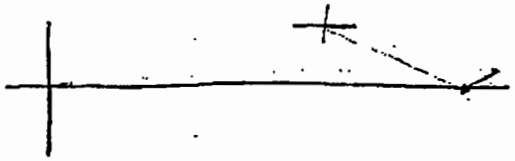
Approx → 9:27.9 = 9.465 min = 9.464 nm

→ 40:00.3 = 40.005 min = 40.005 * cos λ_J = 40.005 cos 40.636

= 30.358

For ISP, r_0 = (19.82 − 8.69) = 21.37 from plot.

[redacted]



Compute rng to ISP wrt JFK traj using AZ

$x_{ISP} = 30.36$

$y_{ISP} = 9.46$

$r_{ISP}^2 = (x_{JFK} - x_{ISP})^2 + (y_{JFK} - y_{ISP})^2$

$x_{JFK} = R \cos A + r_0$

$y_{JFK} = R \sin A$

Compare last xpnd each

$x_{0\,ISP} = 19.52$

$y_{0\,ISP} = -8.70$] 21.37

$(x_{ISP} - x_{0JFK})^2 + (y_{ISP} - y_{0JFK})^2 =$ ≠?

$(30.358 - 50)^2 + (9.464 - 0)^2 = 21.80$

Review

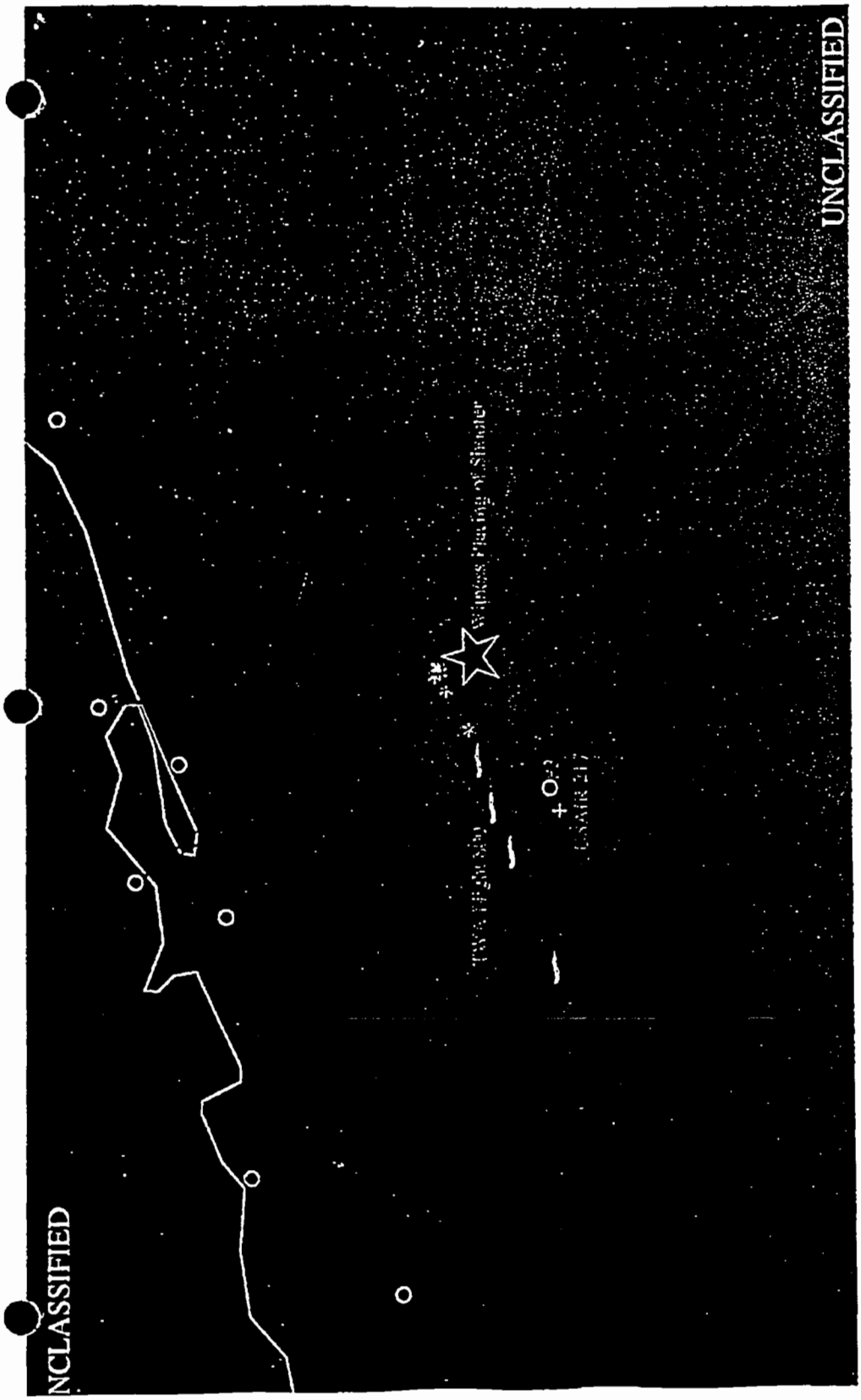
1. Expanded xyzrng.f to calculate range from last transp'd point, assuming flt plt azimuth. Ran data from ISP. Calculate range from ISP to JFK points. Why ½ nm difference?

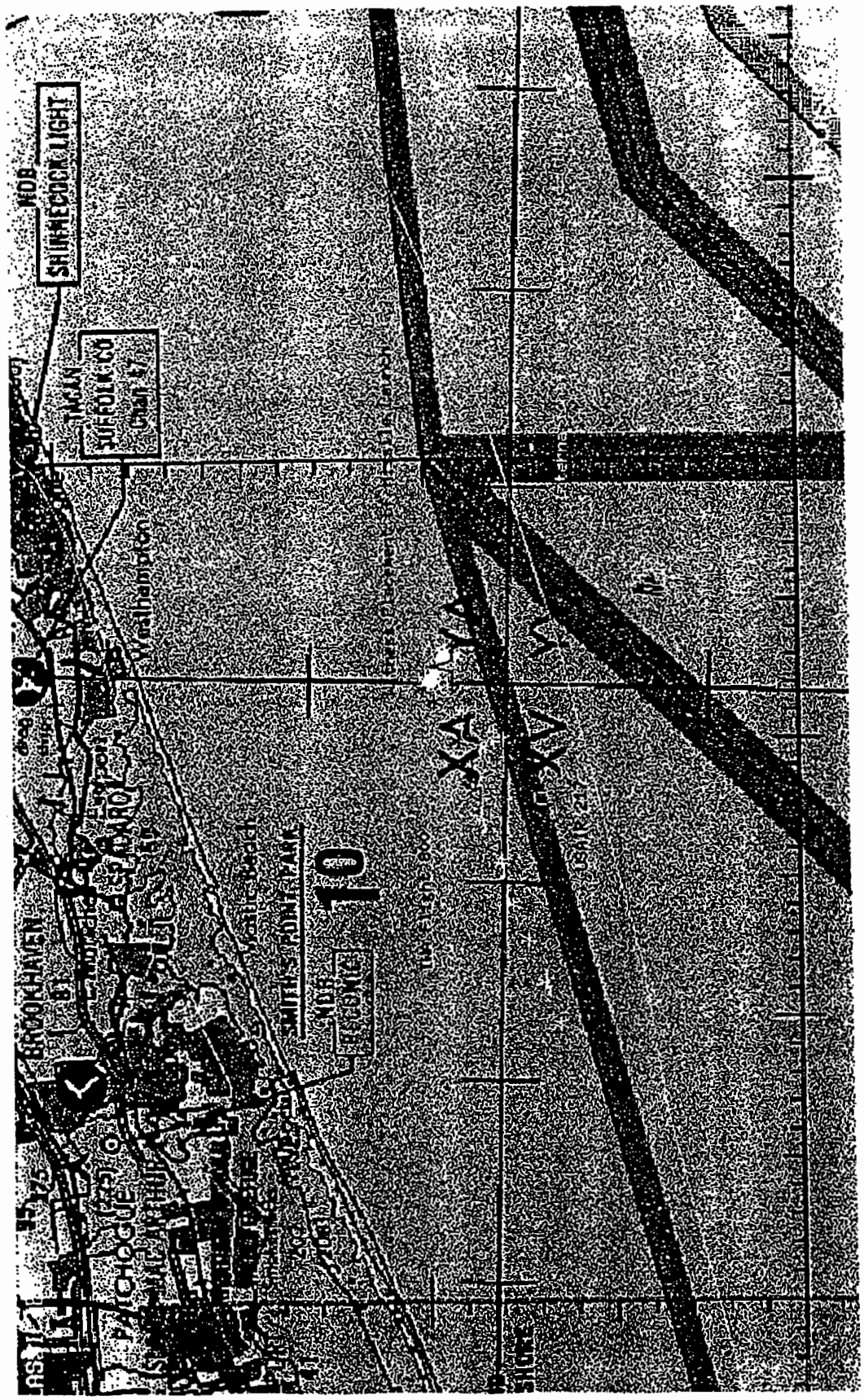
ROTATET.FOR RANGE/AZ → X/Y 47

```
C
C       PROGRAM ROTATE MLM 15-OCT-81
C
C       THIS PROGRAM TAKES DATA FROM AN ARTS LISTING,
C       MANUALLY ENTERED , AND CONVERTS THE RANGE AZIMUTH
C       VALUES TO X Y VALUES.
C       IT WILL ALSO ACCEPT A MAGNETIC DEVIATION AND
C       ROTATE THE AXIS TO MAKE THE DATA ALIGN WITH TRUE NORTH.
C
C       BECAUSE THE AZIMUTH VALUES START AT 0=NORTH AND
C       PROGRESS CLOCKWISE, WHILE THE SINE COSINE FUNCTIONS
C       ARE ESTABLISHED FOR 0=+EAST AND PROGRESS COUNTERCLOCKWISE,
C       AN ALGORITHM WAS NEEDED TO MAKE THIS CONVERSION.
C       [redacted] SUGGESTED THE FOLLOWING:                (b)(6)
C       SIMPLY EXCHANGE THE X AND Y VALUES CALCULATED USING
C       THE ANGLES OF THE ARTS SYSTEM AND VOILA EVERYTHING
C       WORKS OUT FINE. THANK YOU JIM.
C
C       THE OUTPUT IS IN THE FORM OF A FILE WHICH IS
C       READY FOR SUBMISSION TO MANAT OR FIXIT.
C
        CHARACTER*80 BUF
        DATA ANGL,ACPS,DEGS/'    ','ACPS','DEGS'/
        DATA PI/3.14159/
        PI=PI/180.
        PRINT 60
 60     FORMAT(' ENTER INPUT FILENAME :  '$)
        READ (5,2)BUF
        OPEN (UNIT=3,FILE=BUF,STATUS='OLD')
        PRINT 1
 1      FORMAT(' ENTER OUTPUT FILENAME :  '$)
        READ (5,2)BUF
 2      FORMAT(A)
        OPEN (UNIT=4,FILE=BUF,STATUS='UNKNOWN')
        PRINT 50
        PRINT 3
 3      FORMAT(' ENTER MAGNETIC VARIATION HERE IN DEGREES  :')
        PRINT 33
 33     FORMAT(' OR ENTER 0.0, ENTER VARIATION WITH A DECIMAL POINT :   ')
        PRINT 3003
 3003   FORMAT(' ENTER WEST VAR AS POS. AND EAST VAR AS NEG. :  '$)
        READ(5,4)VAR
 4      FORMAT(F10.0)
        PRINT 50
50      FORMAT(/)
 8      PRINT 5
 5      FORMAT(' DO YOU WISH TO ENTER AZIMUTHS IN <DEGS> OR <ACPS> :  '$)
        READ (5,2)ANGL
C       TYPE 50
        IF (ANGL.EQ.ACPS) GO TO 10
        IF(ANGL.NE.DEGS) GO TO 8
        GO TO 10
 10     CONTINUE
 100    CONTINUE
        IPTS=0
 200    CONTINUE
        IF(ANGL.EQ.DEGS) GO TO 250
        IRET=213
 213    CONTINUE
```

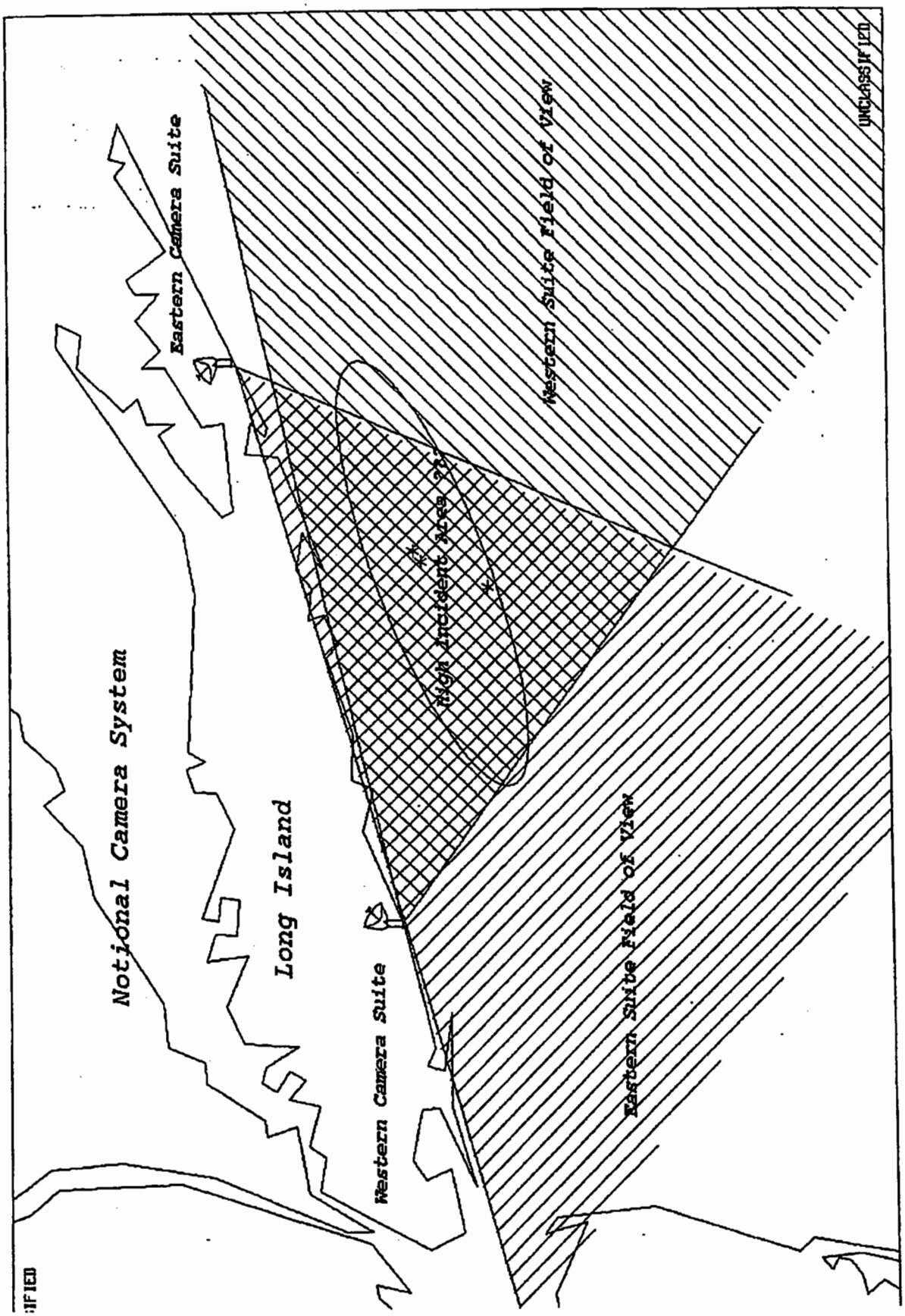
```
202     FORMAT(2I18,F20.0,F20.0,f20.0,F23.0)
cdufus  IF(RR.EQ.0.0) GO TO 1000
        RAZ=RAZ/4096.
        ANG=RAZ*360.
        GO TO 300
 250    CONTINUE
        IRET=263
 263    CONTINUE
        READ(3,252,ERR=2000,END=1000)IH,MIN,SS,RR,ANG,RA
252     FORMAT(2I18,F20.0,2F20.0,F23.0)
cdufus  IF(RR.EQ.0.0) GO TO 1000
 300    CONTINUE
        IPTS=IPTS+1
        ANG=ANG-VAR
        IF(ANG.GT.360.) ANG=ANG-360.
        IF(ANG.LT.0.) ANG=ANG+360.
        X=RR*SIN(ANG*PI)
        Y=RR*COS(ANG*PI)
        TOTTIM = MIN * 60.0 + SS
        WRITE(4,44)IH,MIN,SS,X,Y,RA,TOTTIM
44      FORMAT(1X,2(I2,','),F7.3,',',2(F9.4,','),2(F11.2,','))
        GO TO 200
 2000   CONTINUE
        PRINT 50
        PRINT 2002
 2002   FORMAT(' ERROR ON INPUT... REENTER')
        PRINT 50
        PRINT 2050,IPTS+1
 2050   FORMAT(' IN INPUT LINE c',I8)
        IF(IRET.EQ.213) GO TO 213
        GO TO 263
 1000   CLOSE(4)
        CLOSE(3)
        PRINT 50
        PRINT 1001
 1001   FORMAT(' FILE CLOSED... PROGRAM NORMALLY TERMINATING')
        END
```

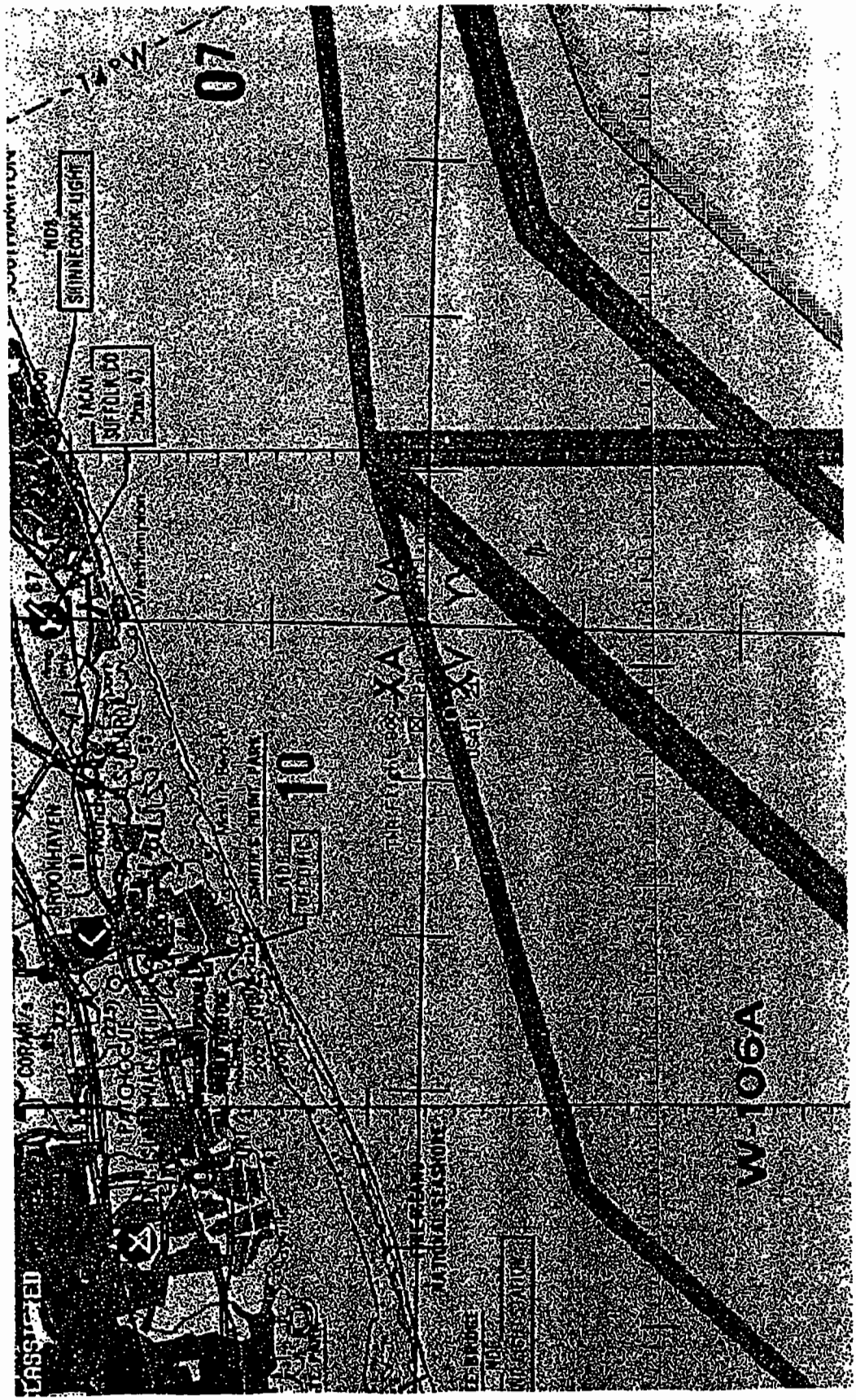
57

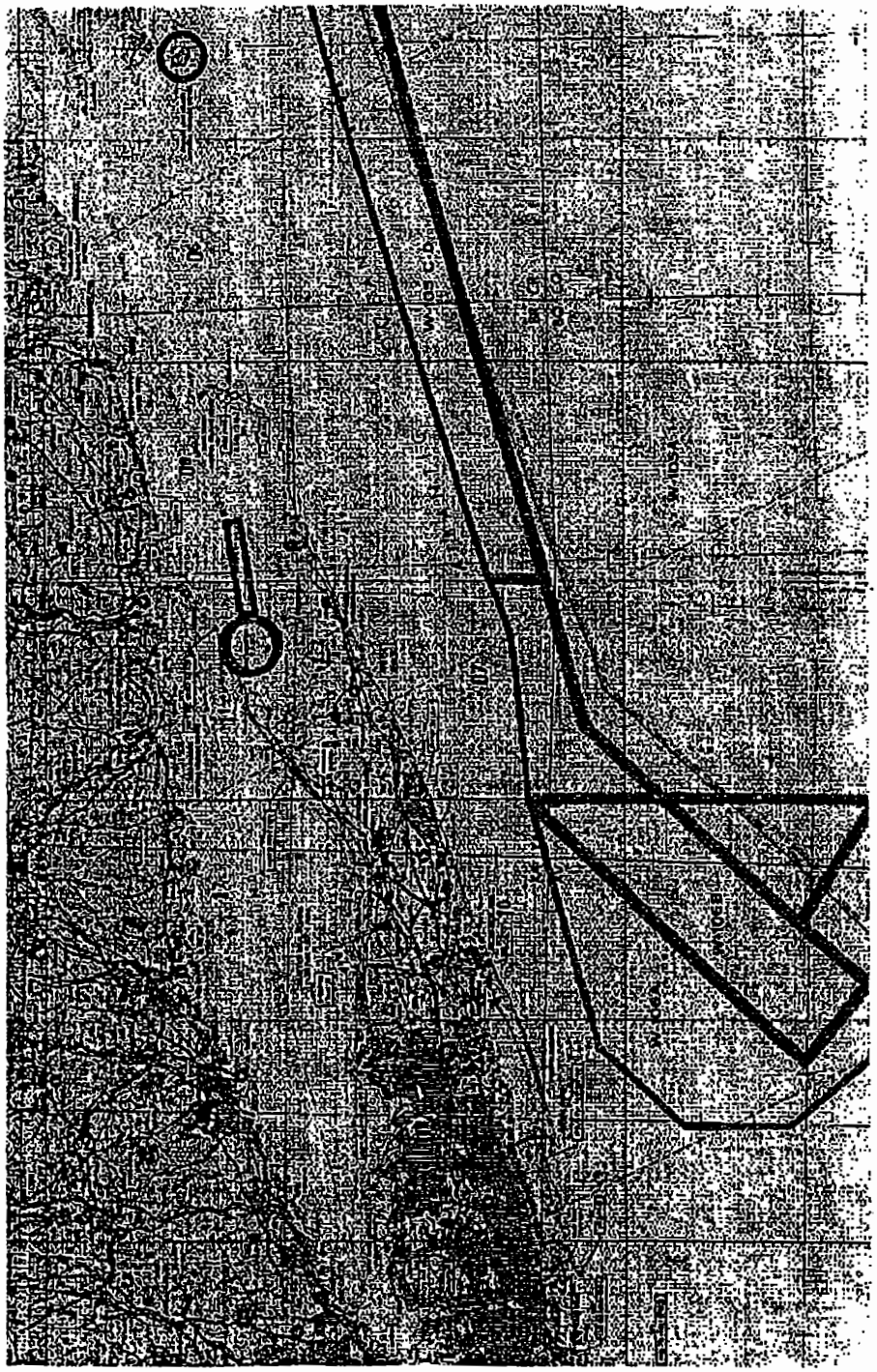


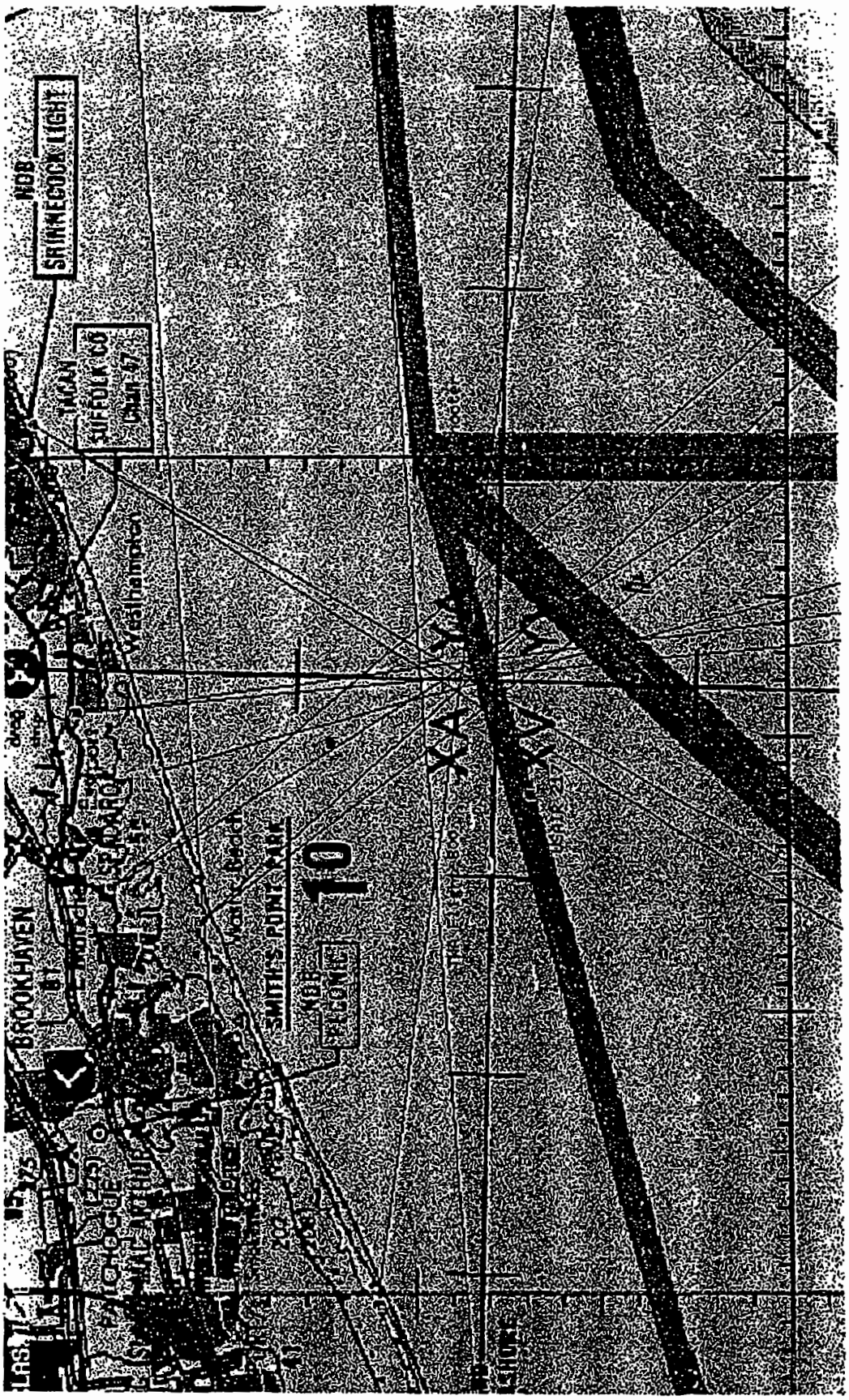

NDB
SHINNECOCK LIGHT
TACAN
SUFFOLK CO
Chan 47
Westhampton
BROOKHAVEN
PATCHOGUE
SMITH POINT PARK
10
NDB
XA
XV
W

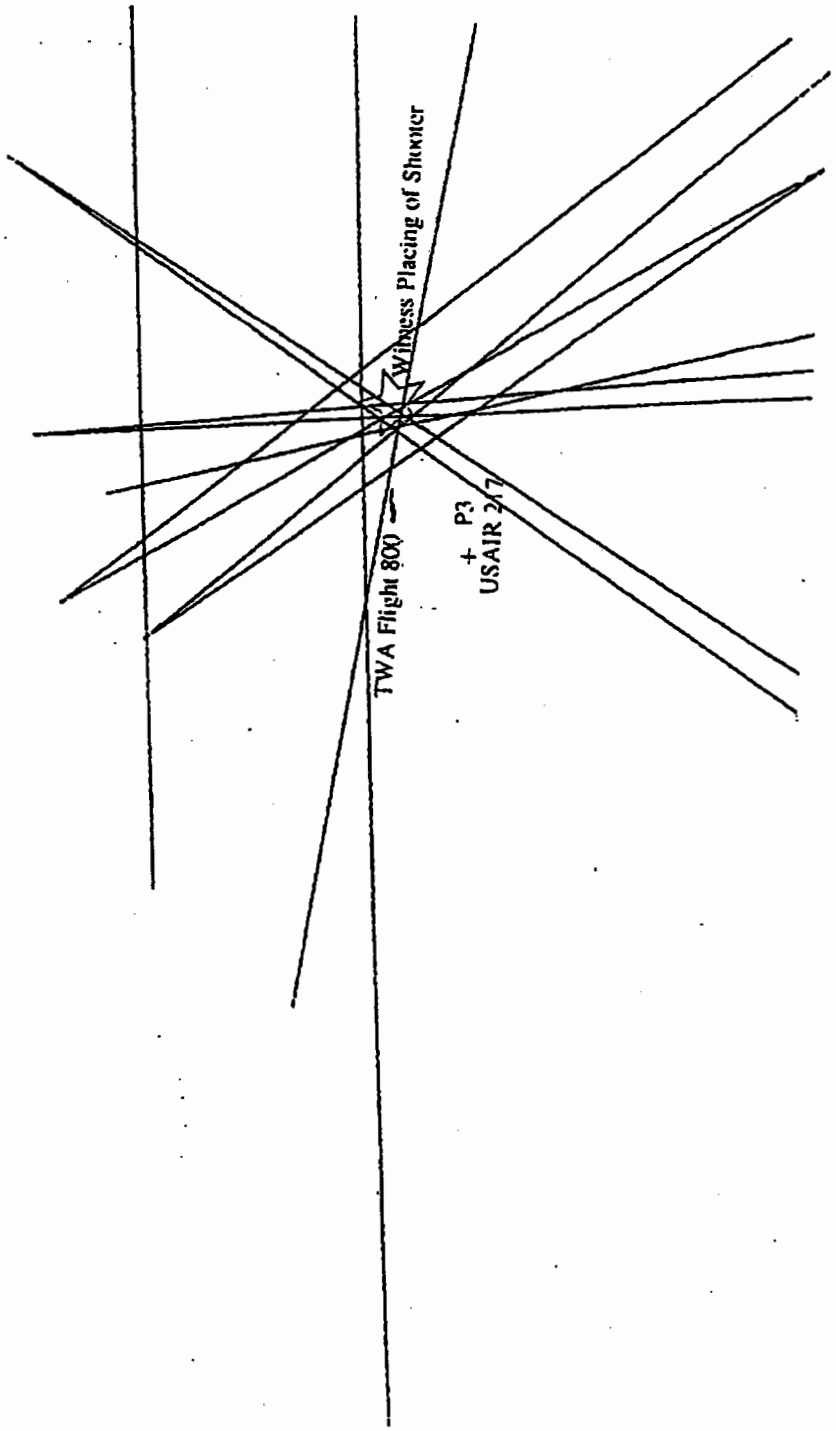
UNCLASSIFIED
Witness Placement of Missile Launch
International Waters Boundary (12 NMI)
UNCLASSIFIED


UNCLASSIFIED
Western Suite Field of View
Eastern Camera Suite
Notional Camera System
Long Island
High Incident Area
Western Camera Suite
Eastern Suite Field of View
IFIED


W-106A
07
10
SKINNEGOAK LIGHT
SUFFOLK CO.
Westhampton
CLASSIFIED

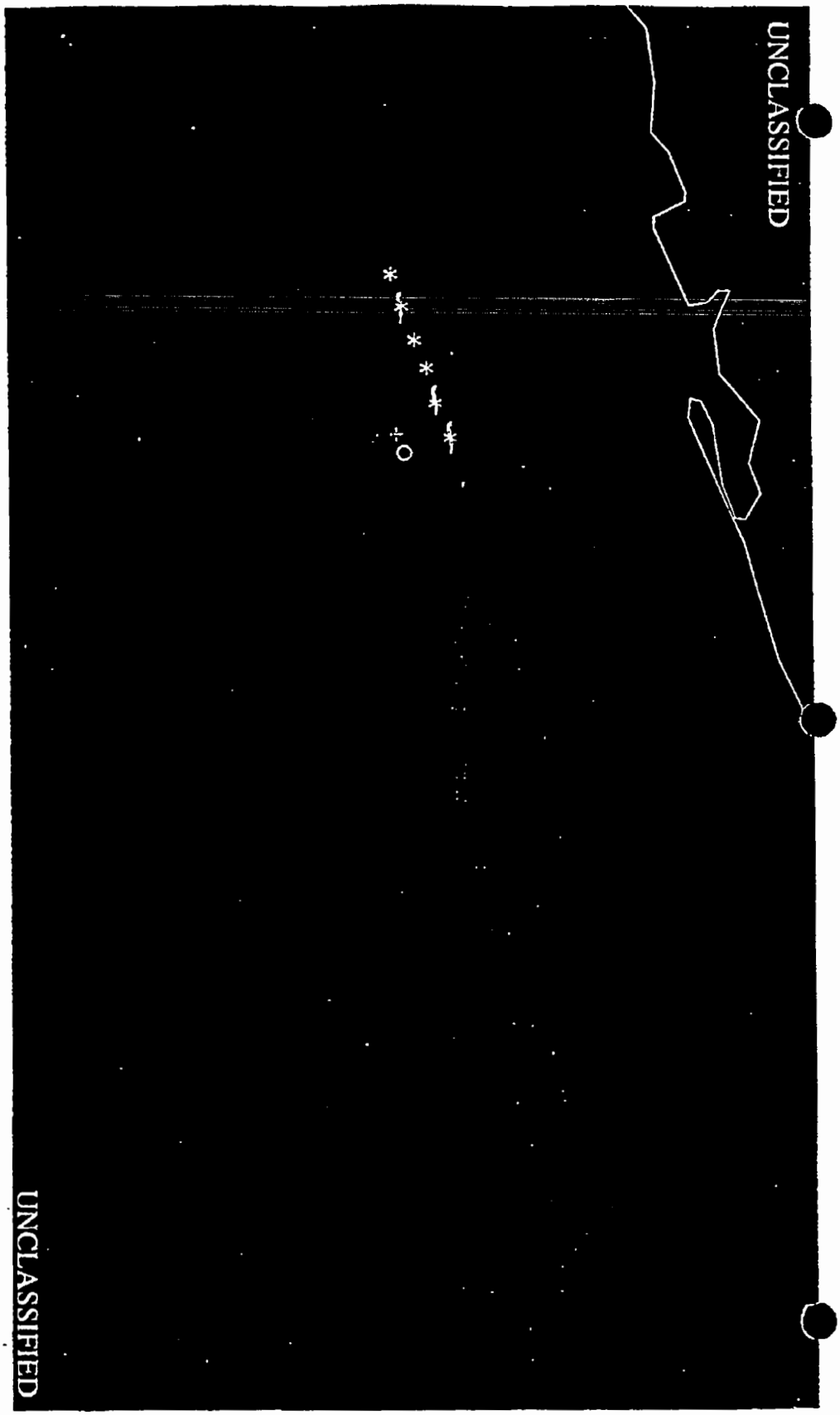



NDB
SHINNECOCK LIGHT
IMAN
SUFFOLK CO
Chan 57
Westhampton
BROOKHAVEN
SMITH'S POINT MARK
VOR
PATCHOGUE
10
XA
XA



UNCLASSIFIED
TWA Flight 800
Witness Placing of Shooter
USAIR 217
UNCLASSIFIED

CLASSIFIED
Witness Placing of Shooter
UNCLASSIFIED



TWA Flight 800

Missile Theory

Projected point of shooter from witness testimony: 40:39 N
72:37.2 W

An alternative position was calculated by FBI to be:
40:40.65 N
72:41 W

Footprint of where shooter would have to be to have brought down the plane at that spot was made by OWTP.

The projected point falls within the "most likely" area.

Last instrument readings: 13,820 ft → altimete
330 knots → airspeed

Most damage to plane and passengers occured on the mid-right side of the plane. (rows 17-28)

Observations Made Prior to July 17, 1996

Sunday, June 30th: in the vicinity of Port Jefferson on the North Shore of Long Island

Sunday, July 7th: Aquebogue, NY on the south side of the north fork of Long Island

Friday, July 12th (4:50 am): Smithtown, NY
azimuth: 70°-72° north magnetic
(in the vicinity of Long Island Sound over towns of Rocky Pt. & Miller Place)
An Airborne Express flight (516) from J.F.K. to RI was flying through there at ≈ 13,000 ft.

Transponder : (has 12-sec. sweep)

Second-to-last at 20:30:57 EST

Last at 20:31:09 EST

Sikorsky (last) at 20:31:12 (has 4-sec sweep)

Non-transponder (skin paint)

20:31:21 EST

20:31:32 EST

20:31:44 EST

Impact occured (of plane ~~body~~ & engines)

≈ 20:33:32 EST

Fist part that came off plane landed

20:33:32 EST

@ 0031 51 [redacted] (b) (3)

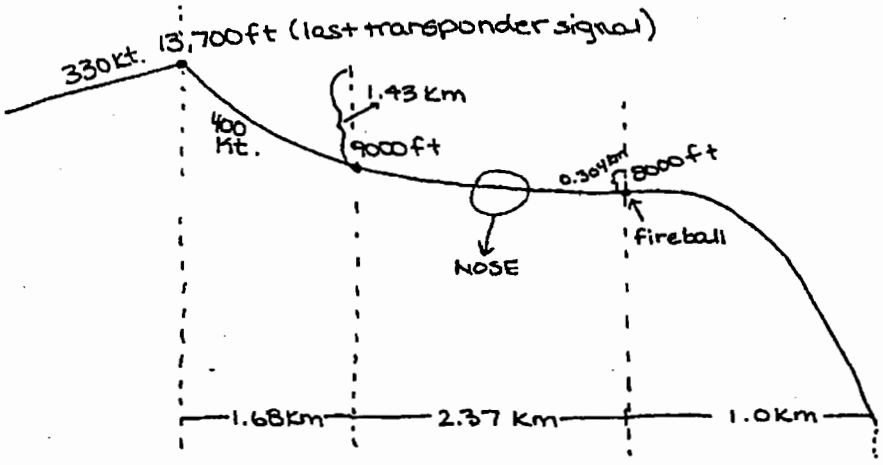
Estimated Explosion : 003123 - 003130

[redacted] detection 27 to 34 seconds after explosion. (b) (3)

NOTE: [redacted] (b) (3)

ELAPSED TIME		
0	003110	LAST BEACON
12	003122	SKIN TRACK HIT
24	003134	1ST DEBRIS HIT
41	003151	DSP

TIM'S PROPOSED SCENARIO



From last transponder to radar scan plane traveled 1.7 km at ground speed of 270 kt.
Next, traveled 2.4 km in ground speed of about 380 kt.
Then traveled 1 km to impact.

Airline positions at 00:31:10 (8:31:10 pm EST)

USAIR 217 (2237)	40:36:33N 072:42:45W
P3	40:36:49N 072:41:56W
TWA 800 (2633)	

TWA (transponded)

~~time~~	Position
8:21:04	40:34:04 N 073:47:26 W
8:21:16	40:33:18N 073:47:04W
8:21:28	40:32:42 N 073:46:23 W
8:21:40	40:32:05 N 073:45:42 W
8:21:52	40:31:30 N 073:44:52 W
8:29:59	40:36:25 N 072:49:58 W
8:30:11	40:36:43 N 072:48:30 W
8:30:23	40:37:14 N 072:47:03 W
8:30:35	40:37:38 N 072:45:44 W
8:30:47	40:37:55 N

time	Position
8:30:59	40:38:26 N 072:42:40W
8:31:10	40:38:49 N 072:41:01 W

non-transponder

time	Position
~~8:31:22~~	~~40:36:03 N~~ ~~072:42:54 W~~
~~8:31:35~~	~~40:35:25 N~~ ~~072:44:02 W~~
~~8:31:47~~	~~40:34:45 N~~ ~~072:45:11 W~~

?

AT 0831:08 PM (from onboard recording):

TWA [illegible] AT: 40° 38' 45" N
72° 41' 12" W

ALTITUDE: [illegible]

GROUND SPEED: [illegible] = 641 FT/SEC

HEADING (TRUE) = 71°

Discrepancies w/ Witness Accounts

- military SAMS use smoke-less gas to avoid the enemy knowing where the missile came from (retaliation)
- witnesses see the object ascend and then describe the fire ball as occuring "2 seconds", "immediately", "just after" the event.

<Something happened (whatever happened) was 20 seconds before the fire ball.>

CASA

Zoom in to 40.5 - 40.75
-73.0 - -72.5

Time to ~~1900~~ 2000

NON-TRANSPONDER

40:39:03	(40.6508)
-72:39:51	(-72.6642)
40:39:41	(40.6614)
-72:38:26	(-72.6405)
40:~~[illegible]~~40.00	(40.6667)
-72:37:56	(-72.6323)
~~40:39:50~~	~~(40.6639)~~
~~-72:37:44~~	~~(-72.6289)~~

DEBRIS

40:39:52.2	(40.6645)
-72:37:46.2	(-72.6295)
40:39:51.5	(40.6643)
-72:37:46.2	(-72.6295)
40:39:51.5	(40.6643)
-72.37.44.8	(-72.6291)

DEBRIS (cont)

40:39:53.6 (40.6649)
-72:37:37.2 (-72.627)

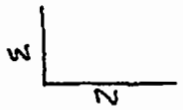
40:39:53.6 (40.6649)
-72:37:36.1 (-72.6267)

CASA files

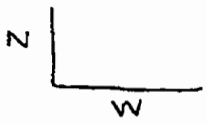
c3, c2, c1

c2 is W
c1 is N
c3 is #

c1, c2, c3



c2, c1, c3



40·38-42
72-41-24

2342?
2633
2237

The following message is a 6.43mb MIME complient attached file from [redacted] Telephonics Corp. (b)(6) (b)(7)(c)
Bellow is a readme.

[redacted]telephonics.com (b)(6) (b)(7)(c)

README:

STRATFORD (CHAN 2) LAT=> 41 17'42'' LNG=>73 04' 59'' AZIMUTH TRUE ???

RIVERHEAD (CHAN 1) LAT=> 40 52' 42'' LNG=>72 41' 17'' AZIMUTH TRUE

VARIABLE SPECIFICATIONS:

No	Name	
1	TYPE	3&4=>BEACON 20 & 9=>SEARCH 0=>WEATHER???
2	CHAN	2=>SIKORSKY BEACON @ STRATFORD 1=>FAA @ RIVERHEAD
3	SCAN	INTERNAL SCAN COUNTER(SEPERATE FOR EACH RADAR)
4	RTQC	REAL TIME QUALITY CONTROL TEST TARGET
5	TRKNUM	NOT USED WITH RAW DATA
6	RANGE_8	RANGE IN 1/8 NMI'S
7	AZ_4096	AZIMUTH IN ACP'S 4096=360 DEGREES
8	M3CODE	MODE 3 CODE
9	M2CODE	MODE 2 CODE
10	ALT_SIGN	MODE C CODE SIGN BIT
11	ALT_100	MODE C ALTITUDE IN 100 FOOT STEPS
12	M2VAL	MODE 2 VALIDATION BIT
13	M3VAL	MODE 3 VALIDATION BIT
14	MCVAL	MODE C VALIDATION BIT
15	SPI	SPECIAL POSITION INDICATOR
16	RR	RADAR REINFORCED
17	MTI	MOVING TARGET INDICATOR
18	RL_ENAB	RUN LENGTH ENABLE FLAG
19	RUNLENGH	RUNLENGTH DATA
20	COL21	NOT USED WITH RAW DATA
21	VEL_2	NOT USED WITH RAW DATA
22	TRKSTAT	NOT USED WITH RAW DATA
23	TIME_MS	INTERNAL COMPUTER TIME IN MILI-SECONDS

99378 lines
read A-H O-Z

TWA transponded data from FAA
(run through rae211.f)

last few detections:

40.6125	72.5680	> 40-36-45	72-34-05
40.6198	72.5930	40-37-11	72-35-35
40.6267	72.6139	40-37-36	72-36-50
40.6316	72.6400	40-37-54	72-38-24
40.6401	72.6659	40-38-24	72-39-57

Sikorsky

last few detections

40.2194	73.0408	40-13-10	73-02-27
40.2239	73.0616	40-13-26	73-03-42
40 2274	73.0720	40-13-38	73-04-19
40.2297	73.0785	40-13-47	73-04-42
40.2287	73.0823	40-13-43	73-04-56
40.2315	73.0900	40-13-53	73-05-24

FAA transponded data (rae211.f)

	40.6061	72.8329	40-36-22	72-49-58
	40.6125	72.8081	40-36-45	72-48-29
	40.6198	72.7831	40-37-11	72-46-59
	40.6267	72.7623	40-37-36	72-45-44
	40.6316	72.7361	40-37-54	72-44-10
223:55:02	40.6401	72.7102	40-38-24	72-42-37

Sikorsky (rae211.f)

223:54:57	40.6361	72.7281	40-38-10	72-43-41
223:55:02	40.6406	72.7072	40-38-26	72-42-26
	40.6441	72.6967	40-38-39	72-41-48
	40.6464	72.6902	40-38-47	72-41-25
	40.6454	72.6864	40-38-43	72-41-11
	40.6482	72.6786	40-38-53	72-40-43

Sikorsky (non-transponded) – Limited > 805920 s. (223:52) > 40.4N > 71W

41.1651 73.123 → (41-09-54)(73-07-23)

41.1649 73.1220 → (41-09-54)(73-07-19)

TWA 800 Transponded data from FAA Radar

HR	MIN	SEC	LAT	LONG	ALT
223	50	5	40.5480	73.3456	3078.5
223	49	54	40.5454	73.3664	2987.0
223	50	17	40.5484	73.3195	3139.4
223	50	29	40.5482	73.2958	3261.4
223	50	41	40.5526	73.2727	3413.8
223	50	53	40.5521	73.2480	3596.6
223	51	5	40.5535	73.2250	3688.1
223	51	17	40.5548	73.2017	3718.6
223	51	29	40.5555	73.1773	3718.6
223	51	41	40.5562	73.1486	3779.5
223	51	52	40.5579	73.1243	3810.0
223	52	4	40.5590	73.0946	3840.5
223	52	16	40.5601	73.0680	3871.0
223	52	28	40.5614	73.0406	3901.4
223	52	40	40.5629	73.0125	3931.9
223	52	52	40.5663	72.9865	3962.4
223	53	4	40.5727	72.9601	3992.9
223	53	16	40.5795	72.9336	3931.9
223	53	27	40.5856	72.9094	3931.9
223	53	39	40.5935	72.8826	3901.4
223	53	51	40.5986	72.8589	3901.4
223	54	3	40.6061	72.8329	3931.9
223	54	15	40.6125	72.8081	3931.9
223	54	27	40.6198	72.7831	3931.9
223	54	38	40.6267	72.7623	3992.9
223	54	50	40.6316	72.7361	4053.8
223	55	2	40.6401	72.7102	4053.8

(21.9 m/sec ≈
2.06 m/sec ≈
6.78 ft/sec

USAIR Transponded data from FAA Radar

HR	MIN	SEC	LAT	LONG	ALT
223	39	8	39.1164	74.3385	8991.6
223	39	20	39.1407	74.3268	9083.0
223	39	32	39.1536	74.2945	9205.0
223	40	32	39.2511	74.1967	10027.9
223	40	44	39.2682	74.1718	10119.4
223	40	56	39.2940	74.1628	10241.3
223	41	8	39.3094	74.1396	10363.2
223	41	20	39.3250	74.1164	10454.6
223	42	19	39.4151	74.0143	10942.3
223	42	31	39.4372	74.0032	11033.8
223	42	43	39.4531	73.9807	11094.7
223	42	55	39.4676	73.9556	11186.2
223	43	7	39.4881	73.9417	11277.6
223	43	19	39.5089	73.9234	11277.6
223	43	31	39.5264	73.9041	11277.6
223	43	43	39.5440	73.8847	11277.6
223	43	55	39.5589	73.8602	11277.6
223	44	7	39.5793	73.8463	11277.6
223	44	19	39.5957	73.8246	11277.6
223	44	31	39.6139	73.8015	11277.6
223	44	42	39.6318	73.7826	11277.6
223	44	54	39.6484	73.7613	11277.6
223	45	6	39.6664	73.7425	11277.6
223	45	18	39.6855	73.7261	11277.6
223	45	30	39.7035	73.7074	11277.6
223	45	42	39.7222	73.6850	11277.6
223	45	54	39.7380	73.6620	11277.6
223	46	6	39.7540	73.6391	11277.6
223	46	18	39.7701	73.6164	11277.6
223	46	30	39.7938	73.6091	11277.6
223	46	42	39.8089	73.5845	11277.6
223	46	54	39.8273	73.5664	11277.6
223	47	6	39.8475	73.5470	11277.6
223	47	18	39.8633	73.5367	274.3
223	47	29	39.8845	73.5112	11277.6
223	47	41	39.9021	73.4914	11277.6
223	47	53	39.9189	73.4699	11277.6
223	48	5	39.9385	73.4542	11277.6
223	48	17	39.9545	73.4312	11216.6
223	48	29	39.9716	73.4102	11155.7
223	48	41	39.9880	73.3877	11094.7
223	48	53	40.0061	73.3689	11033.8
223	49	5	40.0228	73.3469	10972.8
223	49	17	40.0412	73.3285	10911.8
223	49	29	40.0581	73.3070	10850.9
223	49	41	40.0760	73.2873	10789.9
223	50	5	40.1132	73.2458	10668.0
223	49	53	40.0944	73.2634	10729.0
223	50	16	40.1321	73.2283	10607.0
223	50	28	40.1486	73.2051	10576.6
223	50	40	40.1684	73.1840	10485.1
223	50	52	40.1848	73.1603	10363.2
223	51	4	40.2036	73.1425	10241.3
223	51	16	40.2228	73.1198	10088.9
223	51	28	40.2394	73.0963	9906.0
223	51	40	40.2591	73.0746	9723.1
223	51	52	40.2781	73.0571	9509.8
223	52	4	40.2974	73.0340	9296.4
223	52	16	40.3147	73.0116	9052.6
223	52	27	40.3348	72.9899	8839.2
223	52	39	40.3531	72.9699	8595.4

223	53	15	40.4131	72.9090	7894.3
223	53	39	40.4502	72.8647	7589.5
223	53	51	40.4686	72.8401	7467.6
223	54	3	40.4882	72.8195	7345.7
223	54	15	40.5081	72.7986	7223.8
223	54	26	40.5260	72.7770	7101.8
223	54	38	40.5443	72.7544	6979.9
223	55	2	40.5858	72.7223	6736.1
223	55	26	40.6317	72.7065	6583.7
223	55	38	40.6462	72.7012	2468.9
223	55	50	40.6763	72.6950	6461.8
223	56	2	40.6979	72.6880	6400.8
223	56	13	40.7200	72.6823	6400.8
223	56	25	40.7426	72.6762	6400.8
223	56	37	40.7660	72.6703	6400.8
223	56	49	40.7862	72.6635	6400.8

VIRGIN 009 Transponded data from FAA Radar

HR	MIN	SEC	LAT	LONG	ALT

STINGER Transponded data from FAA Radar

HR	MIN	SEC	LAT	LONG	ALT
223	56	59	40.7901	72.4976	4846.3
223	57	12	40.7736	72.5164	4846.3
223	57	24	40.7540	72.5366	4846.3
223	57	48	40.7178	72.5744	4846.3
223	58	0	40.6994	72.5931	4846.3
223	58	12	40.6808	72.6123	4846.3
223	58	37	40.6451	72.6455	4846.3
223	58	49	40.6264	72.6667	4846.3
223	59	1	40.6090	72.6815	4846.3
223	59	13	40.5902	72.7008	4846.3
223	59	25	40.5719	72.7183	4846.3

Non-transponded data from FAA Radar

HR	MIN	SEC	LAT	LONG	ALT
223	52	15	40.4814	72.6207	0.0
223	52	4	40.6230	72.9951	0.0
223	52	7	40.4598	73.4662	0.0
223	52	16	40.7352	72.8601	0.0
223	52	16	40.6209	73.0043	0.0
223	52	19	40.4625	73.4688	0.0
223	52	28	40.6222	72.9941	0.0
223	52	28	40.7342	72.8628	0.0
223	52	29	40.7329	72.9250	0.0
223	52	40	40.4445	73.0316	0.0
223	52	40	40.6228	73.0030	0.0
223	52	43	40.5963	73.1389	0.0
223	52	43	40.4613	73.4710	0.0
223	52	52	40.6221	73.0019	0.0
223	52	55	40.4611	73.4741	0.0
223	53	7	40.7265	72.9286	0.0
223	53	7	40.4592	73.4724	0.0
223	53	15	40.7614	72.7383	0.0
223	53	16	40.4487	73.0247	0.0
223	53	16	40.4486	73.2386	0.0
223	53	19	40.7251	72.9271	0.0
223	53	19	40.4620	73.4749	0.0
223	53	27	40.7592	72.7382	0.0
223	53	27	40.4260	72.8885	0.0
223	53	28	40.4519	73.0211	0.0
223	53	28	40.4558	73.1425	0.0
223	53	30	40.4617	73.4780	0.0
223	53	39	40.4794	72.9379	0.0
223	53	39	40.4537	73.0197	0.0
223	53	40	40.6229	72.9990	0.0
223	53	40	40.7207	72.9294	0.0
223	53	43	40.4589	73.4755	0.0
223	53	51	40.4541	73.0206	0.0
223	53	52	40.4411	73.2363	0.0
223	53	54	40.4571	73.4738	0.0
223	54	14	40.6674	72.6114	0.0
223	54	3	40.7606	72.7348	0.0
223	54	3	40.4518	72.9572	0.0
223	54	4	40.6221	72.9980	0.0
223	54	26	40.6554	72.6303	0.0
223	54	15	40.4577	73.0178	0.0
223	54	16	40.6247	72.9977	0.0
223	54	16	40.4377	73.2355	0.0
223	54	18	40.5944	73.1404	0.0
223	54	18	40.4596	73.4794	0.0
223	54	18	40.4047	73.6022	0.0
223	54	38	40.6427	72.6470	0.0
223	54	27	40.4576	73.0122	0.0
223	54	28	40.7342	72.8628	0.0
223	54	28	40.4355	73.2365	0.0
223	54	30	40.4584	73.4816	0.0
223	54	50	40.6310	72.6636	0.0
223	54	39	40.4115	72.9859	0.0
223	54	39	40.4597	73.0116	0.0
223	54	42	40.4593	73.4825	0.0
223	54	42	40.4007	73.5919	0.0
223	55	2	40.6199	72.6834	0.0
223	54	50	40.5598	72.7402	0.0
223	54	50	40.4597	72.8006	0.0
223	54	51	40.4615	73.0103	0.0
223	54	51	40.6221	72.9980	0.0

Non-transponded data from Sikorsky Radar

HR	MIN	SEC	LAT	LONG	ALT
223	54	38	41.1651	73.1230	0.0
223	54	42	41.1649	73.1220	0.0

223 59	36	40.5561	72.7366	4846.3
223 59	40	40.5530	72.7318	4846.3

STINGER Transponded data from Sikorsky Radar

HR	MIN	SEC	LAT	LONG	ALT
223	55	1	40.9316	72.2669	6583.7
223	55	5	40.9338	72.2747	6492.2
223	55	9	40.9313	72.2831	6431.3
223	55	16	40.9240	72.3051	6248.4
223	55	20	40.9228	72.3158	6157.0
223	55	24	40.9286	72.3296	12679.7
223	55	32	40.9143	72.3462	5913.1
223	55	36	40.9129	72.3507	5852.2
223	55	40	40.9077	72.3622	5760.7
223	55	44	40.9064	72.3667	5669.3
223	55	48	40.8978	72.3784	5577.8
223	55	52	40.8953	72.3808	5516.9
223	55	56	40.8877	72.3920	5425.4
223	56	0	40.8828	72.3969	5364.5
223	56	4	40.8765	72.4036	5303.5
223	56	8	40.8733	72.4070	5242.6
223	56	11	40.8640	72.4173	5181.6
223	56	15	40.8632	72.4182	5120.6
223	56	19	40.8540	72.4287	5059.7
223	56	23	40.8405	72.4451	4998.7
223	56	27	40.8405	72.4450	4968.2
223	56	31	40.8375	72.4487	4937.8
223	56	39	40.8251	72.4608	4876.8
223	56	43	40.8186	72.4656	4876.8
223	56	51	40.8079	72.4764	4876.8
223	56	55	40.8017	72.4854	4876.8
223	56	59	40.7898	72.4987	4846.3
223	57	3	40.7891	72.4997	4846.3
223	57	6	40.7829	72.5051	4846.3
223	57	10	40.7726	72.5170	4846.3
223	57	14	40.7726	72.5170	4846.3
223	57	18	40.7639	72.5270	4846.3
223	57	22	40.7558	72.5361	4846.3
223	57	26	40.7529	72.5367	4846.3
223	57	30	40.7437	72.5483	4846.3
223	57	34	40.7402	72.5500	4846.3
223	57	38	40.7318	72.5609	4846.3
223	57	42	40.7289	72.5616	4846.3
223	57	46	40.7212	72.5715	4846.3
223	57	50	40.7194	72.5700	4846.3
223	57	54	40.7095	72.5849	4846.3
223	57	57	40.7048	72.5894	4846.3
223	58	1	40.7008	72.5927	4846.3
223	58	5	40.6934	72.6034	4846.3
223	58	9	40.6849	72.6116	4846.3
223	58	13	40.6820	72.6127	4846.3
223	58	17	40.6746	72.6187	4846.3
223	58	21	40.6703	72.6254	6065.5
223	58	25	40.6661	72.6274	4846.3
223	58	29	40.6572	72.6376	4846.3
223	58	33	40.6503	72.6492	4846.3
223	58	37	40.6460	72.6481	4846.3
223	58	45	40.6316	72.6683	4846.3
223	58	52	40.6202	72.6745	4846.3
223	58	56	40.6183	72.6733	4846.3
223	59	4	40.6037	72.6896	4846.3
223	59	8	40.6003	72.6860	4846.3
223	59	12	40.5934	72.7004	4846.3
223	59	16	40.5869	72.7069	4846.3
223	59	20	40.5809	72.7120	4846.3
223	59	24	40.5744	72.7187	4846.3

223	58	29	40.8739	72.8856	3566.2
223	58	33	40.8713	72.8872	3566.2
223	58	37	40.8666	72.8880	3535.7
223	58	41	40.8620	72.8976	3505.2
223	58	45	40.8589	72.9011	3505.2
223	58	49	40.8565	72.9020	3474.7
223	58	53	40.8520	72.9119	3444.2
223	58	56	40.8464	72.9176	3413.8
223	59	0	40.8433	72.9224	3383.3
223	59	4	40.8407	72.9244	3352.8
223	59	8	40.8370	72.9320	3322.3
223	59	12	40.8328	72.9316	3291.8
223	59	16	40.8289	72.9413	3261.4
223	59	20	40.8255	72.9482	3230.9
223	59	24	40.8213	72.9480	3200.4
223	59	28	40.8177	72.9571	3169.9
223	59	32	40.8131	72.9589	3139.4
223	59	36	40.8099	72.9662	3078.5
223	59	40	40.8054	72.9682	3048.0

VIRGIN 009 Transponded data from Sikorsky Radar

HR	MIN	SEC	LAT	LONG	ALT
223	54	18	40.9950	72.4241	5181.6
223	54	22	40.9964	72.4293	5120.6
223	54	26	40.9785	72.4509	30.5
223	54	29	40.9944	72.4471	5029.2
223	54	33	40.9930	72.4548	4998.7
223	54	37	40.9924	72.4618	4937.8
223	54	41	40.9925	72.4683	4907.3
223	54	45	40.9889	72.4813	4846.3
223	54	49	40.9898	72.4871	4785.4
223	54	53	40.9874	72.4959	4754.9
223	54	57	40.9851	72.5048	4693.9
223	55	1	40.9867	72.5134	4633.0
223	55	5	40.9839	72.5228	4602.5
223	55	9	40.9813	72.5323	4572.0
223	55	13	40.9813	72.5392	4511.0
223	55	17	40.9825	72.5448	4480.6
223	55	20	40.9814	72.5529	4450.1
223	55	28	40.9801	72.5719	4358.6
223	55	32	40.9798	72.5794	4328.2
223	55	36	40.9801	72.5861	4297.7
223	55	40	40.9760	72.5980	4267.2
223	55	44	40.9782	72.6028	4236.7
223	55	48	40.9749	72.6140	4175.8
223	55	52	40.9761	72.6200	4145.3
223	55	56	40.9770	72.6226	4114.8
223	56	0	40.9740	72.6338	4053.8
223	56	4	40.9707	72.6456	4023.4
223	56	8	40.9702	72.6501	3992.9
223	56	11	40.9686	72.6560	3931.9
223	56	15	40.9657	72.6639	3901.4
223	56	19	40.9635	72.6750	3840.5
223	56	23	40.9631	72.6795	3810.0
223	56	27	40.9595	72.6888	3749.0
223	56	31	40.9575	72.6960	3718.6
223	56	35	40.9569	72.7013	3718.6
223	56	39	40.9536	72.7106	3688.1
223	56	43	40.9506	72.7199	3657.6
223	56	47	40.9647	72.7409	15118.1
223	56	51	40.9460	72.7322	3657.6
223	56	55	40.9441	72.7402	3627.1
223	56	59	40.9415	72.7497	3627.1
223	57	3	40.9413	72.7548	3627.1
223	57	7	40.9379	72.7613	3627.1
223	57	10	40.9370	72.7679	3627.1
223	57	14	40.9345	72.7782	3627.1
223	57	18	40.9373	72.7775	3627.1
223	57	22	40.9331	72.7862	3627.1
223	57	26	40.9315	72.7950	3627.1
223	57	30	40.9305	72.7972	3627.1
223	57	34	40.9285	72.8075	3657.6
223	57	38	40.9244	72.8172	3657.6
223	57	42	40.9201	72.8219	3657.6
223	57	46	40.9189	72.8250	3657.6
223	57	50	40.9135	72.8329	3657.6
223	57	54	40.9093	72.8379	3657.6
223	57	58	40.9060	72.8407	3657.6
223	58	2	40.9016	72.8466	3657.6
223	58	5	40.8970	72.8535	3657.6
223	58	9	40.8948	72.8532	3657.6
223	58	13	40.8903	72.8603	3627.1
223	58	17	40.8851	72.8700	3627.1

223	56	47	40.7871	72.6632	6400.8
223	56	55	40.7993	72.6634	6400.8
223	57	3	40.8139	72.6591	6400.8
223	57	7	40.8241	72.6541	6400.8
223	57	10	40.8305	72.6516	6400.8
223	57	14	40.8382	72.6516	6400.8
223	57	18	40.8441	72.6503	6400.8
223	57	22	40.8525	72.6445	6400.8
223	57	26	40.8605	72.6441	6400.8
223	57	30	40.8659	72.6440	6400.8
223	57	34	40.8749	72.6422	6400.8
223	57	38	40.8833	72.6372	6400.8
223	57	42	40.8881	72.6382	6400.8
223	57	50	40.9044	72.6342	6400.8
223	57	53	40.9096	72.6347	6400.8
223	57	57	40.9206	72.6268	6400.8
223	58	1	40.9242	72.6298	6400.8
223	58	5	40.9326	72.6261	6400.8
223	58	9	40.9414	72.6220	6400.8
223	58	13	40.9508	72.6174	6400.8
223	58	17	40.9532	72.6152	30.5
223	58	21	40.9647	72.6151	6400.8
223	58	25	40.9730	72.6125	6400.8
223	58	33	40.9879	72.6100	6400.8
223	58	36	40.9953	72.6053	6400.8
223	58	40	40.9991	72.6084	6400.8
223	58	44	41.0111	72.6027	6400.8
223	58	48	41.0163	72.6008	6400.8
223	58	52	41.0239	72.6002	6400.8
223	58	56	41.0324	72.5954	6400.8
223	59	0	41.0388	72.5962	6400.8
223	59	4	41.0434	72.5954	6400.8
223	59	8	41.0525	72.5940	6400.8
223	59	12	41.0650	72.5867	6400.8
223	59	16	41.0707	72.5854	6400.8
223	59	20	41.0735	72.5864	6400.8

223	52	29	40.3384	72.9947	8808.7
223	52	32	40.3454	72.9819	8717.3
223	52	36	40.3523	72.9712	8656.3
223	52	40	40.3558	72.9811	8595.4
223	52	44	40.3633	72.9630	8503.9
223	52	48	40.3706	72.9490	8412.5
223	52	52	40.3781	72.9352	8351.5
223	52	56	40.3820	72.9376	8260.1
223	53	0	40.3887	72.9331	8168.6
223	53	4	40.3940	72.9432	8107.7
223	53	8	40.4017	72.9280	8016.2
223	53	12	40.4076	72.9108	7924.8
223	53	15	40.4138	72.9120	7863.8
223	53	19	40.4216	72.8991	7802.9
223	53	23	40.4253	72.9035	7772.4
223	53	27	40.4343	72.8822	7711.4
223	53	31	40.4391	72.8780	7681.0
223	53	35	40.4459	72.8744	7620.0
223	53	39	40.4512	72.8669	7589.5
223	53	43	40.4597	72.8533	7559.0
223	53	47	40.4659	72.8410	7498.1
223	53	51	40.4675	72.8571	7467.6
223	53	55	40.4777	72.8341	7437.1
223	53	59	40.4826	72.8304	7376.2
223	54	2	40.4879	72.8251	7345.7
223	54	6	40.4954	72.8190	7315.2
223	54	10	40.5016	72.8091	7284.7
223	54	14	40.5063	72.8073	7223.8
223	54	18	40.5139	72.7914	7193.3
223	54	22	40.5219	72.7843	7162.8
223	54	26	40.5270	72.7812	7132.3
223	54	30	40.5334	72.7719	7071.4
223	54	34	40.5388	72.7675	7040.9
223	54	38	40.5439	72.7646	7010.4
223	54	42	40.5523	72.7482	6949.4
223	54	46	40.5571	72.7553	6919.0
223	54	49	40.5665	72.7364	6888.5
223	54	53	40.5752	72.7290	6827.5
223	54	57	40.5779	72.7352	6797.0
223	55	1	40.5862	72.7295	6766.6
223	55	5	40.5925	72.7229	6705.6
223	55	13	40.6088	72.7135	6644.6
223	55	17	40.6163	72.7111	6614.2
223	55	21	40.6246	72.7061	6614.2
223	55	25	40.6317	72.7053	6583.7
223	55	29	40.6374	72.7086	6553.2
223	55	33	40.6454	72.7052	6553.2
223	55	36	40.6542	72.6995	6522.7
223	55	40	40.6603	72.7016	6492.2
223	55	44	40.6696	72.6948	6492.2
223	55	48	40.6766	72.6945	6461.8
223	55	52	40.6795	72.6994	6461.8
223	55	56	40.6855	72.7017	6431.3
223	56	0	40.6956	72.6930	6400.8
223	56	4	40.6916	72.7172	6400.8
223	56	8	40.7110	72.6896	6400.8
223	56	12	40.7211	72.6817	6400.8
223	56	16	40.7262	72.6808	6400.8
223	56	19	40.7364	72.6734	6400.8
223	56	23	40.7396	72.6830	6400.8
223	56	27	40.7531	72.6682	6400.8
223	56	31	40.7572	72.6698	6400.8
223	56	35	40.7660	72.6664	6400.8
223	56	39	40.7728	72.6675	6400.8

USAIR Transponded data from Sikorsky Radar

HR	MIN	SEC	LAT	LONG	ALT
223	45	57	39.7405	73.6466	11277.6
223	46	2	39.7517	73.6790	30.5
223	46	56	39.8302	73.5557	11277.6
223	47	3	39.8444	73.5512	11277.6
223	47	15	39.8590	73.5134	11277.6
223	47	39	39.8930	73.5033	30.5
223	47	47	39.9060	73.4619	11277.6
223	47	54	39.9174	73.4532	11277.6
223	47	58	39.9235	73.4373	11277.6
223	48	2	39.9285	73.4276	11277.6
223	48	6	39.9358	73.4342	11247.1
223	48	18	39.9521	73.3996	11216.6
223	48	26	39.9629	73.3862	11155.7
223	48	37	39.9822	73.4088	30.5
223	48	41	39.9854	73.3463	11094.7
223	48	45	39.9975	73.3918	11064.2
223	48	49	40.0000	73.3619	11064.2
223	48	53	40.0075	73.3709	11033.8
223	48	57	40.0107	73.3465	11003.3
223	49	5	40.0207	73.3030	10972.8
223	49	9	40.0288	73.3197	10942.3
223	49	13	40.0372	73.3386	10942.3
223	49	17	40.0349	73.3057	30.5
223	49	28	40.0582	73.2992	10850.9
223	49	32	40.0639	73.2932	10820.4
223	49	44	40.0838	73.2825	10759.4
223	49	48	40.0869	73.2453	10759.4
223	49	52	40.0951	73.2685	10729.0
223	50	0	40.1050	73.2357	10698.5
223	50	4	40.1132	73.2586	10668.0
223	50	8	40.1172	73.2294	10668.0
223	50	15	40.1285	73.2116	10607.0
223	50	19	40.1360	73.2295	10607.0
223	50	23	40.1416	73.2195	10576.6
223	50	27	40.1489	73.2025	10576.6
223	50	35	40.1608	73.1921	10515.6
223	50	39	40.1653	73.1554	10485.1
223	50	43	40.1719	73.1640	10454.6
223	50	47	40.1819	73.1968	10424.2
223	50	51	40.1852	73.1809	10393.7
223	50	55	40.1903	73.1538	10332.7
223	50	58	40.1959	73.1359	10302.2
223	51	2	40.2022	73.1378	10241.3
223	51	6	40.2083	73.1309	10210.8
223	51	10	40.2143	73.1220	10149.8
223	51	14	40.2206	73.1261	10119.4
223	51	18	40.2268	73.1237	10058.4
223	51	22	40.2326	73.0958	9997.4
223	51	26	40.2388	73.0936	9936.5
223	51	30	40.2450	73.0915	9875.5
223	51	34	40.2512	73.0851	9814.6
223	51	38	40.2575	73.0747	9753.6
223	51	42	40.2637	73.0665	9692.6
223	51	45	40.2699	73.0666	9601.2
223	51	49	40.2762	73.0606	9540.2
223	51	53	40.2826	73.0506	9479.3
223	51	57	40.2888	73.0508	9387.8
223	52	1	40.2952	73.0430	9326.9
223	52	5	40.3015	73.0392	9265.9
223	52	13	40.3127	73.0121	9113.5
223	52	17	40.3194	73.0027	9022.1

223	53	27	40.5888	72.9120	3931.9
223	53	31	40.5902	72.9021	3931.9
223	53	35	40.5925	72.9012	3901.4
223	53	39	40.5938	72.8927	3901.4
223	53	43	40.5958	72.8800	3901.4
223	53	47	40.5995	72.8708	3901.4
223	53	51	40.6018	72.8582	3901.4
223	53	55	40.6026	72.8541	3901.4
223	54	2	40.6091	72.8326	3931.9
223	54	6	40.6091	72.8326	3931.9
223	54	10	40.6109	72.8243	3962.4
223	54	14	40.6149	72.8064	3931.9
223	54	18	40.6152	72.8050	3931.9
223	54	22	40.6162	72.8009	3931.9
223	54	26	40.6202	72.7846	3931.9
223	54	30	40.6216	72.7791	3962.4
223	54	34	40.6223	72.7764	3962.4
223	54	38	40.6260	72.7629	3992.9
223	54	42	40.6297	72.7495	3992.9
223	54	46	40.6305	72.7468	4023.4
223	54	49	40.6341	72.7348	4053.8
223	54	53	40.6357	72.7295	4053.8
223	54	57	40.6361	72.7281	4053.8
223	55	1	40.6406	72.7072	4053.8
223	55	5	40.6441	72.6967	4084.3
223	55	9	40.6464	72.6902	4114.8
223	55	13	40.6454	72.6864	4145.3
223	55	17	40.6482	72.6786	4175.8

TWA 800 Transponded data from Sikorsky Radar

HR	MIN	SEC	LAT	LONG	ALT
223	49	18	40.5432	73.4355	2407.9
223	49	21	40.5445	73.4315	2712.7
223	49	25	40.5429	73.4170	2712.7
223	49	29	40.5445	73.4146	2743.2
223	49	34	40.5450	73.4077	2773.7
223	49	36	40.5462	73.4038	2804.2
223	49	40	40.5449	73.3894	2834.6
223	49	44	40.5466	73.3871	2895.6
223	49	48	40.5459	73.3743	2926.1
223	49	52	40.5456	73.3630	2956.6
223	49	56	40.5476	73.3622	3017.5
223	50	0	40.5477	73.3525	3048.0
223	50	4	40.5491	73.3488	3078.5
223	50	8	40.5496	73.3405	3078.5
223	50	15	40.5508	73.3242	3139.4
223	50	19	40.5502	73.3086	3169.9
223	50	23	40.5502	73.3086	3200.4
223	50	27	40.5520	73.3065	3230.9
223	50	31	40.5525	73.2969	3261.4
223	50	35	40.5529	73.2859	3322.3
223	50	39	40.5520	73.2799	3383.3
223	50	43	40.5521	73.2659	3444.2
223	50	47	40.5533	73.2595	3505.2
223	50	51	40.5531	73.2580	3566.2
223	50	55	40.5540	73.2486	3596.6
223	50	59	40.5545	73.2347	3657.6
223	51	2	40.5528	73.2198	3657.6
223	51	6	40.5552	73.2224	3688.1
223	51	10	40.5559	73.2086	3688.1
223	51	14	40.5619	73.2438	3688.1
223	51	18	40.5567	73.1949	3718.6
223	51	22	40.5556	73.1815	3718.6
223	51	26	40.5574	73.1768	3718.6
223	51	30	40.5567	73.1664	3718.6
223	51	34	40.5588	73.1662	3749.0
223	51	38	40.5578	73.1499	3749.0
223	51	42	40.5601	73.1541	3779.5
223	51	46	40.5593	73.1379	3779.5
223	51	49	40.5592	73.1334	3779.5
223	51	53	40.5608	73.1185	3810.0
223	51	57	40.5606	73.1126	3810.0
223	52	1	40.5604	73.0978	3840.5
223	52	5	40.5603	73.0949	3840.5
223	52	9	40.5603	73.0860	3840.5
223	52	13	40.5604	73.0698	3871.0
223	52	17	40.5625	73.0654	3871.0
223	52	21	40.5626	73.0580	3901.4
223	52	25	40.5629	73.0462	3901.4
223	52	29	40.5629	73.0462	3901.4
223	52	32	40.5633	73.0344	3901.4
223	52	36	40.5639	73.0212	3931.9
223	52	40	40.5647	73.0065	3931.9
223	52	44	40.5646	73.0080	3931.9
223	52	48	40.5652	72.9991	3931.9
223	52	52	40.5686	72.9818	3962.4
223	52	56	40.5692	72.9745	3962.4
223	53	0	40.5709	72.9792	3992.9
223	53	4	40.5749	72.9577	3992.9
223	53	8	40.5782	72.9465	3962.4
223	53	12	40.5804	72.9278	3931.9
223	53	16	40.5812	72.9283	3931.9

223	58	50	40.4133	73.0262	0.0
223	58	50	40.6251	72.9860	0.0
223	58	53	40.4564	73.5064	0.0
223	59	12	40.6566	72.6113	0.0
223	59	12	40.6364	72.6044	0.0
223	59	12	40.6519	72.6131	0.0
223	59	2	40.4028	73.0463	0.0
223	59	2	40.6279	72.9819	0.0
223	59	5	40.4552	73.5086	0.0
223	59	24	40.6567	72.6109	0.0
223	59	24	40.6517	72.6140	0.0
223	59	14	40.6258	72.9871	0.0
223	59	14	40.7356	72.8607	0.0
223	59	15	40.4307	73.3558	0.0
223	59	17	40.4552	73.5086	0.0
223	59	36	40.6567	72.6104	0.0
223	59	36	40.6502	72.6111	0.0
223	59	25	40.4212	72.8262	0.0
223	59	27	40.6418	73.0126	0.0
223	59	29	40.5847	73.2205	0.0
223	59	29	40.4521	73.5092	0.0

223	57	5	40.6623	73.0781	0.0
223	57	5	40.4580	73.4979	0.0
223	57	25	40.6590	72.6215	0.0
223	57	25	40.6391	72.6683	0.0
223	57	14	40.4838	72.8474	0.0
223	57	14	40.4930	72.8747	0.0
223	57	15	40.6241	72.9845	0.0
223	57	15	40.7352	72.8601	0.0
223	57	17	40.4503	73.4368	0.0
223	57	17	40.4580	73.4979	0.0
223	57	37	40.6589	72.6219	0.0
223	57	37	40.6391	72.6683	0.0
223	57	26	40.4388	72.8163	0.0
223	57	26	40.4833	72.8949	0.0
223	57	27	40.6253	72.9822	0.0
223	57	27	40.6227	72.9907	0.0
223	57	27	40.4090	73.2430	0.0
223	57	27	40.7356	72.8607	0.0
223	57	27	40.6908	72.9417	0.0
223	57	29	40.4345	73.3710	0.0
223	57	29	40.5847	73.2273	0.0
223	57	29	40.4590	73.4988	0.0
223	57	49	40.6590	72.6211	0.0
223	57	49	40.5830	72.6625	0.0
223	57	37	40.4962	72.7568	0.0
223	57	38	40.4714	72.9144	0.0
223	57	39	40.6267	72.9842	0.0
223	57	39	40.4061	73.2429	0.0
223	57	41	40.4576	73.2808	0.0
223	57	41	40.4559	73.4993	0.0
223	57	50	40.4350	72.8193	0.0
223	57	50	40.4607	72.9303	0.0
223	57	51	40.4052	73.2457	0.0
223	57	51	40.6257	72.9909	0.0
223	57	53	40.5878	73.2303	0.0
223	58	13	40.6491	72.6467	0.0
223	58	13	40.5512	72.7019	0.0
223	58	1	40.5620	72.7745	0.0
223	58	2	40.4509	72.9483	0.0
223	58	2	40.6253	72.9822	0.0
223	58	2	40.4030	73.2465	0.0
223	58	2	40.6312	72.9826	0.0
223	58	3	40.6844	72.9409	0.0
223	58	5	40.4557	73.5024	0.0
223	58	24	40.6572	72.6191	0.0
223	58	25	40.6351	72.6640	0.0
223	58	25	40.5677	72.6830	0.0
223	58	14	40.4393	72.9672	0.0
223	58	14	40.6257	72.9827	0.0
223	58	17	40.5847	73.2273	0.0
223	58	17	40.4576	73.5041	0.0
223	58	36	40.6533	72.6169	0.0
223	58	37	40.5850	72.6632	0.0
223	58	26	40.4302	72.9864	0.0
223	58	26	40.6243	72.9889	0.0
223	58	29	40.4566	73.5033	0.0
223	58	48	40.6577	72.6165	0.0
223	58	49	40.6031	72.6441	0.0
223	58	38	40.4212	73.0051	0.0
223	58	38	40.6265	72.9881	0.0
223	58	41	40.4564	73.5064	0.0
223	59	0	40.6581	72.6147	0.0
223	59	0	40.6518	72.6136	0.0
223	59	0	40.6205	72.6224	0.0

223	55	15	40.6243	72.9889	0.0
223	55	3	40.6250	72.9899	0.0
223	55	15	40.7363	72.8577	0.0
223	55	3	40.6247	72.9977	0.0
223	55	15	40.6194	73.0062	0.0
223	55	15	40.4284	73.2385	0.0
223	55	4	40.4306	73.2375	0.0
223	55	6	40.4653	73.4513	0.0
223	55	6	40.4600	73.4864	0.0
223	55	18	40.4600	73.4864	0.0
223	55	6	40.5954	73.2338	0.0
223	55	38	40.6605	72.6393	0.0
223	55	26	40.5956	72.7160	0.0
223	55	27	40.6246	72.9894	0.0
223	55	27	40.7354	72.8604	0.0
223	55	27	40.4275	73.2412	0.0
223	55	27	40.7053	72.9333	0.0
223	55	30	40.4625	73.4920	0.0
223	55	49	40.6636	72.6324	0.0
223	55	38	40.5845	72.7350	0.0
223	55	39	40.6243	72.9889	0.0
223	55	39	40.6308	72.9821	0.0
223	55	39	40.7356	72.8607	0.0
223	55	42	40.4560	73.4861	0.0
223	56	1	40.6621	72.6280	0.0
223	55	50	40.5736	72.7517	0.0
223	55	51	40.6230	72.9951	0.0
223	55	51	40.4228	73.2385	0.0
223	55	51	40.7346	72.8634	0.0
223	55	54	40.6024	73.2136	0.0
223	55	54	40.4597	73.4895	0.0
223	56	13	40.6619	72.6293	0.0
223	56	2	40.5614	72.7707	0.0
223	56	3	40.7591	72.7784	0.0
223	56	3	40.6230	72.9951	0.0
223	56	3	40.7340	72.8625	0.0
223	56	6	40.4576	73.4909	0.0
223	56	25	40.6622	72.6275	0.0
223	56	14	40.5492	72.7877	0.0
223	56	15	40.6262	72.9875	0.0
223	56	15	40.4190	73.2413	0.0
223	56	18	40.4585	73.4917	0.0
223	56	37	40.6623	72.6271	0.0
223	56	26	40.7628	72.7104	0.0
223	56	26	40.5376	72.8058	0.0
223	56	27	40.7350	72.8598	0.0
223	56	27	40.4190	73.2413	0.0
223	56	27	40.6259	72.9953	0.0
223	56	30	40.4595	73.4926	0.0
223	56	49	40.6623	72.6266	0.0
223	56	38	40.5260	72.8227	0.0
223	56	39	40.6241	72.9928	0.0
223	56	40	40.4564	73.4931	0.0
223	56	41	40.6594	73.1418	0.0
223	57	1	40.6626	72.6253	0.0
223	56	50	40.5142	72.8376	0.0
223	56	51	40.6248	72.9855	0.0
223	56	51	40.4140	73.2422	0.0
223	56	51	40.7369	72.8585	0.0
223	56	53	40.4573	73.4940	0.0
223	57	13	40.6607	72.6239	0.0
223	57	13	40.6391	72.6683	0.0
223	57	2	40.5035	72.8561	0.0
223	57	3	40.6237	72.9840	0.0

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Technical Analysis Briefing

TWA Flight 800

PREPARED FOR

James K. Kallstrom, Assistant Director, FBI

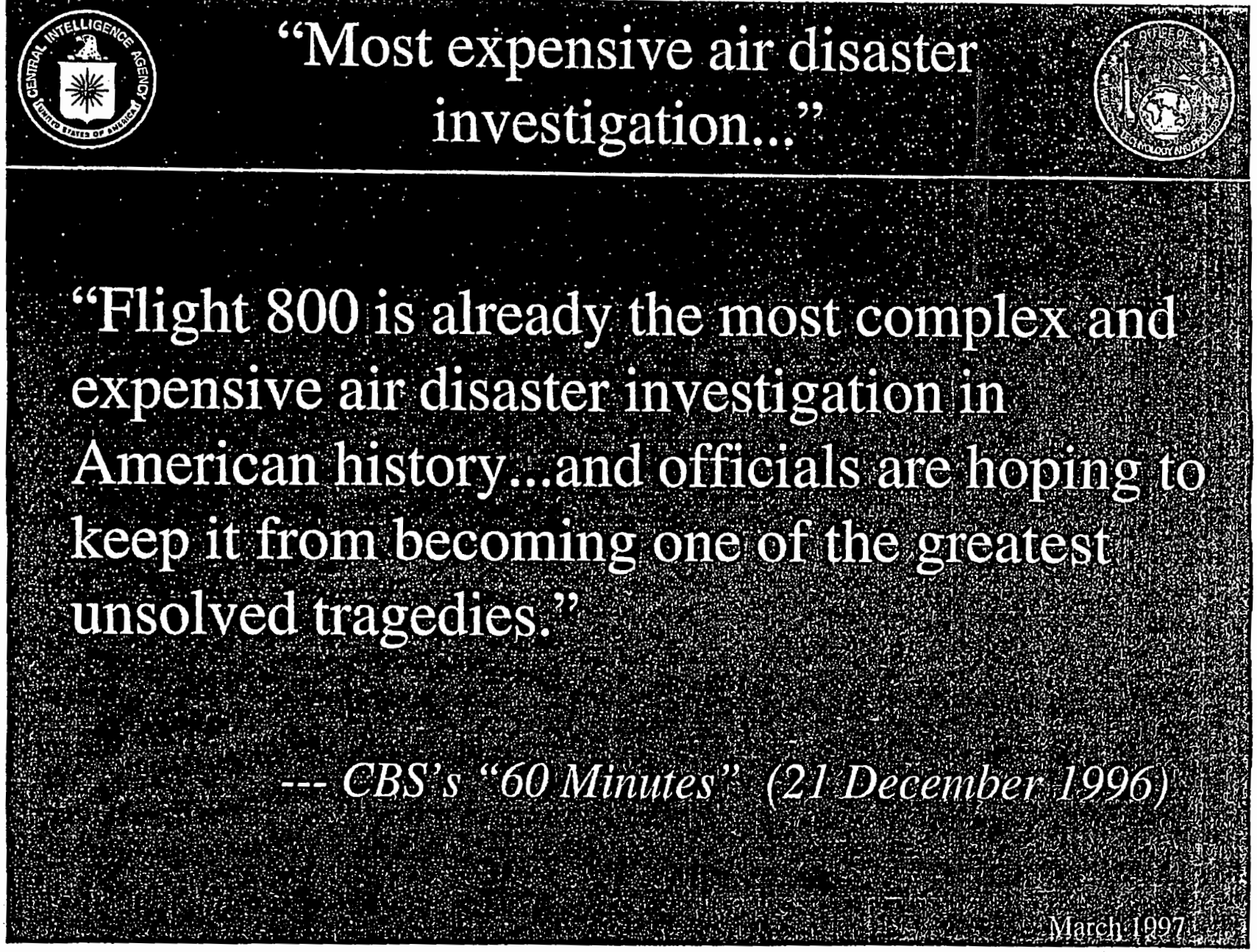
[redacted]

March 1997

"Terrorist implications..."

If the TWA Flight 800 disaster was foreign terrorism, it would be one of the most horrific foreign terrorist acts ever committed against the U.S.

March 1997

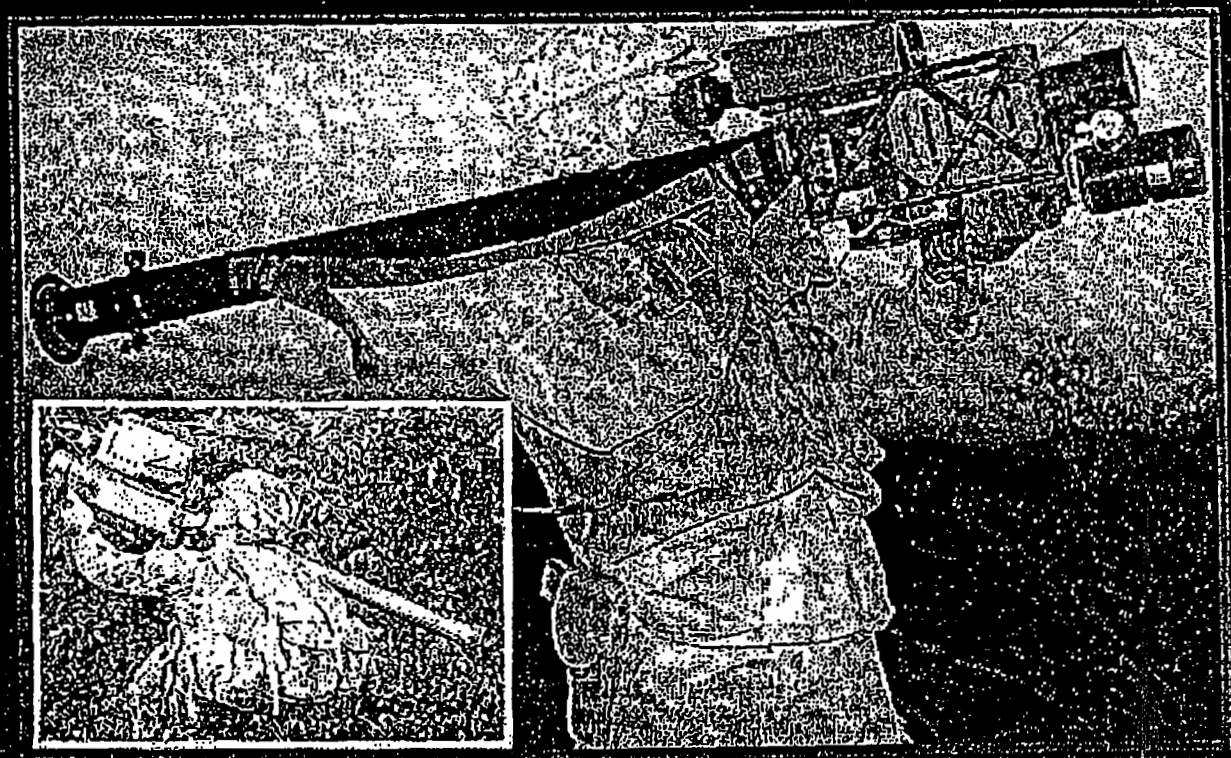


Most Expensive "Criminal Investigation" in History

- Federal Bureau of Investigation
- Central Intelligence Agency
- National Security Agency
- Defense Intelligence Agency
  -- Missile and Space Intelligence Center
- Federal Aviation Administration
- National Transportation Safety Board
- U.S. Navy
- National Labs (Sandia, Brookhaven, Lawrence Livermore)

March 1997

Was a Missile Used to Shoot Down TWA Flight 800?



Almost certainly not.

March 1997

Why This Conclusion?

There is no evidence that any "missile" sighting occurred before Flight 800 exploded.

March 1997

Eyewitnesses

Many witnesses describe seeing "flare" or "firework" ascend toward plane just before explosion...

What did they see?

March 1997

Answer

Only the plane in various stages of destruction.

March 1997

Data Sources

- Cockpit Voice Recorder (CVR)
- Flight Data Recorder (FDR)
- Infrared data (one sample)
- Locations of major debris on ocean floor
- Radar data
- Eyewitness accounts
  - -- Sight
  - -- Sound

March 1997

Data Deficiencies

- Power off just after initial explosion:
  - -- Cockpit Voice Recorder (CVR)
  - -- Flight Data Recorder (FDR)
  - -- Aircraft Radar Transponder (altitude data)

- JFK Airport Radar limitations:
  - -- Provides only latitude and longitude
  - -- Samples only every 12 seconds

March 1997

Analytical Approach

- Determine precise latitude, longitude, altitude, speed and heading of TWA 800 when onboard voice and data recordings ended.
- Precisely locate each witness using GPS and/or mapping software.
- For as many witnesses as possible, determine precise azimuth of "flare/firework" sightings and "fireball" sightings.
- Determine what each witness heard ... and when (with respect to visual observations).
- Determine how long sound takes to travel from TWA 800 to each witness.
- Combine results, along with infrared data and radar tracking (transponded and "skin tracking"), to determine what the witnesses most likely saw and heard.

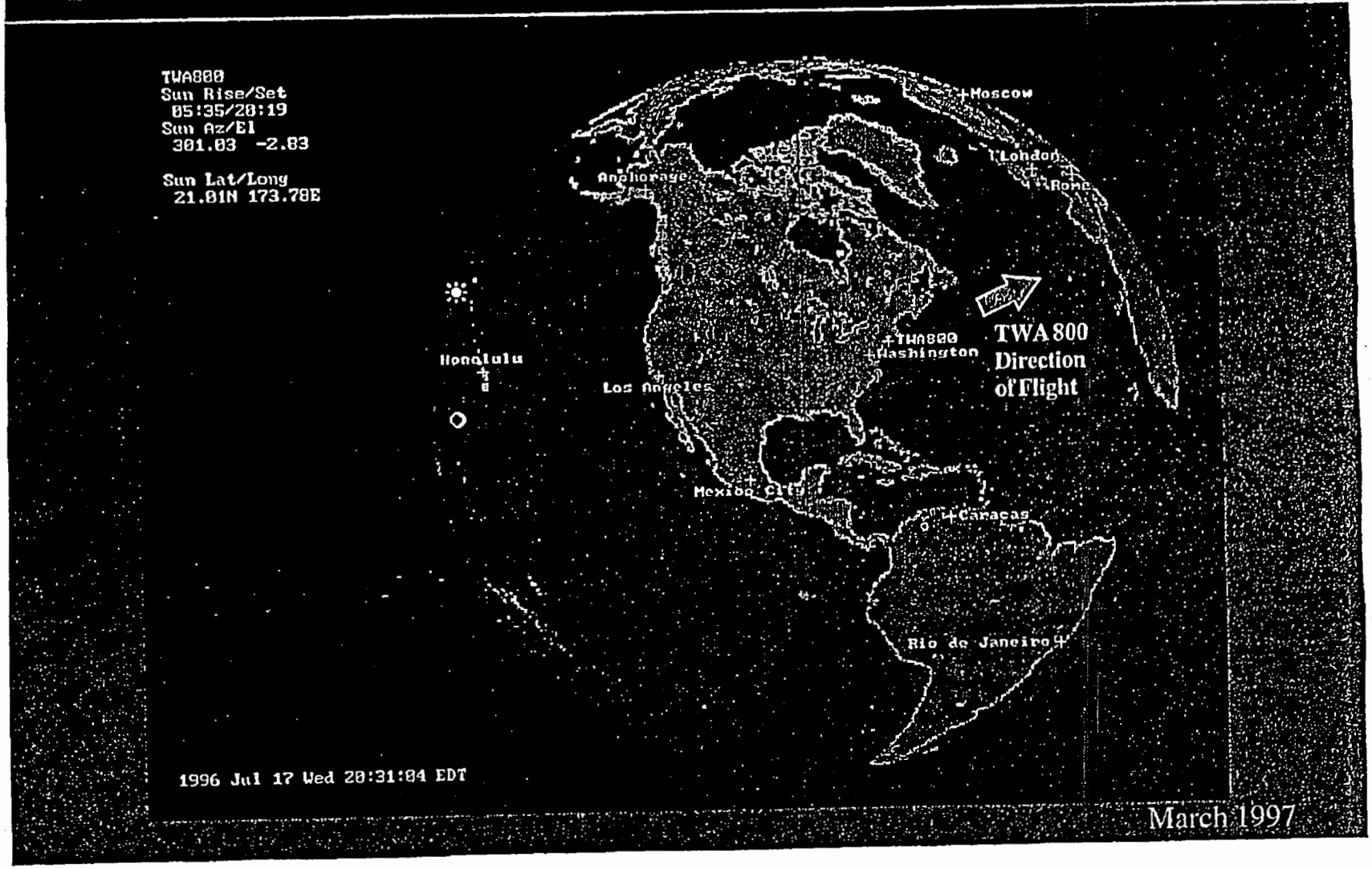
March 1997

TWA 800 Conditions When Onboard Voice and Data Recordings Ended

- Time recordings ended: 831:07.496 PM.
- Lat/Long = 40° 38' 45" north; 72° 41' 12" west;
  = 40° 38.76' north; 72° 41.22' west;
  = 40.646° north/72.687° west.
- Altitude = 13,820 ft.
- Ground Speed = 380 knots (= 641 ft/sec = MACH 0.60).
- Air Speed = 330 knots (= 557 ft/sec = MACH 0.52).
- Heading = 70.93 degrees.
- Other Fact: Average speed of sound from plane at 13,820 ft. altitude (1,062 ft/sec) to observers on ground or water (1,116 ft/sec) = 1,089 ft/sec.

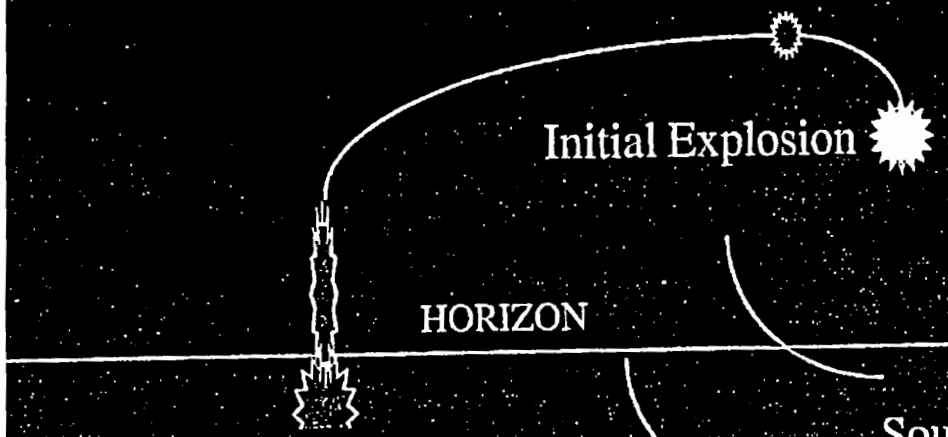
March 1997

TWA 800: Lighting Conditions When Recordings End



March 1997

How Long From Initial Explosion to Water Impact?



Answer: Slightly Less Than 49 Seconds

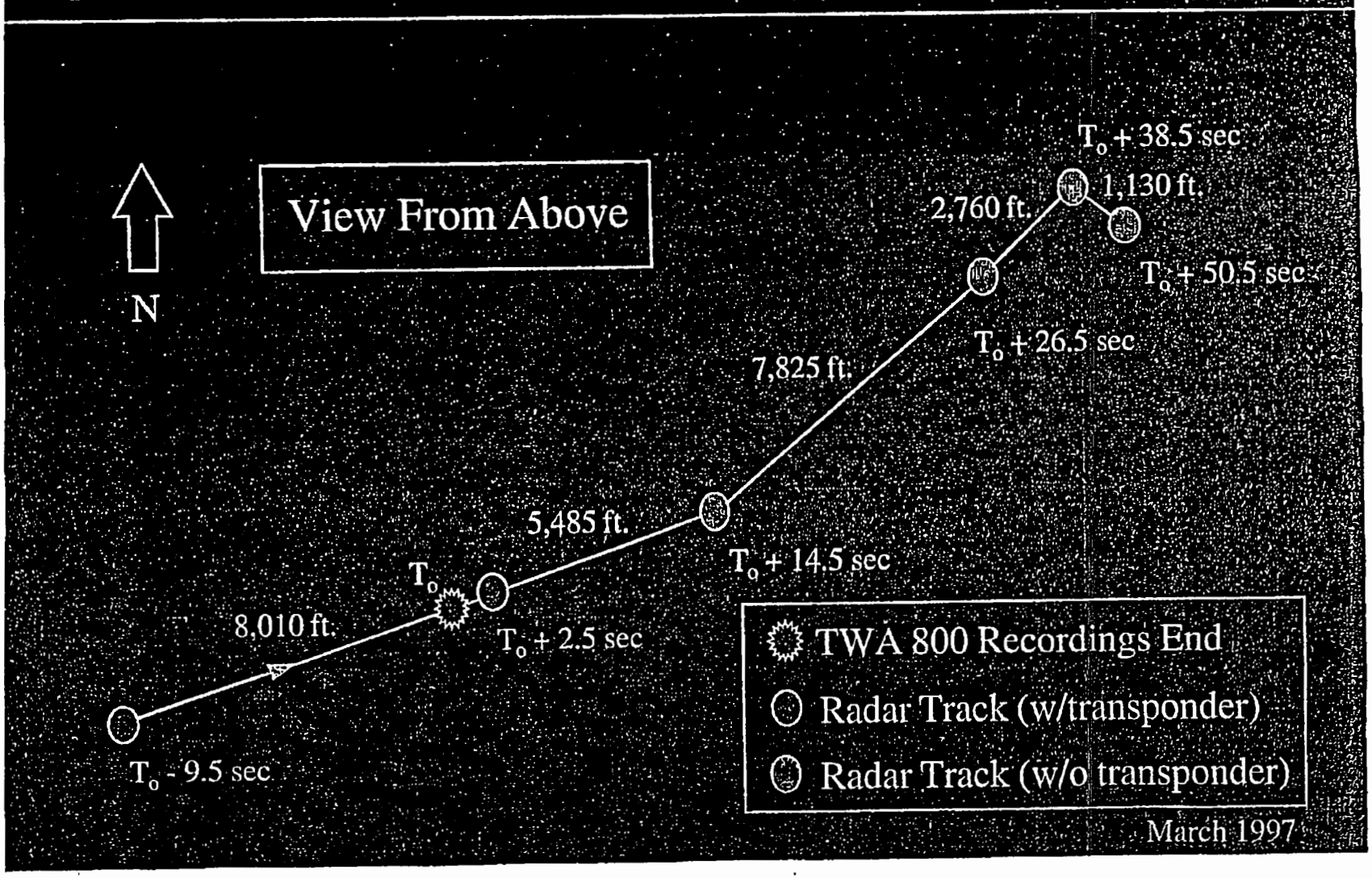
Sound takes 48.6 sec to travel 52,250 ft. from aircraft to witness (corrected for "winds aloft").

Witness "V.S."

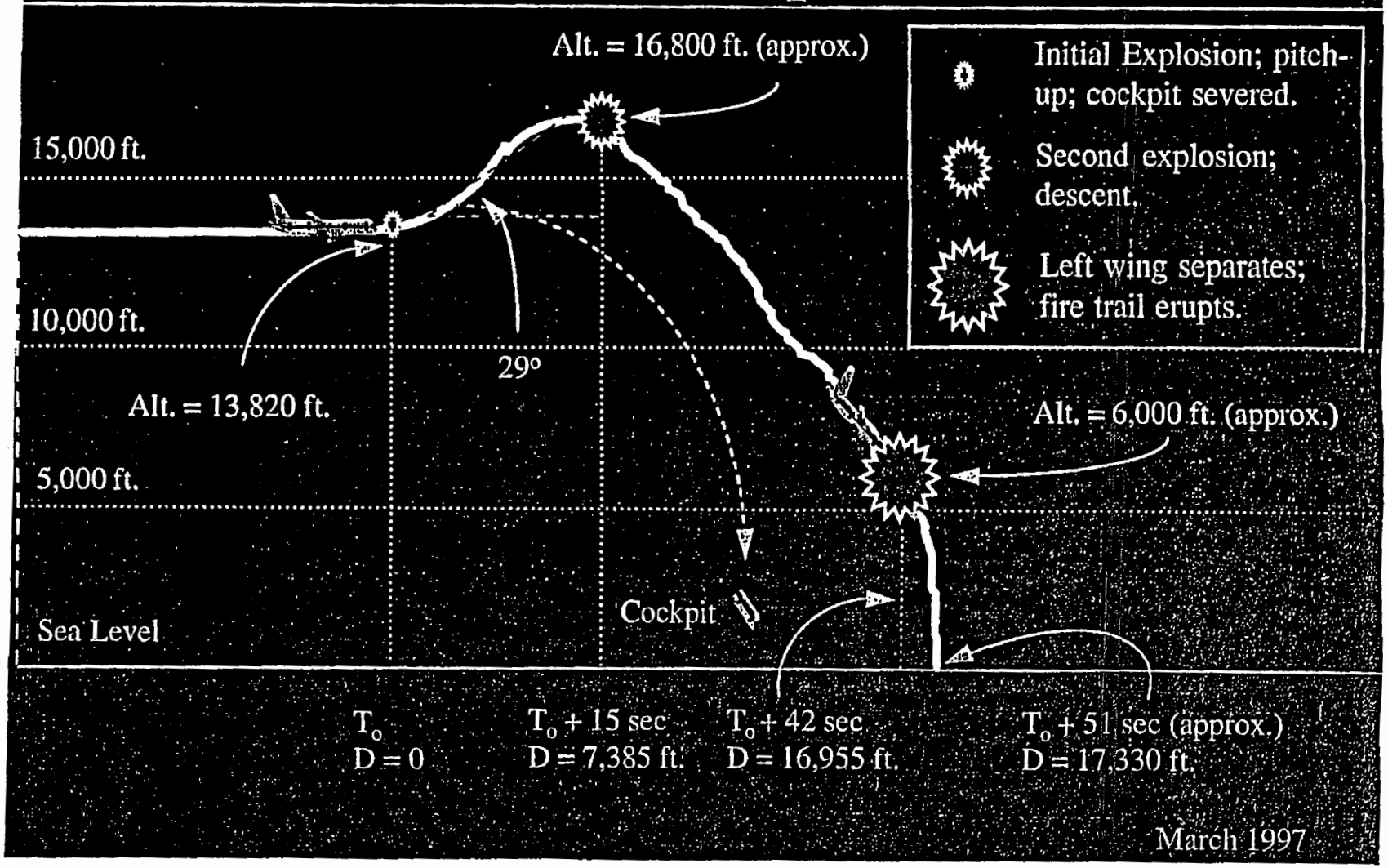
- Saw "huge, intense, orange, yellow and red fireball, that looked pear-shaped, drop from the sky into the ocean."
- "Two large...booms reached the condo and shook the ground [just]...after the fireball reached the surface of the water."

March 1997

TWA Flight 800 Radar Tracking



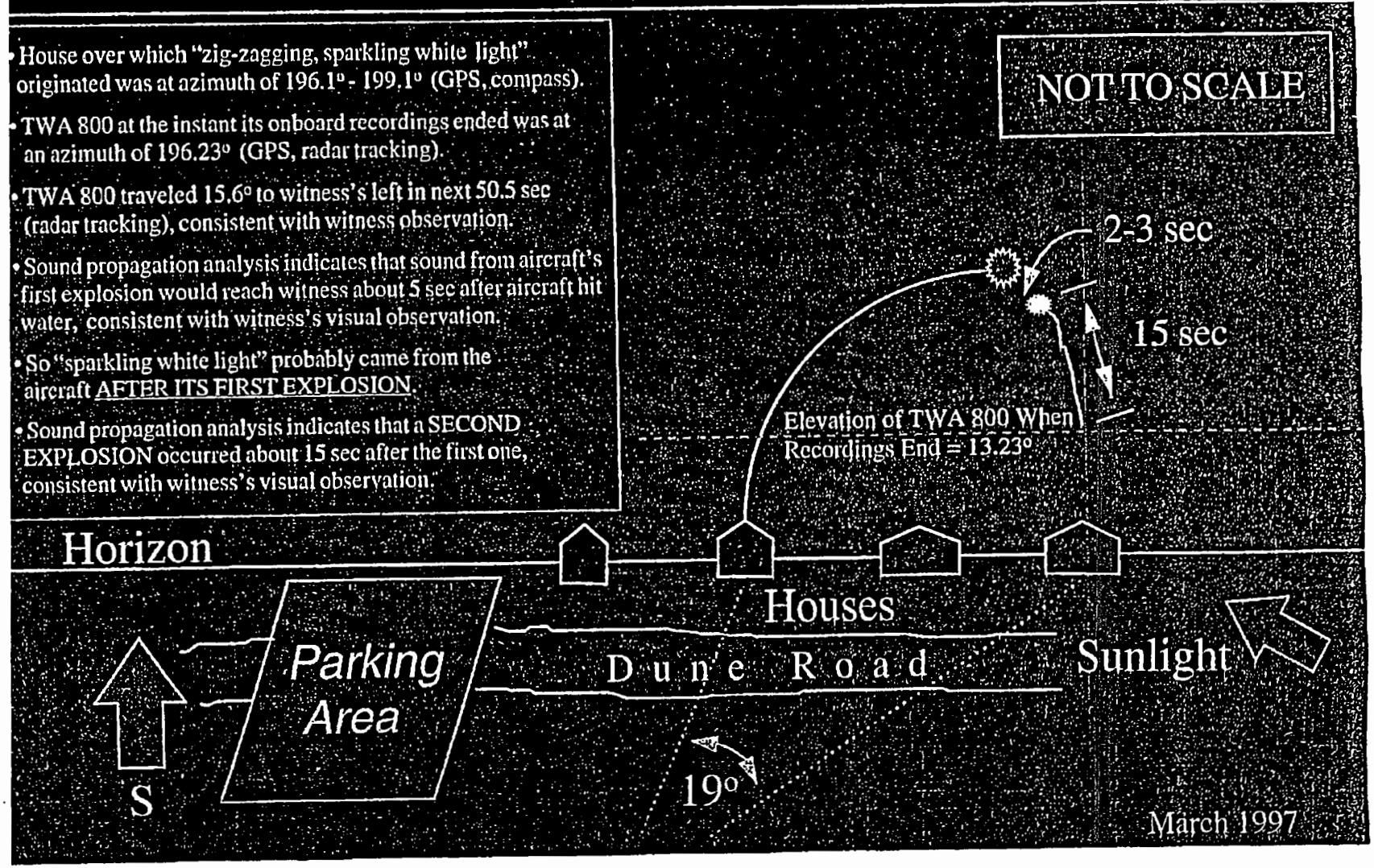
Estimated Flight Profile After First Explosion



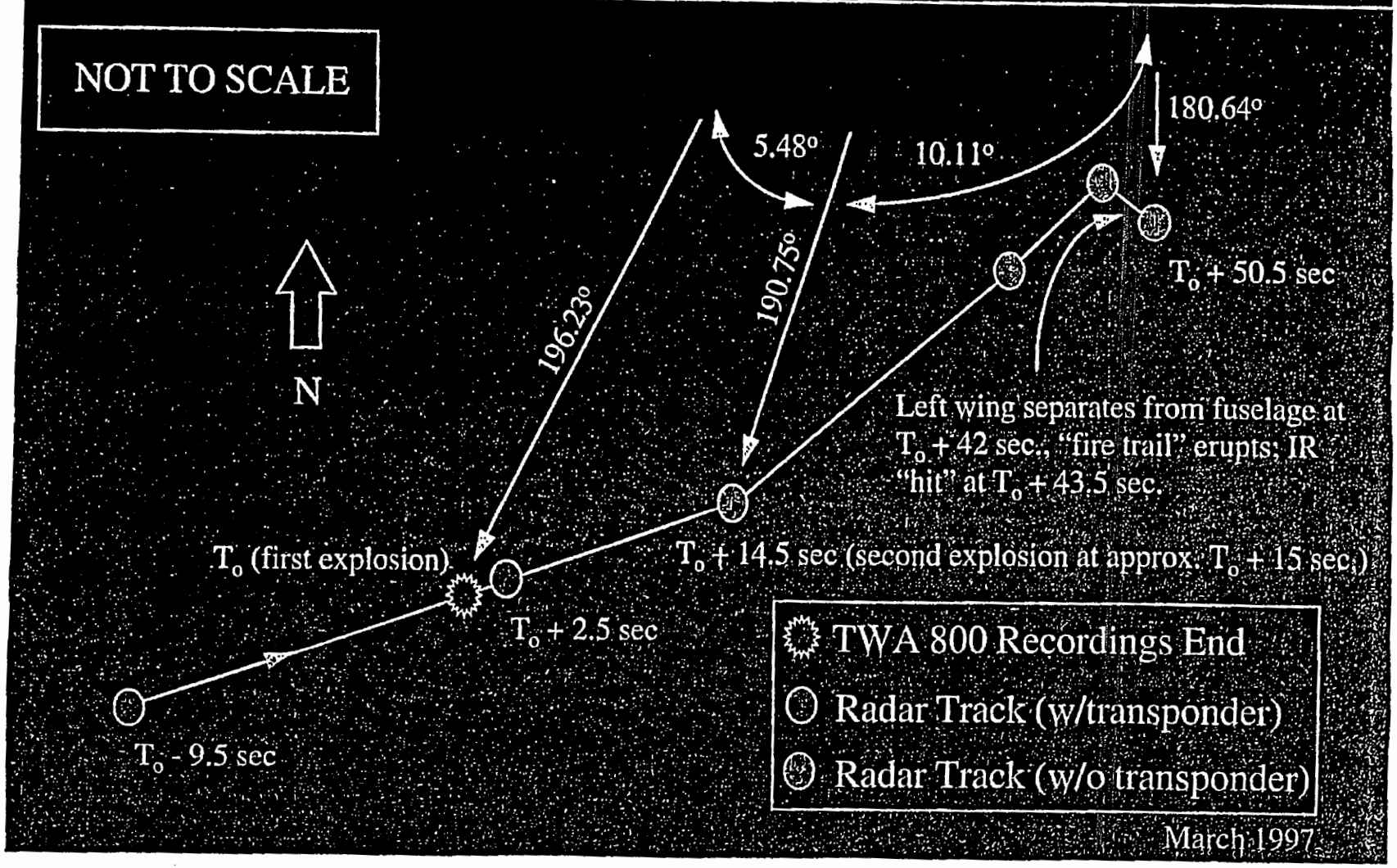
March 1997

Perspective of Witness "M.W."

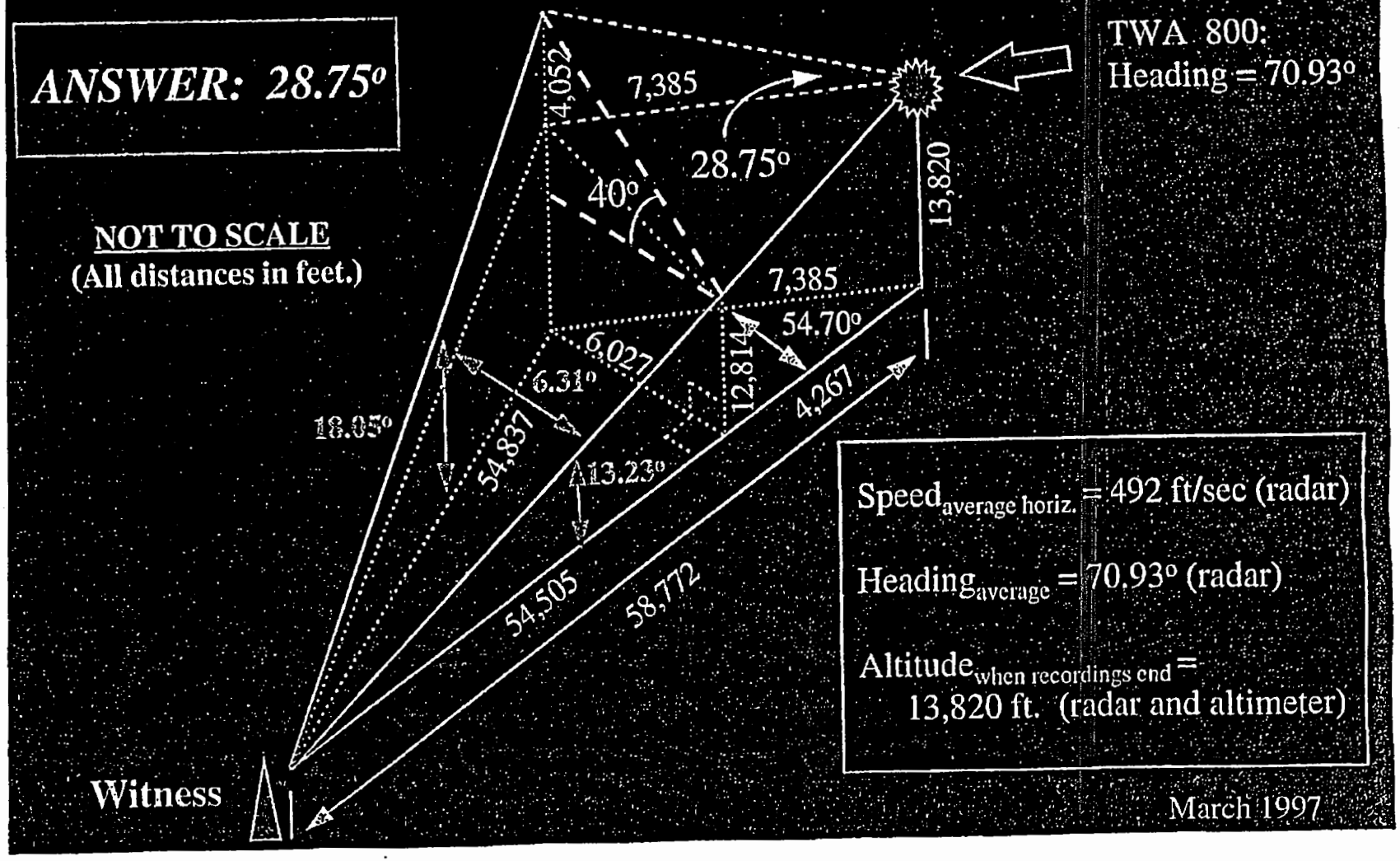
- House over which "zig-zagging, sparkling white light" originated was at azimuth of 196.1° - 199.1° (GPS, compass).
- TWA 800 at the instant its onboard recordings ended was at an azimuth of 196.23° (GPS, radar tracking).
- TWA 800 traveled 15.6° to witness's left in next 50.5 sec (radar tracking), consistent with witness observation.
- Sound propagation analysis indicates that sound from aircraft's first explosion would reach witness about 5 sec after aircraft hit water, consistent with witness's visual observation.
- So "sparkling white light" probably came from the aircraft AFTER ITS FIRST EXPLOSION.
- Sound propagation analysis indicates that a SECOND EXPLOSION occurred about 15 sec after the first one, consistent with witness's visual observation.



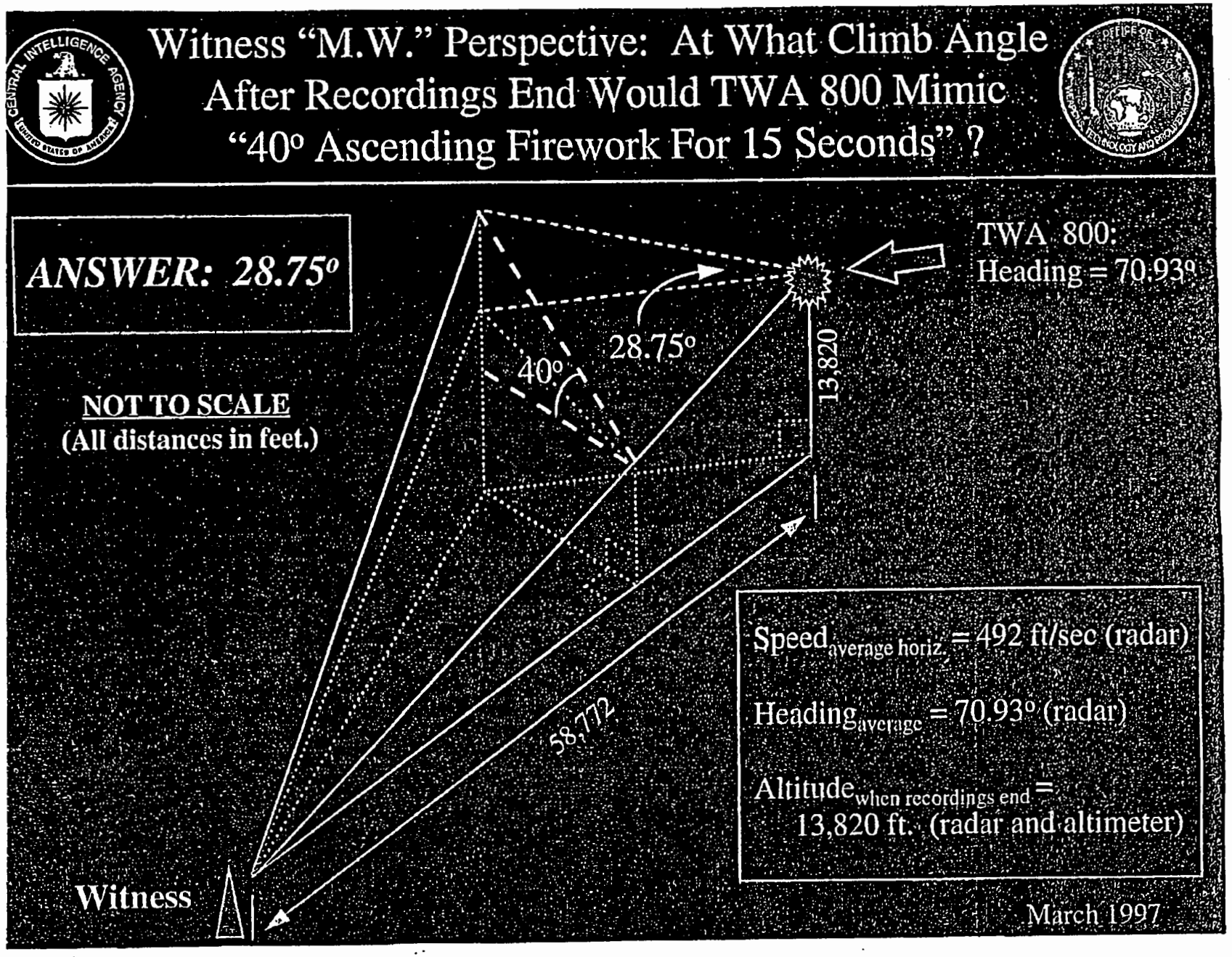
TWA Flight 800 Radar Tracking (Azimuths to Witness "M.W.")



Witness "M.W." Perspective: At What Climb Angle After Recordings End Would TWA 800 Mimic "40° Ascending Firework For 15 Seconds" ?



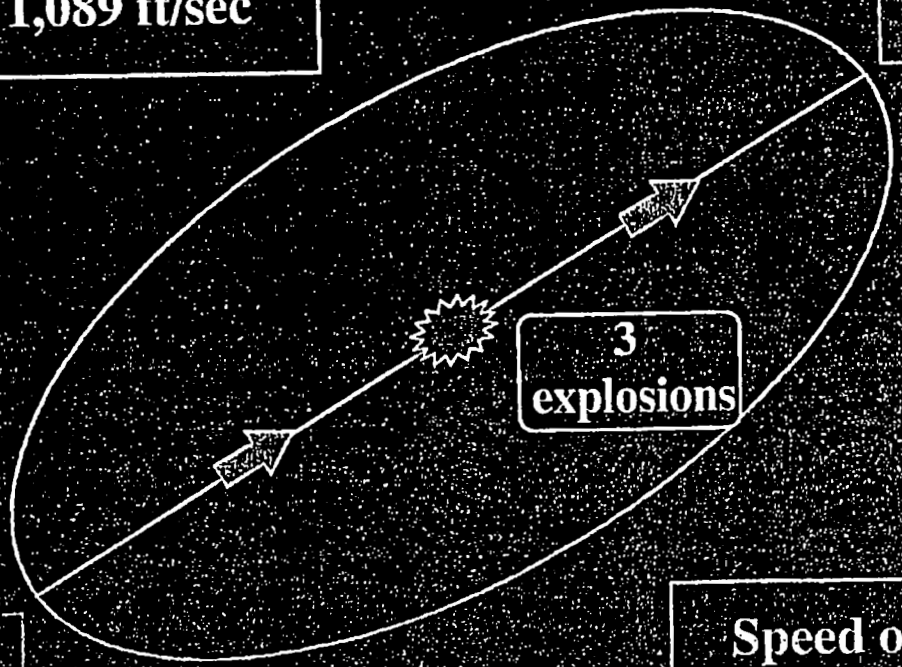
Witness "M.W." Perspective: At What Climb Angle After Recordings End Would TWA 800 Mimic "40° Ascending Firework For 15 Seconds" ?



TWA 800 Sound Propagation Analysis

Average speed of sound to observers = 1,089 ft/sec

Sounds 10 sec apart appear 4.1 sec apart



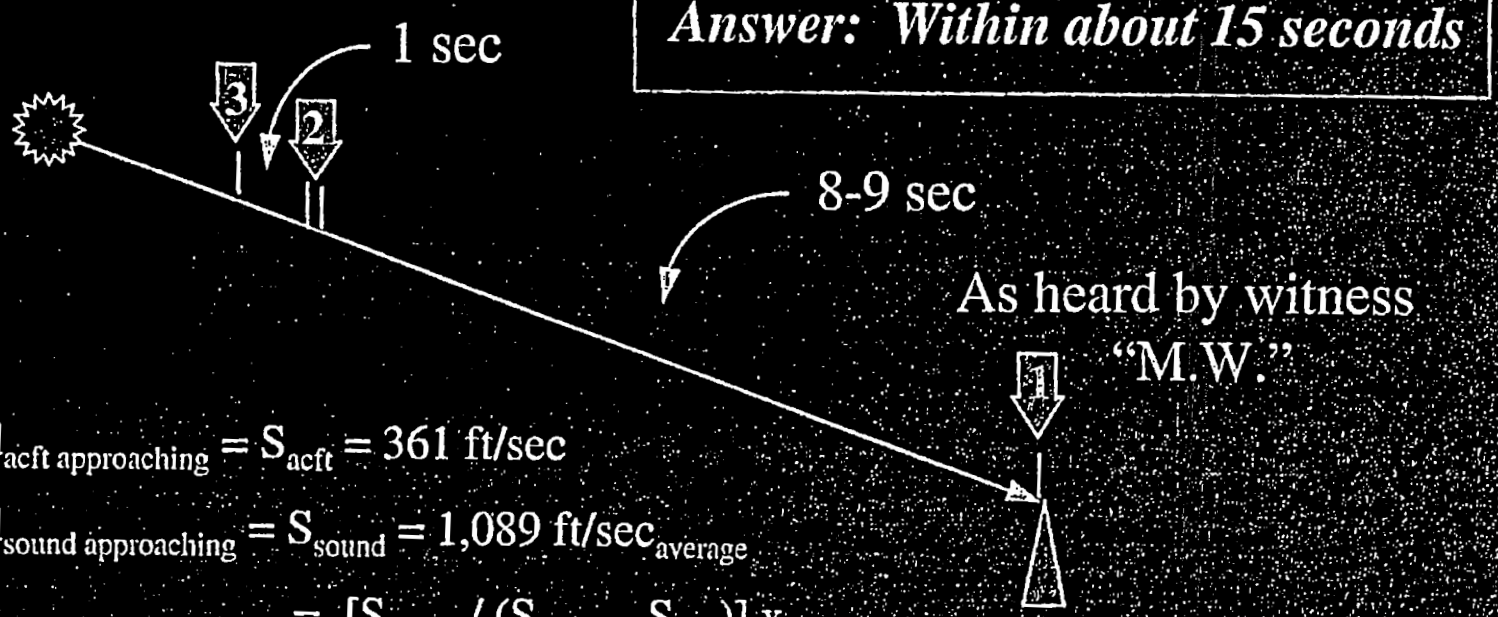
Sounds 10 sec apart appear 15.9 sec apart

Speed of TWA 800 = 641 ft/sec

March 1997

When Did "Three Explosions" on Plane Occur?

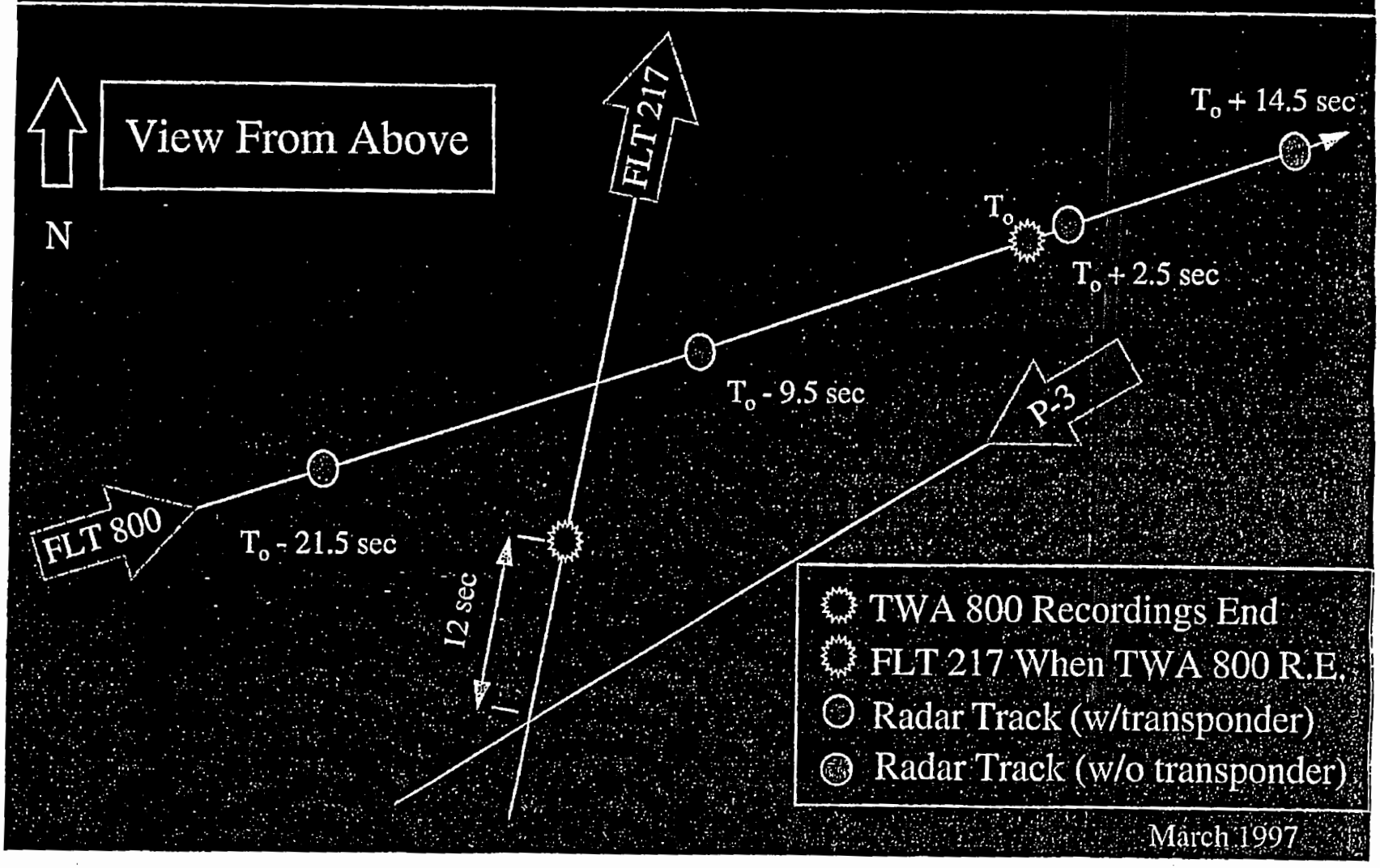
Answer: Within about 15 seconds



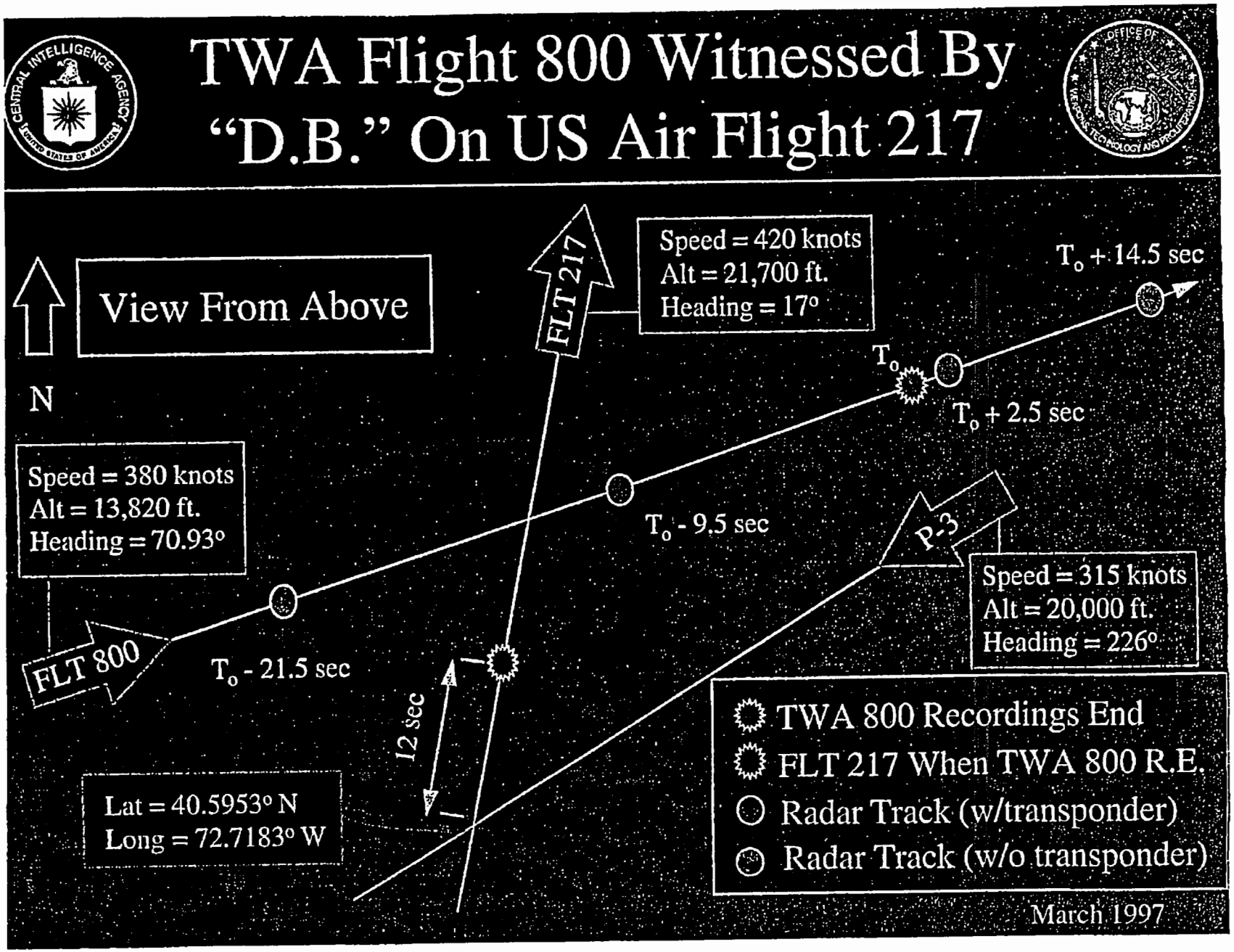
- $\text{Speed}_{\text{acft approaching}} = S_{\text{acft}} = 361$ ft/sec
- $\text{Speed}_{\text{sound approaching}} = S_{\text{sound}} = 1{,}089$ ft/sec$_{\text{average}}$
- $\text{Time}_{\text{between sounds on acft}} = [S_{\text{sound}} / (S_{\text{sound}} - S_{\text{acft}})] \times \text{Time}_{\text{between sounds heard on ground}}$
  $= (1{,}089 \text{ ft/sec}) / [(1{,}089 \text{ ft/sec}) - (361 \text{ ft/sec})] \times 10 \text{ sec}$
  $= 15.0$ sec
- So sounds heard by witness "M.W." 10 seconds apart were produced on plane 15 seconds apart.

March 1997

TWA Flight 800 Witnessed By "D.B." On US Air Flight 217



TWA Flight 800 Witnessed By "D.B." On US Air Flight 217



TWA 800 Timeline

Initial Explosion (T_o = 0831:07.496 PM)

Onboard flight data and voice recordings end at T_o = 0; cockpit separates within 4 sec (last transponded radar signal received at 0831:12.133 PM); aircraft pitches up dramatically.

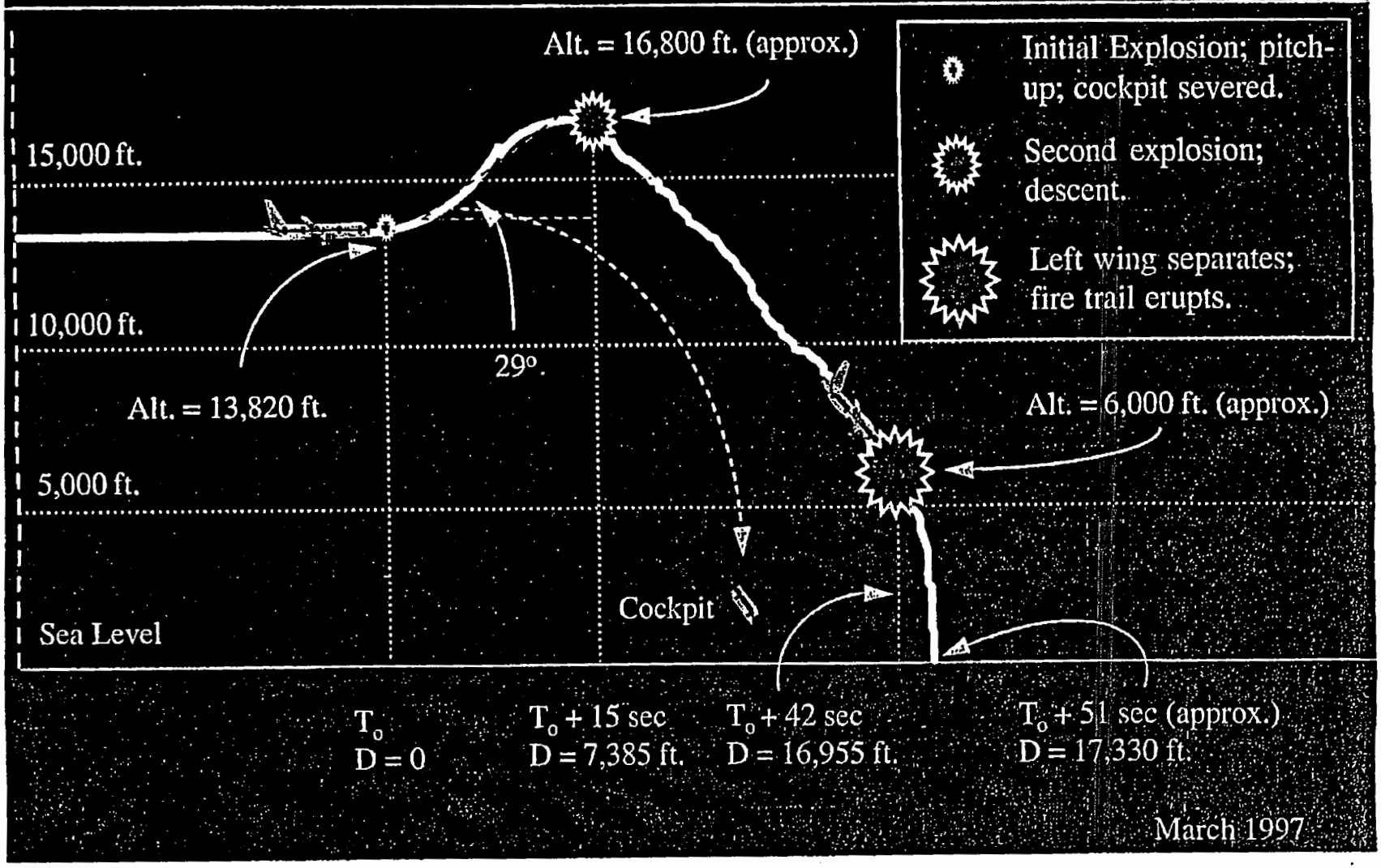
Two or 3 secondary explosions occur over a 2-sec period beginning at about T_o + 15 sec (witness and sound propagation analysis).

While at altitude of about one mile, aircraft hooks to left and downward; left wing separates from fuselage at T_o + 42 sec (witness and sound propagation analysis); "fire trail" erupts. (Infrared "hit" at T_o + 43.5 sec, detects heat of "fire trail.")

Left wing and most of rest of plane impact water; wing trails rest of plane by 1-2 sec (witness and radar "skin track" [0831:58 PM].

March 1997

Estimated Flight Profile After First Explosion



TWA Flight 800
Eyewitnesses Summary

How do the eyewitness accounts match the proposed trajectory of TWA Flight 800?

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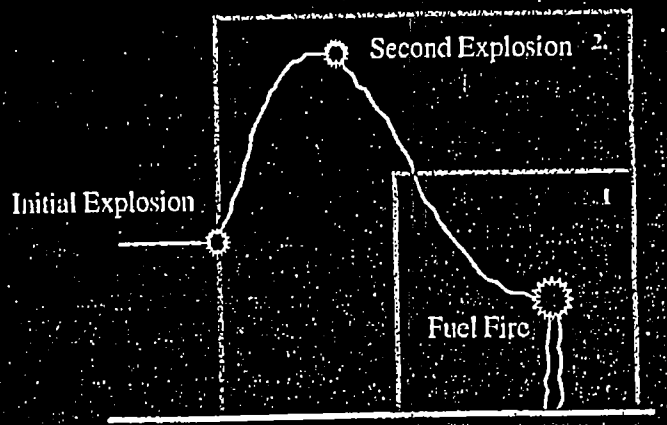
Method of Grouping TWA 800 Eyewitnesses

Group

1. Observes only end event
2. Observations begin close to but after initial explosion
3. Observations consistent with Group 1 or 2, but description includes "object hitting aircraft"
4. Observations inconclusive

Groups 1 & 2 limit observations to *after* initial explosion



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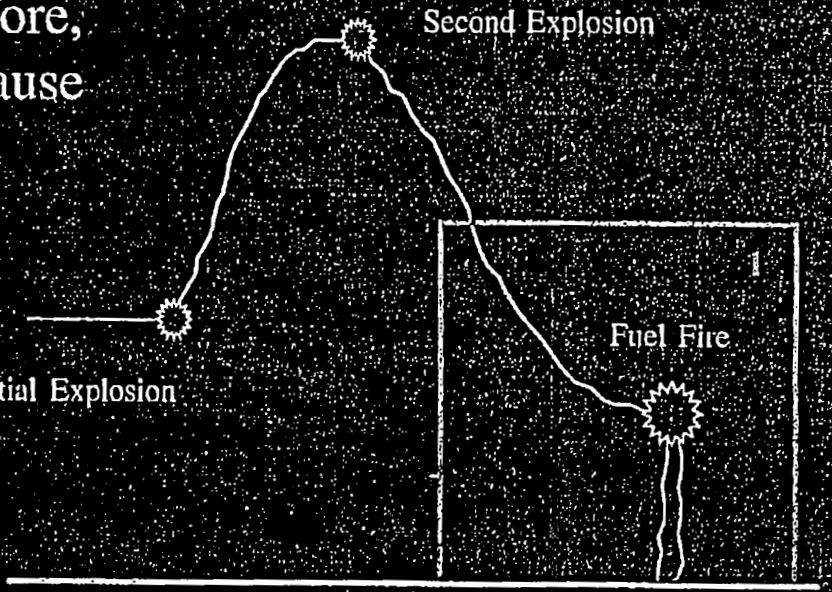
Group 1: 146 Eyewitnesses

Eyewitnesses assigned to Group 1, only observe events at the end of TWA 800's flight, and, therefore, *could not* have seen missile cause the initial explosion.



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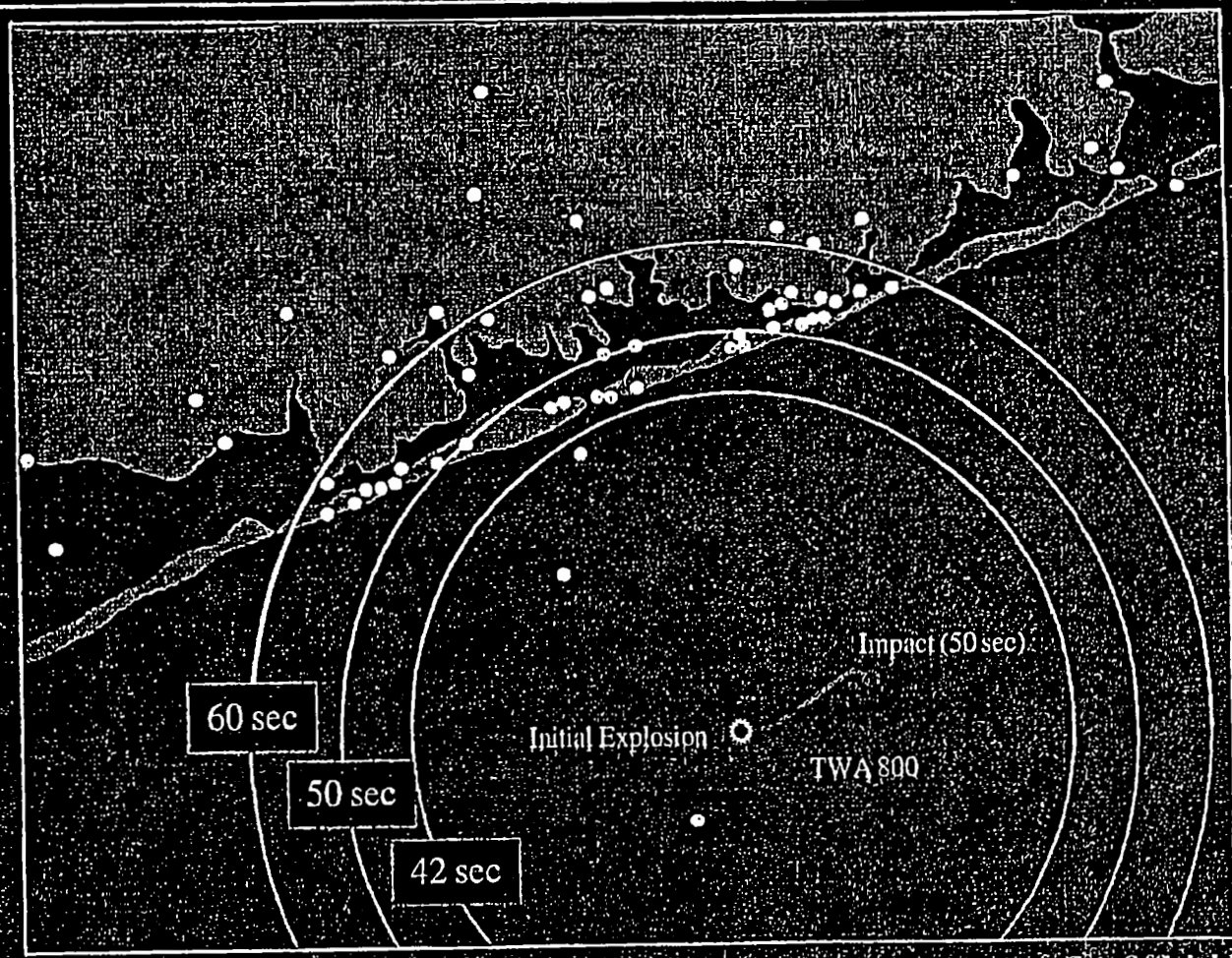
Group 1: Observations Begin Close to Hearing First Sound



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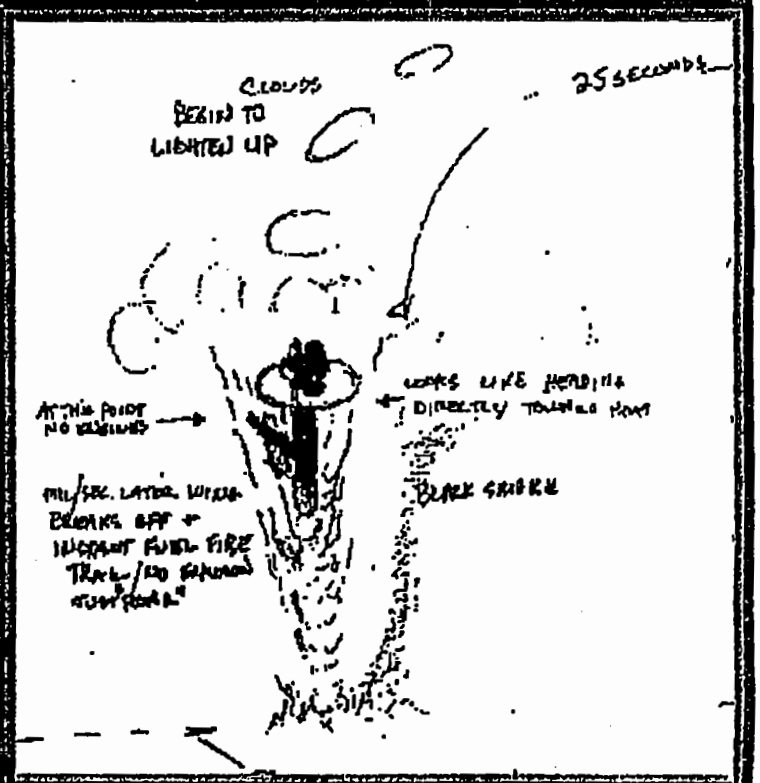
Wing Separation

-- Debris show the left wing separated from the aircraft and was intact
-- W.P. [21] "It (the light) then grew more intense in brightness and broke into two, red balls of fire".
-- A.L. [26] "...entire right wing separates from fuselage, and peeled back, alongside the fuselage...". The entire wing was intact and did not observe engines.
-- D.G. [29] "..the fireball broke into two pieces; one pencil-shaped or telephone shaped, and one shaped like a circle".
-- A.C. [47] "...witnessed a small explosion, followed by two (2) 'tremendous' explosions, then two large objects falling toward horizon".



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TWA 800 Timeline

Initial Explosion (T_o = 0831:07.496 PM)

T_o + 15 sec

T_o + 42 sec

T_o + 50.5+ sec

Onboard flight data and voice recordings end at T_o = 0; cockpit separates within 4 sec (last transponded radar signal received at 0831:12.133 PM); aircraft pitches up dramatically.

Two or 3 secondary explosions occur over a 2-sec period beginning at about T_o + 15 sec (witness and sound propagation analysis).

While at altitude of about one mile, aircraft hooks to left and downward; right wing separates from fuselage at T_o + 42 sec (witness and sound propagation analysis); "fire trail" erupts. (Infrared "hit" at T_o + 43.5 sec, detects heat of "fire trail.")

Left wing and most of rest of plane impact water; wing trails rest of plane by 1-2 sec (witness and radar "skin track" [0831:58 PM].

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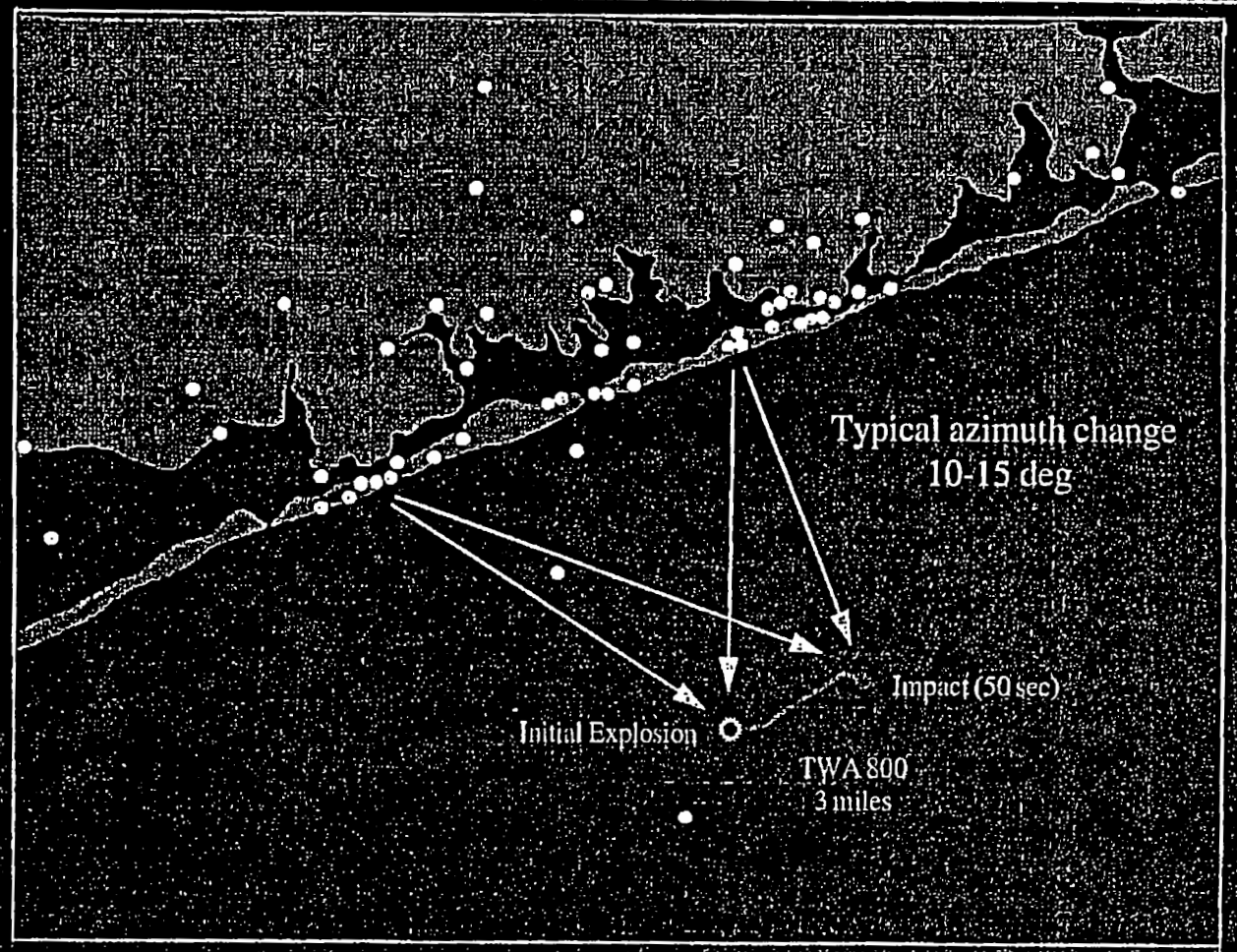
Group 1: Eyewitnesses Observe Only Vertical Motion



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Where Were Eyewitnesses Looking?

WITNESS	AZIMUTH TO TWA 800 WHEN RECORDINGS END	AZIMUTH TO TWA 800 "WING SEPARATION; FIRE ERUPTION"	AZIMUTH CITED BY WITNESS
J. & T.C. [--]	87.31°	85.00°	84.1°
K.B. [--]	98.58°	93.07°	96.1°
A.C. [47]	119.48°	110.31°	84.1°
B.K. & D.F. [73]	149.82°	131.15°	136.1°/141.1°
A. & J.C. [112/113]	161.69°	145.52°	138.1°/146.1°
V. & S.S. [114/115]	180.73°	161.19°	163.1°
J.D. [52]	189.15°	174.98°	171.1°/173.1°
R. & L.C. [50]	219.89°	214.82°	211.1°/209.1°

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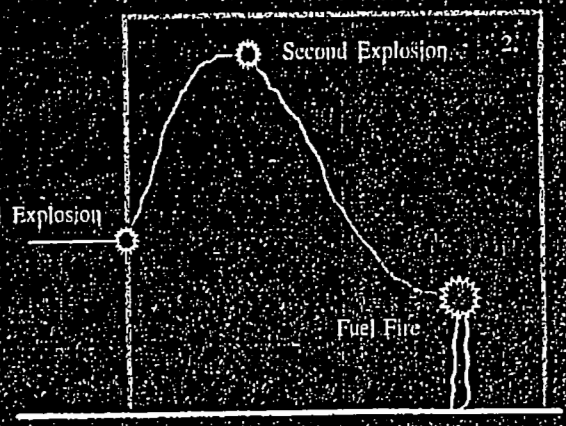
Group 2: 18 Eyewitnesses' Observations Begin Near Initial Event

- See only single object...hence did not see missile and aircraft
- See object ascend and descend... most see end fireball

Observations correlate with TWA 800 trajectory



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"One Continuous Motion..."

- Most eyewitnesses describe observations as "one continuous motion."
  -- Airborne witness "V.S.": *"...it seemed all integral, transitioning from ascent to descent in a fluid motion."*
- This is inconsistent with "missile hitting aircraft," because aircraft and missile most likely would be traveling at different speeds and in different directions.

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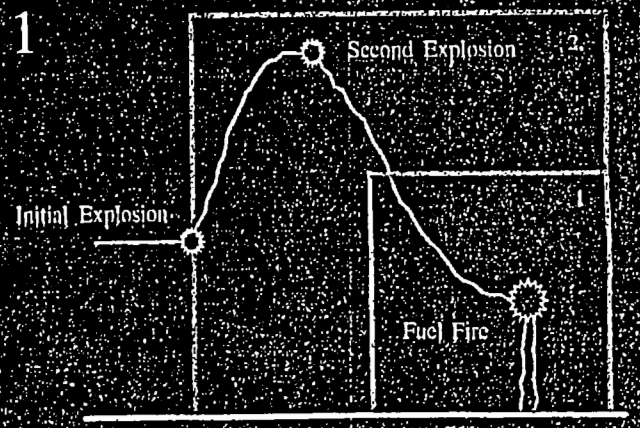
Group 3: 8 Eyewitnesses See "Object Hit Aircraft"

Eyewitnesses *do not* describe an object and aircraft simultaneously

Seven (7) eyewitnesses are in Group 1
(End Event Only) and could
not have seen missile
strike aircraft



One (1) eyewitness is in Group 2

- Witness probably interpreting observations incorrectly
- Need to re-interview witness

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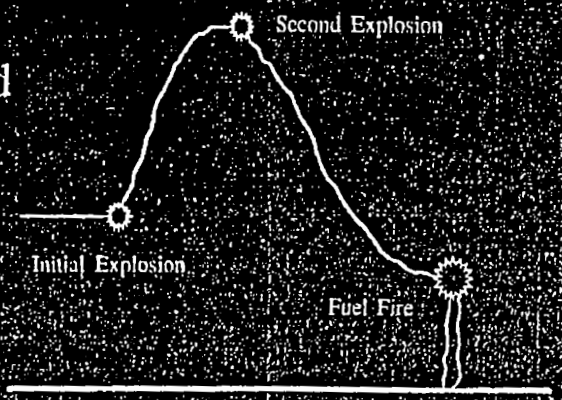
Remaining Eyewitness - A.C. [47]

Observations

- Observed red object ascending for 30 sec from *East to West*
- As object reached zenith, it arced over, traveled horizontally for 10 sec, followed by a small explosion and 2 tremendous explosions
- Finally, saw two objects fall toward horizon



Conclusions

- Likely saw most of event due to extended observation time
- Observed end event with explosion and two falling objects
- Observations consistent with aircraft hypothesis *except for East to West motion*

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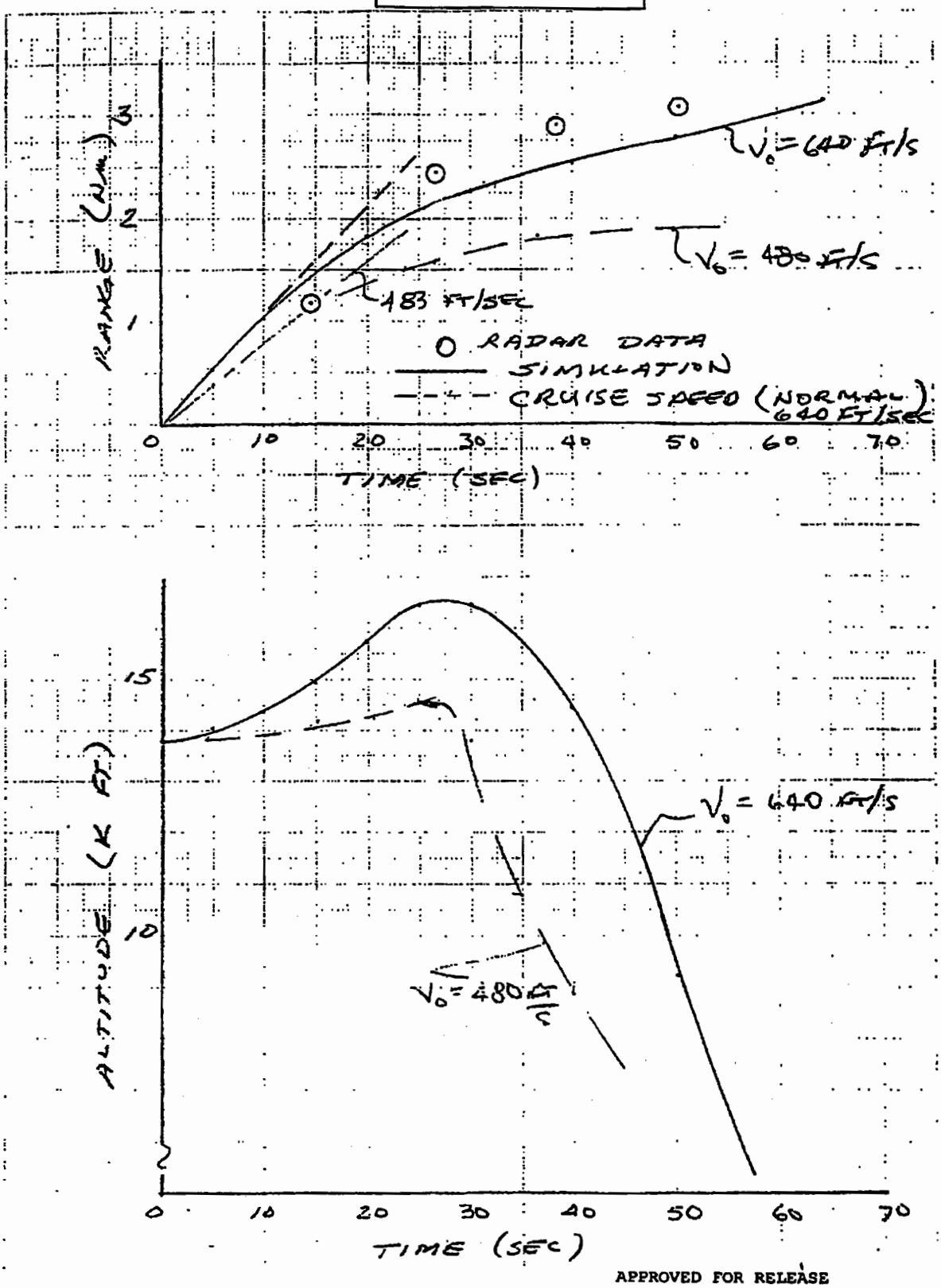
[redacted] - 18 MAR 97 (b)(3) 68



ASSUMING SKIN THICKNESS = 0.25 IN

A BODY DIAMETER OF 23 FT GIVES A CIRCUMFERENCE OF 72 FT. THIS GIVES A SURFACE AREA $\approx 220\ IN^2$. ALUMINUM (2130) IS GOOD TO ABOUT 40,000 PSI. WHICH GIVES A BREAKING LOAD $\approx 9 \times 10^6$ LBS IF THIS LOAD EXISTED FOR 0.2 SECONDS THE IMPULSE WOULD BE $\approx 1.8 \times 10^6$ LB·SEC.

THE VELOCITY INCREMENT IS

$$\Delta V = \frac{g\,I}{W} = \frac{32\left(1.8 \times 10^6\right)}{580\,000} \approx 100 \text{ FT/SE}$$

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27 October 1997

MEMORANDUM FOR: [redacted] (b) (3)

FROM: [redacted] (b) (3)

OFFICE: OWTP

SUBJECT: New Radar Plots Impact on TWA800 Analysis

REFERENCE:

Gentlemen, I have reviewed the new radar plots and [redacted] concerns and here are the findings. (b) (6) (b) (7) (c)

The location of the initial explosion has changed. CIA has used 40.646 N, 072.687 W (at 0831:08) as the location based on the initial reporting from the FBI and NTSB. The new radar plots include additional transponder hits (mainly the JFK 4.6 second radar) which leads the FBI to claim a location of 40.6483 N, 072.6733 W (at 0831:12.25) as the intial location. Further, based on NTSB reconstruction and front end trajectory analysis (which I do not believe we have the latter), the nose separated 4 seconds later at 0831:16 (plus or minus 1/2 second) at 40.6525 N, 072.6617 W. Finally, the FBI (and O'Roarke) have determined that the JFK 4.6 second radar is the most accurate and have decided to use this radar for the trajectory plot.

What is the impact of this? First the timing of the arrival of the intial explosion changes slightly for the eyewitnesses we have been concentrating on (adding winds aloft will add about .5 - .7 seconds to the time of arrivals).

(b) (6)
(b) (7) (c)

Eyewitness	Time for Initial Explosion to Arrive 40.646N, 072.687 W	40.6483N, 072.6733W
[redacted]	55.44 seconds	53.87 seconds
	41.00 seconds	42.15 seconds
	47.75 seconds	47.09 seconds

Here is the first problem for our scenario. The DSP IR hit occured at 0831:51. Based on [redacted] statement, the aircraft wing separated either 41 seconds or 42.15 seconds after the initial explosion. This results in the start of the end fireball event at 0831:49 or 0831:54, respectively. Obviously the latter time is after DSP's sweep and therefore no IR hit should have been registered (the original time of 0831:49 is still good if used). Assuming the new radar data to be correct, three possible explanations for this discrepency exist. First, the time of the sound arrival from the initial explosion to [redacted] is in reality after the start of the fuel explosion (and he mistakenly thinks they are at the same time). Second, the times oon the JFK radar and DSP are not the same. And finally, the location of [redacted] is not that well known. For him to hear the sound sooner, he would have to be *further* offshore than he reported by about 3/4 of mile. ([redacted] reported being 1 mile offshore).

(b) (6) (b) (7) (c)
(b) (6) (b) (7) (c)
(b) (6) (b) (7) (c)
(b) (6) (b) (7) (c)

Another concern for the FBI is the change in azimuth of the aircraft in regards to [redacted] At the original point, his reported azimuth to the initial explosion, and the calculated azimuth were fairly close. However, the new explosion point moves the calculated azimuth to the East by 3.4 degrees, well off the first [redacted] reported. To make matters worse, if the nose of the aircraft doesnt come off

(b) (6) (b) (7) (c)
(b) (6) (b) (7) (c)

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until 4 seconds later, the aircraft should not start pitching up later, pushing the azimuth reading 6.3 degrees further East from the original calculated azimuth. Hence the question comes up, if [redacted] did see a white light ascending above the first house, what could it have been because the aircraft should not have exhibited that behavior at that location? As a matter of fact, it appears that it could have been a missile rising up and striking the aircraft. *(Now the problems with that last statement are two-fold. One, according to [redacted] the aircraft would not ascended since only the white light ascended. Second, a manpad would not have a engine burn that would last 15 seconds, nor burn all the way up to 13800 feet).* (b) (6) (b) (7) (c) (b) (6) (b) (7) (c)

Flanlly, some good news. [redacted] was arguing that the aircraft could not possible make the first two JFK 4.6 second radar location because the average speed between them was 375 knots, close to the 380 knots tha aircraft was traveling at before the explosion. [redacted] determined that the radar locations match his simulation that he created previously better than the old data. However, this analysis was based on the aircraft nose coming off immediately at 0831:12.25 and not 4 seconds later. [redacted] has not been able to run new runs based on the 4 second delay in the nose coming off due to problems in running the trajectory ananlysis program on a different host than the VM mainframe. (b) (6) (b) (7) (c) (b) (3) (b) (3)

To summarize,
1) the new radar data most likely will not impact the trajecotry analysis too much [redacted] correct me if I am overstating this), (b) (3)
2) the time difference in the DSP hit needs to be addresses, and
3) the [redacted] observations are in question. (b) (6) (b) (7) (c)

CC: [redacted] (b) (3)

Sent on 27 October 1997 at 09:45:00 AM

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SUBJECT: TWA800 beacon datasets (3)
DATE: Tue, 25 Nov 1997 12:52:44 -0800
FROM: Mike O'Rourke

TO: [redacted] (b)(3)

The datasets you requested this AM are attached. As I mentioned on the phone, the timing indicates adjustments to raw time based on the final CVR & DFDR time values. The range, ACPS, and Mode "C" altitude are raw (as extracted from FAA data).

Data format is: HH,MM,SS.SS, NM RANGE, ACPS, MODE C ALT IN ft MSL
00,00,00.00, 00.00, 0000, 000

Feel free to call if you have any questions. I should be in all week.

Mike O'Rourke
wmor@ix.netcom.com
(703)437-5521 or 742-9428

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NOTE FOR: [redacted] (b) (3)
FROM:
DATE: 04-21-97 11:11:01 AM
SUBJECT: Inputs for TWA Flight 800 Video (16 June 1997 distribution date)

[redacted] over the weekend, I read the TWA Flight 800 Metallurgy/Structures Sequencing Group Report, provided to me by [redacted] of the FBI. The Sequencing Group is chaired by a member of the NTSB, and includes engineers from Boeing and TWA. The purpose of this report is to document the sequence in which Flight 800 came apart. (b) (3) (b) (6) (b) (7) (c)

After reading it, two things are apparent:

1) The eyewitnesses who described the last 15 seconds or so of the disaster did a credible job. The details of their descriptions are very consistent with the progression of events postulated by the Sequencing Group.

2) The complexity of the destruction makes cursory aerodynamic modeling of the postulated flight profile after the first explosion a futile endeavor. (I think [redacted] has been trying to tell us this for about a month.) (b) (3)

So here are my recommendations for how to proceed in developing inputs for the Flight 800 video —

Generate a spline fit (or equivalent smoothed fit) to the following latitude/longitude sequence. These points are based on the JFK radar data, and three of them include associated altitude points. The first altitude (high confidence) is derived from an onboard altimeter monitored in the flight recorder data and corroborated by the JFK radar data; the second (medium confidence) is an approximation based on eyewitness descriptions and [redacted] modeling work; and the third (high confidence) is based on the calculated time of water impact, derived from analysis of sound propagation. (b) (3)

T = 0 (first explosion, 831:11.3 PM): lat = N40.6478 deg; long = W72.6807 deg; alt = 13,820 ft

T = +10.7 sec: lat = N40.6518 deg; long = W72.6649 deg; alt = 16,500 ft [note that aircraft in free-fall remains within 200 feet of apex altitude for about 7 seconds, 3.5 seconds before apex and 3.5 seconds after apex --- so this altitude does not vary too much with assumed time of apex]. Based on analysis of eyewitness data, apex occurs at about 15 seconds after first explosion.

T = +22.7 sec: lat = N40.6627 deg; long = W72.6406 deg; alt = ?

T = +34.7 sec: lat = N40.6670 deg; long = W72.6324 deg; alt = ?

T = +46.7 sec: lat = N40.6647 deg; long = W72.6296 deg; alt = ?

T = +49 sec: alt = 0.

Our current schedule calls for distributing the video on 16 June 1997, and the DI TV Center needs two weeks to integrate the animation into the overall production. So all the final animation renderings will be needed by COB Friday, 30 May 1997.

CC: [redacted] (b) (3)

~~ADMINISTRATIVE - INTERNAL USE ONLY~~

Sheet1

bridge	40.8008N	72.6276w
boat	40.7471N	72.7633w
condo	40.7835N	72.6847W

From [redacted] at CIA (b) (3)

Sheet1

	40.64889	72.67139								
	Recorder Down t=0			Apex t=15 sec			Right Wing Fail t=42			
Witness name	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	
1.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
2.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
3.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
4.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
5.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
6.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
7.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
8.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
9.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
10	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
11	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
12	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
13	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
14	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
15	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
16	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
17	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
18	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
19	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
20	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
21	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
22	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
23	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
24	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
25	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
26	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
27	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
28	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
29	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
30	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
31	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
32	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
33	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453

(b) (6)
(b) (7) (c)

Sheet1

		Recorder Down t=0			Apex t=15 sec			Right Wing Fail t=42			
	Witness name	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	
34.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
35.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
36.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
37.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
38.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
39.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
40.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
41.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
42.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
43.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
44.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
45.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
46.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
47.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
48.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
49.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
50.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
51.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
52.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
53.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
54.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
55.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
56.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
57.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
58.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
59.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
60.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
61.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
62.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
63.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
64.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
65.		40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
66.											

Page 2

(b) (6)
(b) (7) (c)

Sheet1

	Recorder Down t=0			Apex t=15 sec			Right Wing Fail t=42			
Witness name	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	
67.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
68.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
69.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
70.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
71.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
72.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
73.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
74.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
75.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
76.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
77.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
78.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
79.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
80.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
81.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
82.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
83.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
84.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
85.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
86.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
87.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
88.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
89.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
90.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
91.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
92.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
93.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
94.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
95.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
96.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
97.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
98.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
99.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453

(b) (6)
(b) (7) (c)

Sheet1

	Recorder Down t=0			Apex t=15 sec			Right Wing Fail t=42			
Witness name	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	
100.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
101.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
102.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
103.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
104.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
105.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
106.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
107.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
108.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
109.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
110.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
111.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
112.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
113.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
114.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
115.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
116.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
117.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
118.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
119.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
120.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
121.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
122.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
123.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
124.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
125.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
126.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
127.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
128.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
129.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
130.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
131.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
132.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453

(b) (6)
(b) (7) (c)

Sheet1

	Recorder Down t=0			Apex t=15 sec			Right Wing Fail t=42				
Witness name	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)		
133.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
134.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
135.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
136.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
137.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
138.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
139.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
140.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
141.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
142.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
143.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
144.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
145.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
146.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
147.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
148.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
149.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
150.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
151.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
152.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
153.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
154.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
155.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
156.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
157.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
158.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
159.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
160.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
161.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
162.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
163.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
164.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	
165.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453	

	Recorder Down t=0			Apex t=15 sec			Right Wing Fail t=42			
Witness name	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	
166.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
167.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
168.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
169.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
170.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
171.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
172.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
173.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
174.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
175.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
176.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
177.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
178.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
179.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
180.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
181.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
182.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
183.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
184.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
185.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
186.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
187.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
188.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
189.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
190.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
191.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
192.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
193.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
194.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
195.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
196.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
197.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
198.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453

(b) (6)
(b) (7) (c)

Sheet1

	Recorder Down t=0			Apex t=15 sec			Right Wing Fail t=42			
Witness name	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	
199.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
200.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
201.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
202.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
203.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
204.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
205.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
206.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
207.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
208.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
209.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
210.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
211.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
212.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
213.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
214.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
215.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
216.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
217.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
218.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
219.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
220.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
221.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
222.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
223.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
224.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
225.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
226.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
227.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
228.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
229.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
230.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
231.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453

(b) (6)
(b) (7) (c)

Sheet1

	Recorder Down t=0			Apex t=15 sec			Right Wing Fail t=42			
Witness name	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	Latitude	Longitude	Altitude (ft)	
232.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
233.	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453
	40.64889	72.67139	13760	40.6522	72.664	16800	40.6661	72.6315	6000	0.017453

(b) (6)
(b) (7) (c)

Sheet1

				Ground	Ground	Ground	Az (deg)	Az (deg)	Az (deg)	
	Witness Location		Witness	Dist (ft)	Dist (ft)	Dist (ft)	[1]	[2]	[3]	Closest Az
Witness name	Latitude	Longitude	Azimuth	t=0	t=15	t=42	t=0	t=15	t=42	(deg)
1.	40.8008	72.6276	?	56687	55099	49118	192.34	190.53	181.26	#VALUE!
2.	40.7669	72.7539	?	48691	48638	49943	152.05	149.25	137.33	#VALUE!
3.	40.74	72.85	?	59503	60561	66125	123.87	121.85	113.97	#VALUE!
4.	40.7198	73.094	?	119657	121398	129332	102.34	101.57	98.56	#VALUE!
5.	40.6532	73.1575	?	134462	136493	145543	90.51	89.99	87.98	#VALUE!
6.	41.0171	72.2448	?	178506	176255	166578	221.38	221.13	219.94	#VALUE!
7.	40.767	72.7539	?	48723	48670	49969	152.07	149.28	137.36	#VALUE!
8.	40.7358	72.8542	?	59644	60768	66589	122.03	120.04	112.36	#VALUE!
9.	40.7333	72.8667	?	62143	63352	69469	119.62	117.75	110.57	#VALUE!
10.	40.794	72.807	?	64827	65064	67266	144.65	142.56	133.82	#VALUE!
11.	40.794	72.807	?	64827	65064	67266	144.65	142.56	133.82	#VALUE!
12.	40.7988	72.64	?	55335	53854	48434	189.03	187.08	177.22	#VALUE!
13.	40.8009	72.7565	?	60200	59932	60061	156.98	154.73	144.86	#VALUE!
14.	40.7897	72.6695	?	51337	50150	46266	180.58	178.26	166.87	#VALUE!
15.	40.7841	72.7358	?	52407	52017	51778	160.13	157.56	146.15	#VALUE!
16.	40.74	72.85	?	59503	60561	66125	123.87	121.85	113.97	#VALUE!
17.	40.74	72.85	?	59503	60561	66125	123.87	121.85	113.97	#VALUE!
18.	40.9783	73.0444	?	158158	158583	161026	139.28	138.44	134.84	#VALUE!
19.	41.25	72.2	?	254694	252620	243771	210.79	210.53	209.31	#VALUE!
20.	40.8418	72.5538	?	77485	75525	67552	204.83	203.80	198.55	#VALUE!
21.	40.7815	72.7515	?	53172	52977	53564	155.37	152.82	141.72	#VALUE!
22.	40.8383	72.8117	?	79184	79165	80110	150.65	148.93	141.54	#VALUE!
23.	40.5945	73.5029	?	230939	233077	242502	84.80	84.55	83.54	#VALUE!
24.	40.8125	72.6876	?	59814	58802	55576	175.70	173.63	163.79	#VALUE!
25.	40.7495	72.8193	?	54923	55683	60149	131.85	129.52	120.30	#VALUE!
26.	40.7471	72.7633	?	43901	44161	46890	144.61	141.54	128.99	#VALUE!
27.	40.5784	73.3654	?	193774	195958	205577	82.15	81.88	80.81	#VALUE!
28.	40.8278	72.6268	?	66377	64836	58964	190.71	189.13	181.26	#VALUE!
29.	40.7367	72.8542	?	59819	60933	66714	122.30	120.31	112.62	#VALUE!
30.	40.8443	72.5035	?	85001	82882	73959	213.11	212.38	208.59	#VALUE!
31.	40.7125	73.0758	?	114185	115949	123977	101.59	100.79	97.70	#VALUE!
32.	40.7833	72.6904	?	49282	48347	45720	173.87	171.31	159.13	#VALUE!
33.	40.7748	72.8151	?	60697	61164	64372	139.09	136.90	127.94	#VALUE!

(b) (6)
(b) (7) (c)

Sheet1

				Ground	Ground	Ground	Az (deg)	Az (deg)	Az (deg)	
	Witness Location		Witness	Dist (ft)	Dist (ft)	Dist (ft)	[1]	[2]	[3]	Closest Az
Witness name	Latitude	Longitude	Azimuth	t=0	t=15	t=42	t=0	t=15	t=42	(deg)
34.	40.9783	73.0449	?	158247	158674	161124	139.24	138.40	134.81	#VALUE!
35.	40.8514	72.515	?	85533	83468	74822	210.38	209.59	205.50	#VALUE!
36.	40.7687	72.7527	?	49119	49037	50205	152.75	149.98	138.12	#VALUE!
37.	40.74	72.85	?	59503	60561	66125	123.87	121.85	113.97	#VALUE!
38.	40.9192	72.2576	?	150855	148521	138431	229.35	229.18	228.32	#VALUE!
39.	40.7698	72.7349	?	47445	47137	47387	158.27	155.42	142.89	#VALUE!
40.	40.7915	72.6552	?	52182	50841	46182	184.92	182.74	171.84	#VALUE!
41.	40.7982	72.6638	?	54473	53226	48978	182.21	180.06	169.49	#VALUE!
42.	40.7369	72.8845	?	67078	68324	74536	118.51	116.80	110.18	#VALUE!
43.	40.7961	72.6397	?	54377	52888	47447	189.28	187.30	177.26	#VALUE!
44.	40.762	72.7763	?	50408	50650	53134	144.85	142.18	131.10	#VALUE!
45.	40.9083	72.1838	?	164504	162138	151879	235.07	235.00	234.60	#VALUE!
46.	40.9231	72.844	?	110740	110553	110534	154.46	153.24	147.89	#VALUE!
47.	40.7517	72.9328	?	81393	82673	88920	117.33	115.94	110.45	#VALUE!
48.	40.7939	72.6461	?	53325	51894	46765	187.54	185.47	175.05	#VALUE!
49.	40.8383	72.4754	?	87741	85536	76154	218.16	217.58	214.53	#VALUE!
50.	40.8383	72.4754	?	87741	85536	76154	218.16	217.58	214.53	#VALUE!
51.	40.7811	72.6944	?	48616	47737	45384	172.48	169.86	157.46	#VALUE!
52.	40.8198	72.6501	?	62584	61221	56268	185.40	183.60	174.76	#VALUE!
53.	40.7356	73.0822	?	117873	119527	127116	105.42	104.60	101.35	#VALUE!
54.	40.7223	73.1542	?	136127	137899	145924	101.18	100.52	97.90	#VALUE!
55.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
56.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
57.	40.7928	72.6503	?	52787	51397	46481	186.34	184.23	173.58	#VALUE!
58.	40.802	72.6594	?	55916	54626	50140	183.40	181.33	171.15	#VALUE!
59.	40.8244	72.6663	?	64000	62780	58505	181.26	179.42	170.53	#VALUE!
60.	40.8742	72.8079	?	90376	90160	90152	155.30	153.80	147.24	#VALUE!
61.	40.7311	72.8771	?	64279	65553	71899	117.72	115.96	109.16	#VALUE!
62.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
63.	40.7669	72.7539	?	48691	48638	49943	152.05	149.25	137.33	#VALUE!
64.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
65.	40.8194	72.6507	?	62424	61065	56138	185.26	183.45	174.57	#VALUE!
66.	40.8038	72.6125	?	58771	57069	50474	196.09	194.45	185.97	#VALUE!

(b) (6)
(b) (7) (c)

Sheet1

		Witness Location		Witness	Ground Dist (ft)	Ground Dist (ft)	Ground Dist (ft)	Az (deg) [1]	Az (deg) [2]	Az (deg) [3]	Closest Az
	Witness name	Latitude	Longitude	Azimuth	t=0	t=15	t=42	t=0	t=15	t=42	(deg)
67.		40.7669	72.7539	?	48691	48638	49943	152.05	149.25	137.33	#VALUE!
68.		40.797	72.8313	?	69768	70165	72965	140.66	138.74	130.78	#VALUE!
69.		40.7431	73.0287	?	104563	106109	113305	109.06	108.08	104.21	#VALUE!
70.		40.7669	72.7539	?	48691	48638	49943	152.05	149.25	137.33	#VALUE!
71.		40.7535	73.1828	?	146398	148062	155645	104.93	104.27	101.63	#VALUE!
72.		40.8007	72.7406	?	58555	58127	57586	160.92	158.62	148.41	#VALUE!
73.		40.7624	72.7762	?	50512	50749	53210	144.98	142.30	131.24	#VALUE!
74.		?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
75.		40.7478	73.0101	?	100322	101808	108785	110.95	109.91	105.77	#VALUE!
76.		40.8045	72.7499	?	60735	60381	60129	159.05	156.83	147.01	#VALUE!
77.		40.7747	72.815	?	60651	61118	64328	139.09	136.90	127.93	#VALUE!
78.		40.7807	72.8542	?	69720	70403	74373	133.51	131.65	124.10	#VALUE!
79.		?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
80.		40.8282	72.7621	?	70007	69650	69234	159.00	157.07	148.56	#VALUE!
81.		40.796	72.6705	?	53631	52454	48566	180.26	178.04	167.17	#VALUE!
82.		40.785	72.7981	?	60729	60965	63226	144.75	142.53	133.23	#VALUE!
83.		40.623	73.2595	?	162975	165085	174423	86.49	86.11	84.63	#VALUE!
84.		40.7998	72.6454	?	55483	54054	48893	187.44	185.46	175.49	#VALUE!
85.		40.7822	72.7369	?	51862	51496	51375	159.55	156.95	145.44	#VALUE!
86.		40.8244	72.6664	?	63999	62781	58509	181.24	179.39	170.51	#VALUE!
87.		?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
88.		40.6167	72.7097	?	15813	18093	28148	42.08	44.32	50.20	#VALUE!
89.		?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
90.		?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
91.		?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
92.		?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
93.		40.7631	72.7542	?	47512	47497	48990	151.18	148.31	136.17	#VALUE!
94.		40.7134	73.0144	?	97703	99407	107240	103.82	102.86	99.13	#VALUE!
95.		40.7303	72.8725	?	63019	64283	70603	118.03	116.22	109.28	#VALUE!
96.		40.7661	72.7486	?	47762	47653	48744	153.44	150.59	138.37	#VALUE!
97.		41.0833	73.3956	?	254842	255694	259802	128.18	127.69	125.58	#VALUE!
98.		41.2201	73.0046	?	227565	227292	226597	156.11	155.51	152.91	#VALUE!
99.		41.254	72.4417	?	229485	227770	220602	196.07	195.66	193.76	#VALUE!

				Ground	Ground	Ground	Az (deg)	Az (deg)	Az (deg)	
	Witness Location		Witness	Dist (ft)	Dist (ft)	Dist (ft)	[1]	[2]	[3]	Closest Az
Witness name	Latitude	Longitude	Azimuth	t=0	t=15	t=42	t=0	t=15	t=42	(deg)
100.	41.2227	73.0566	?	234552	234406	234258	152.98	152.40	149.88	#VALUE!
101.	41.2227	73.0566	?	234552	234406	234258	152.98	152.40	149.88	#VALUE!
102.	41.2672	72.6526	?	225471	224226	219214	181.32	180.81	178.47	#VALUE!
103.	41.0678	73.3748	?	246857	247717	251869	127.99	127.47	125.31	#VALUE!
104.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
105.	40.7632	72.7723	?	50144	50331	52600	146.18	143.48	132.25	#VALUE!
106.	40.6167	72.7097	?	15813	18093	28148	42.08	44.32	50.20	#VALUE!
107.	40.8752	72.5084	?	93981	91952	83463	208.67	207.91	204.07	#VALUE!
108.	40.7807	72.8542	?	69720	70403	74373	133.51	131.65	124.10	#VALUE!
109.	40.7883	72.6697	?	50829	49634	45719	180.84	178.50	167.00	#VALUE!
110.	40.8383	72.4754	?	87741	85536	76154	218.16	217.58	214.53	#VALUE!
111.	40.7961	72.9032	?	83560	84378	88769	129.88	128.36	122.18	#VALUE!
112.	40.8009	72.7565	?	60200	59932	60061	156.98	154.73	144.86	#VALUE!
113.	40.8009	72.7565	?	60200	59932	60061	156.98	154.73	144.86	#VALUE!
114.	40.7835	72.6847	?	49211	48207	45253	175.71	173.18	161.03	#VALUE!
115.	40.7835	72.6847	?	49211	48207	45253	175.71	173.18	161.03	#VALUE!
116.	40.7835	72.6847	?	49211	48207	45253	175.71	173.18	161.03	#VALUE!
117.	40.6627	73.3696	?	193169	195179	204112	91.27	90.89	89.41	#VALUE!
118.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
119.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
120.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
121.	40.7961	72.9032	?	83560	84378	88769	129.88	128.36	122.18	#VALUE!
122.	40.6491	73.4577	?	217491	219532	228578	89.76	89.45	88.18	#VALUE!
123.	40.752	72.9336	?	81640	82919	89165	117.33	115.94	110.46	#VALUE!
124.	40.752	72.9336	?	81640	82919	89165	117.33	115.94	110.46	#VALUE!
125.	40.7632	72.7723	?	50144	50331	52600	146.18	143.48	132.25	#VALUE!
126.	40.7667	72.7465	?	47702	47562	48526	154.18	151.33	139.06	#VALUE!
127.	40.7687	72.7527	?	49119	49037	50205	152.75	149.98	138.12	#VALUE!
128.	40.8125	72.6876	?	59814	58802	55576	175.70	173.63	163.79	#VALUE!
129.	40.7424	72.8314	?	55841	56764	61853	127.57	125.35	116.66	#VALUE!
130.	40.7252	72.8868	?	65726	67093	73782	114.97	113.30	106.90	#VALUE!
131.	40.735	72.8602	?	60905	62067	68017	120.97	119.04	111.60	#VALUE!
132.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

(b) (6)
(b) (7) (c)

Sheet1

Witness name	Witness Location Latitude	Longitude	Witness Azimuth	Ground Dist (ft) t=0	Ground Dist (ft) t=15	Ground Dist (ft) t=42	Az (deg) [1] t=0	Az (deg) [2] t=15	Az (deg) [3] t=42	Closest Az (deg)
133.	40.8196	72.5635	?	69003	67045	59028	205.62	204.49	198.58	#VALUE!
134.	40.767	72.7539	?	48723	48670	49969	152.07	149.28	137.36	#VALUE!
135.	40.7368	72.8542	?	59838	60952	66728	122.32	120.34	112.65	#VALUE!
136.	40.7894	72.664	?	51265	50018	45838	182.28	0.00	168.69	#VALUE!
137.	40.7355	72.86	?	60951	62107	68033	121.14	119.21	111.76	#VALUE!
138.	40.6784	73.6758	?	277963	279954	288783	91.89	91.63	90.55	#VALUE!
139.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
140.	40.767	73.003	?	101253	102605	109043	115.06	113.98	109.59	#VALUE!
141.	40.8196	72.5635	?	69003	67045	59028	205.62	204.49	198.58	#VALUE!
142.	40.7665	72.7552	?	48732	48698	50080	151.60	148.80	136.92	#VALUE!
143.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
144.	40.7626	72.7755	?	50461	50689	53113	145.20	142.53	131.43	#VALUE!
145.	40.8313	72.7548	?	70378	69944	69186	160.86	158.96	150.47	#VALUE!
146.	40.9581	72.6208	?	113587	112154	106492	187.08	186.12	181.59	#VALUE!
147.	40.737	72.8524	?	59458	60560	66298	122.64	120.63	112.87	#VALUE!
148.	40.7909	72.661	?	51851	50571	46221	183.18	180.94	169.83	#VALUE!
149.	40.7228	73.0744	?	114622	116333	124154	103.46	102.65	99.44	#VALUE!
150.	40.7823	72.6889	?	48876	47926	45233	174.31	171.74	159.46	#VALUE!
151.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
152.	40.7304	72.8746	?	63549	64820	71163	117.81	116.02	109.15	#VALUE!
153.	40.7399	73.0314	?	104896	106464	113749	108.32	107.36	103.55	#VALUE!
154.	40.7387	73.0312	?	104706	106282	113594	108.10	107.14	103.34	#VALUE!
155.	40.7851	72.8829	?	49759	48731	45648	176.83	173.84	161.86	#VALUE!
156.	40.8174	72.6137	?	63466	61807	55377	194.56	193.01	185.10	#VALUE!
157.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
158.	40.6419	72.2306	?	121954	119939	111230	271.34	271.94	274.68	#VALUE!
159.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
160.	40.7961	72.9032	?	83560	84378	88769	129.88	128.36	122.18	#VALUE!
161.	40.7664	72.754	?	48543	48496	49827	151.92	149.12	137.17	#VALUE!
162.	40.785	72.7977	?	60666	60898	63145	144.84	142.61	133.30	#VALUE!
163.	40.785	72.7977	?	60666	60898	63145	144.84	142.61	133.30	#VALUE!
164.	40.7434	72.8691	?	64603	65719	71456	122.17	120.32	113.15	#VALUE!
165.	40.7953	72.8073	?	65261	65491	67655	144.83	142.76	134.07	#VALUE!

(b) (6)
(b) (7) (c)

Sheet1

				Ground	Ground	Ground	Az (deg)	Az (deg)	Az (deg)	
	Witness Location		Witness	Dist (ft)	Dist (ft)	Dist (ft)	[1]	[2]	[3]	Closest Az
Witness name	Latitude	Longitude	Azimuth	t=0	t=15	t=42	t=0	t=15	t=42	(deg)
166.	40.8498	72.4762	?	90943	88766	79524	216.42	215.81	212.68	#VALUE!
167.	40.7979	72.6326	?	55371	53820	48050	191.17	189.29	179.64	#VALUE!
168.	40.8477	72.5031	?	86101	83990	75101	212.73	212.00	208.21	#VALUE!
169.	41.0615	73.4344	?	258633	259593	264157	125.31	124.83	122.81	#VALUE!
170.	40.8644	72.4114	?	106430	104164	94443	222.51	222.12	220.12	#VALUE!
171.	40.91	72.6439	?	95493	94147	88982	184.57	183.39	177.79	#VALUE!
172.	40.4868	73.8607	?	334616	336836	346579	79.44	79.30	78.73	#VALUE!
173.	40.7909	72.7532	?	56491	56251	56572	156.39	153.99	143.50	#VALUE!
174.	40.8361	72.4966	?	83599	81440	72311	215.33	214.65	211.06	#VALUE!
175.	40.8528	72.4114	?	103352	101067	91250	224.09	223.73	221.84	#VALUE!
176.	40.9168	72.6621	?	97703	96464	91785	181.51	180.31	174.71	#VALUE!
177.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
178.	40.7971	72.6547	?	54228	52887	48185	184.88	182.79	172.35	#VALUE!
179.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
180.	40.8255	72.6454	?	64784	63387	58238	186.37	184.66	176.22	#VALUE!
181.	40.7134	73.0144	?	97703	99407	107240	103.82	102.86	99.13	#VALUE!
182.	40.7671	72.9964	?	99621	100957	107341	115.53	114.41	109.94	#VALUE!
183.	40.9435	72.86205	?	119601	119437	119476	153.84	152.70	147.75	#VALUE!
184.	40.7909	72.6587	?	51890	50586	46113	183.88	181.66	170.61	#VALUE!
185.	40.8011	72.8671	?	77478	78071	81597	135.68	133.98	127.02	#VALUE!
186.	40.8555	72.5605	?	81310	79436	71777	202.16	201.12	195.87	#VALUE!
187.	40.7895	72.7893	?	60738	60860	62645	147.52	145.29	135.85	#VALUE!
188.	40.7431	72.0287	?	180930	178693	168942	259.27	259.52	260.63	#VALUE!
189.	40.7655	72.7743	?	51148	51334	53573	146.18	143.54	132.52	#VALUE!
190.	40.7905	72.6609	?	51707	50426	46073	183.22	180.97	169.84	#VALUE!
191.	40.7971	72.6547	?	54228	52887	48185	184.88	182.79	172.35	#VALUE!
192.	40.8684	72.4509	?	99975	97778	88423	217.59	217.07	214.39	#VALUE!
193.	40.7375	72.8512	?	59278	60369	66064	122.96	120.94	113.13	#VALUE!
194.	40.7361	72.8571	?	60382	61517	67372	121.71	119.75	112.18	#VALUE!
195.	40.8507	72.8598	?	90114	90337	92214	144.67	143.17	136.79	#VALUE!
196.	40.738	72.847	?	58409	59472	65072	123.74	121.67	113.68	#VALUE!
197.	40.7446	72.7978	?	49379	50023	54141	134.92	132.29	121.86	#VALUE!
198.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

				Ground	Ground	Ground	Az (deg)	Az (deg)	Az (deg)	
	Witness Location		Witness	Dist (ft)	Dist (ft)	Dist (ft)	[1]	[2]	[3]	Closest Az
Witness name	Latitude	Longitude	Azimuth	t=0	t=15	t=42	t=0	t=15	t=42	(deg)
199.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
200.	40.6294	73.2283	?	154226	156324	165617	87.18	86.77	85.17	#VALUE!
201.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
202.	40.7699	73.0236	?	106863	108240	114760	114.27	113.24	109.13	#VALUE!
203.	40.807	72.6	?	60922	59139	52098	198.91	197.42	189.62	#VALUE!
204.	40.7469	73.2567	?	165675	167413	175272	102.26	101.71	99.47	#VALUE!
205.	40.7811	72.6944	?	48616	47737	45384	172.48	169.86	157.46	#VALUE!
206.	40.7647	72.7537	?	47958	47922	49318	151.66	148.82	136.75	#VALUE!
207.	40.785	72.7981	?	60729	60965	63226	144.75	142.53	133.23	#VALUE!
208.	41.2655	72.6589	?	224827	223593	218629	181.02	180.50	178.16	#VALUE!
209.	40.807	72.6	?	60922	59139	52098	198.91	197.42	189.62	#VALUE!
210.	40.7961	72.9032	?	83560	84378	88769	129.88	128.36	122.18	#VALUE!
211.	40.8438	72.6314	?	71910	70428	64782	188.85	187.36	180.02	#VALUE!
212.	40.802	72.6594	?	55916	54626	50140	183.40	181.33	171.15	#VALUE!
213.	40.8256	72.6455	?	64818	63421	58276	186.34	184.63	176.19	#VALUE!
214.	40.7358	72.8566	?	60207	61343	67202	121.69	119.73	112.14	#VALUE!
215.	40.7694	72.8482	?	65708	66457	70735	131.90	129.95	122.10	#VALUE!
216.	40.7954	72.6403	?	54098	52614	47200	189.15	187.16	177.04	#VALUE!
217.	40.777	72.7553	?	52143	52024	52958	153.57	150.96	139.73	#VALUE!
218.	40.6245	72.7105	?	14005	16354	26599	50.58	51.85	55.21	#VALUE!
219.	40.7352	72.8583	?	60493	61644	67556	121.28	119.33	111.82	#VALUE!
220.	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
221.	40.6257	73.241	?	157807	159912	169235	86.74	86.35	84.81	#VALUE!
222.	40.8034	72.6619	?	56390	55125	50754	182.67	180.60	170.47	#VALUE!
223.	40.8438	72.6314	?	71910	70428	64782	188.85	187.36	180.02	#VALUE!
224.	40.7228	73.0744	?	114622	116333	124154	103.46	102.65	99.44	#VALUE!
225.	40.6394	73.3127	?	177431	179497	188658	88.67	88.30	86.82	#VALUE!
226.	40.6836	73.0048	?	93061	94930	103411	97.71	96.81	93.42	#VALUE!
227.	40.6884	73.2691	?	165903	167835	176471	94.79	94.31	92.43	#VALUE!
228.	40.8438	72.6314	?	71910	70428	64782	188.85	187.36	180.02	#VALUE!
229.	40.649	73.1591	?	134899	136945	146047	89.86	89.35	87.38	#VALUE!
230.	40.8323	72.433	?	93844	91553	81710	224.64	224.26	222.20	#VALUE!
231.	40.8323	72.433	?	93844	91553	81710	224.64	224.26	222.20	#VALUE!

	Witness Location		Witness	Ground Dist (ft)	Ground Dist (ft)	Ground Dist (ft)	Az (deg) [1]	Az (deg) [2]	Az (deg) [3]	Closest Az
Witness name	Latitude	Longitude	Azimuth	t=0	t=15	t=42	t=0	t=15	t=42	(deg)
232.	40.7647	72.7532	?	47893	47851	49223	151.80	148.96	136.87	#VALUE!
233.	40.777	72.7553	?	52143	52024	52958	153.57	150.96	139.73	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
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	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
	?	?	?	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

(b) (6)
(b) (7) (c)

Sheet1

	Elevation (deg)	Elevation (deg)	Elevation (deg)	Explos. Delta Time	Explos. Delta Time	Explos. Delta Time	Time For Sound	Time For Sound	Time For Sound
Witness name	t=0	t=15	t=42	t=0 to 15	t=0 to 42	t=15 to 42	t=0	t=15	t=38.5
1.	13.64	16.96	6.96	14.62	33.24	18.61	53.95887	52.56915	46.23163
2.	15.78	19.06	6.85	16.05	41.08	25.03	47.44199	47.58641	47.55988
3.	13.02	15.50	5.18	16.95	46.03	29.08	57.48246	58.30468	62.8435
4.	6.56	7.88	2.66	17.56	48.62	31.06	113.2418	113.5591	122.3513
5.	5.84	7.02	2.36	17.87	49.77	31.90	126.8219	127.172	137.3724
6.	4.41	5.44	2.06	14.08	28.51	14.43	163.595	159.5402	153.2423
7.	15.77	19.04	6.85	16.05	41.08	25.02	47.47082	47.61358	47.58487
8.	12.99	15.45	5.15	17.01	46.32	29.32	57.61413	58.49144	63.27608
9.	12.49	14.85	4.94	17.07	46.68	29.61	59.90951	60.80382	65.98409
10.	11.98	14.48	5.10	16.19	42.29	26.10	62.23317	62.2209	63.8793
11.	11.98	14.48	5.10	16.19	42.29	26.10	62.23317	62.2209	63.8793
12.	13.96	17.33	7.06	14.73	33.83	19.10	52.81592	51.55388	45.66633
13.	12.88	15.66	5.70	15.77	39.94	24.18	57.8294	57.48667	57.0016
14.	15.00	18.52	7.39	15.03	35.43	20.40	49.39224	48.49433	43.80983
15.	14.71	17.90	6.61	15.72	39.44	23.72	50.69803	50.45046	49.21157
16.	13.02	15.50	5.18	16.95	46.03	29.08	57.48246	58.30468	62.8435
17.	13.02	15.50	5.18	16.95	46.03	29.08	57.48246	58.30468	62.8435
18.	4.97	6.05	2.13	16.47	42.11	25.64	149.2145	147.7523	152.4015
19.	3.09	3.80	1.41	14.55	28.55	14.00	234.1112	229.1439	225.1952
20.	10.07	12.54	5.08	14.19	31.15	16.96	72.39754	70.22439	62.9192
21.	14.51	17.59	6.39	15.88	40.36	24.48	51.45569	51.35413	50.92798
22.	9.86	11.98	4.28	15.92	40.93	25.01	75.38102	74.8439	75.90815
23.	3.41	4.12	1.42	18.33	49.18	30.85	216.7847	215.8218	228.5168
24.	12.96	15.95	6.16	15.11	36.25	21.14	57.14068	56.16484	52.54146
25.	14.06	16.79	5.70	16.71	44.74	28.02	53.26537	53.93887	57.22048
26.	17.40	20.83	7.29	16.38	42.55	26.17	43.20365	43.75626	44.73391
27.	4.06	4.90	1.67	18.22	49.82	31.60	181.9085	181.5222	193.6037
28.	11.71	14.53	5.81	14.60	33.41	18.82	62.74652	61.1579	55.37353
29.	12.95	15.41	5.14	17.00	46.28	29.28	57.77404	58.63886	63.3953
30.	9.20	11.46	4.64	14.02	30.11	16.09	78.95522	76.48002	68.54739
31.	6.87	8.24	2.77	17.57	48.77	31.20	108.122	108.5477	117.2803
32.	15.60	19.16	7.48	15.28	36.76	21.49	47.66644	47.04397	43.40184
33.	12.77	15.36	5.33	16.42	43.38	26.97	58.49837	58.78005	61.18352

(b) (6)
(b) (7) (c)

Sheet1

	Elevation (deg)	Elevation (deg)	Elevation (deg)	Explos. Delta Time	Explos. Delta Time	Explos. Delta Time	Time For Sound	Time For Sound	Time For Sound
Witness name	t=0	t=15	t=42	t=0 to 15	t=0 to 42	t=15 to 42	t=0	t=15	t=38.5
34.	4.97	6.04	2.13	16.47	42.12	25.65	149.2994	147.8372	152.4943
35.	9.14	11.38	4.58	14.06	30.41	16.34	79.52983	77.09048	69.43436
36.	15.65	18.91	6.82	16.02	40.94	24.92	47.82044	47.92746	47.8014
37.	13.02	15.50	5.18	16.95	46.03	29.08	57.48246	58.30468	62.8435
38.	5.21	6.45	2.48	13.91	28.35	14.44	137.9683	134.2481	126.9465
39.	16.17	19.62	7.22	15.84	39.88	24.04	46.24599	46.21036	45.123
40.	14.77	18.29	7.40	14.89	34.61	19.72	50.06816	49.0142	43.65944
41.	14.18	17.52	6.98	14.94	35.08	20.14	52.18088	51.14259	46.29656
42.	11.59	13.81	4.60	17.09	46.82	29.74	64.45293	65.27187	70.75989
43.	14.20	17.62	7.21	14.73	33.79	19.06	51.94946	50.70727	44.7491
44.	15.27	18.35	6.44	16.29	42.43	26.14	49.0672	49.41453	50.59215
45.	4.78	5.92	2.26	13.93	28.03	14.10	150.0173	146.0805	138.9116
46.	7.08	8.64	3.11	15.78	39.75	23.97	104.5701	103.316	104.4749
47.	9.60	11.49	3.86	17.10	46.89	29.79	77.69799	78.26156	84.33601
48.	14.47	17.94	7.31	14.79	34.12	19.32	51.04122	49.87812	44.15156
49.	8.91	11.11	4.50	13.93	29.61	15.67	81.26318	78.66277	70.39008
50.	8.91	11.11	4.50	13.93	29.61	15.67	81.26318	78.66277	70.39008
51.	15.80	19.39	7.53	15.33	37.05	21.72	47.09274	46.53664	43.10703
52.	12.40	15.35	6.09	14.78	34.39	19.61	59.43963	58.09313	52.99569
53.	6.66	8.00	2.70	17.48	48.24	30.77	111.617	111.883	120.3092
54.	5.77	6.95	2.35	17.63	48.59	30.96	128.6181	128.7022	138.002
55.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
56.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
57.	14.61	18.10	7.36	14.84	34.34	19.50	50.58234	49.46914	43.91047
58.	13.82	17.10	6.82	14.89	34.84	19.95	53.4569	52.34258	47.35208
59.	12.13	14.98	5.86	14.90	35.14	20.24	60.81976	59.5639	55.16007
60.	8.66	10.56	3.81	15.74	39.86	24.12	85.64698	84.7243	85.28471
61.	12.08	14.37	4.77	17.12	46.96	29.84	61.87331	62.77738	68.2678
62.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
63.	15.78	19.06	6.85	16.05	41.08	25.03	47.44199	47.58641	47.55988
64.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
65.	12.43	15.38	6.10	14.78	34.42	19.64	59.2974	57.95896	52.87825
66.	13.18	16.40	6.78	14.50	32.59	18.09	55.74791	54.20543	47.40188

(b) (6)
(b) (7) (c)

Sheet1

	Witness name	Elevation (deg) t=0	Elevation (deg) t=15	Elevation (deg) t=42	Explos. Delta Time t=0 to 15	Explos. Delta Time t=0 to 42	Explos. Delta Time t=15 to 42	Time For Sound t=0	Time For Sound t=15	Time For Sound t=38.5
67.		15.78	19.06	6.85	16.05	41.08	25.03	47.44199	47.58641	47.55988
68.		11.16	13.47	4.70	16.32	42.98	26.67	66.82429	66.8436	69.26976
69.		7.50	9.00	3.03	17.35	47.88	30.53	99.2274	99.61598	107.3079
70.		15.78	19.06	6.85	16.05	41.08	25.03	47.44199	47.58641	47.55988
71.		5.37	6.47	2.21	17.57	48.00	30.43	138.2927	138.12	147.2617
72.		13.22	16.12	5.95	15.63	39.19	23.55	56.26759	55.82701	54.63775
73.		15.24	18.32	6.43	16.29	42.41	26.12	49.15982	49.49998	50.66225
74.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
75.		7.81	9.37	3.16	17.29	47.66	30.37	95.28549	95.69337	103.0575
76.		12.77	15.55	5.70	15.69	39.53	23.84	58.2856	57.8561	57.04096
77.		12.78	15.37	5.33	16.42	43.38	26.97	58.45657	58.73944	61.14192
78.		11.16	13.42	4.61	16.58	44.30	27.72	66.84244	67.11318	70.62559
79.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
80.		11.12	13.56	4.95	15.64	39.40	23.76	66.77816	66.1342	65.57801
81.		14.39	17.76	7.04	15.01	35.46	20.45	51.46115	50.50646	45.94819
82.		12.77	15.41	5.42	16.21	42.32	26.11	58.47369	58.5545	60.07701
83.		4.83	5.81	1.97	18.03	49.83	31.79	153.3212	153.3134	164.4567
84.		13.93	17.27	7.00	14.77	34.11	19.33	52.98193	51.76068	46.12115
85.		14.86	18.07	6.66	15.74	39.56	23.82	50.21256	50.00068	48.84114
86.		12.13	14.98	5.86	14.90	35.14	20.24	60.81979	59.56471	55.16481
87.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
88.		41.03	42.88	12.03	18.55	48.81	30.26	19.34978	22.49046	26.80491
89.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
90.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
91.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
92.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
93.		16.15	19.48	6.98	16.10	41.26	25.17	46.3881	46.59873	46.67304
94.		8.02	9.59	3.20	17.49	48.64	31.16	92.78311	93.43123	101.51
95.		12.32	14.65	4.86	17.12	46.92	29.80	60.71466	61.63764	67.04651
96.		16.07	19.42	7.02	16.01	40.82	24.81	46.58853	46.71216	46.42864
97.		3.09	3.76	1.32	17.25	42.93	25.68	240.1577	237.6692	245.9649
98.		3.46	4.23	1.52	16.10	37.88	21.78	213.5462	210.4586	213.695
99.		3.43	4.22	1.56	14.78	30.70	15.92	212.3308	207.9951	205.1544

	Elevation (deg)	Elevation (deg)	Elevation (deg)	Explos. Delta Time	Explos. Delta Time	Explos. Delta Time	Time For Sound	Time For Sound	Time For Sound
Witness name	t=0	t=15	t=42	t=0 to 15	t=0 to 42	t=15 to 42	t=0	t=15	t=38.5
100.	3.36	4.10	1.47	16.24	38.41	22.17	220.2502	217.1737	221.0691
101.	3.36	4.10	1.47	16.24	38.41	22.17	220.2502	217.1737	221.0691
102.	3.49	4.28	1.57	15.19	33.12	17.93	209.8656	205.9776	205.1009
103.	3.19	3.88	1.36	17.22	43.07	25.85	232.6582	230.2904	238.4606
104.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
105.	15.34	18.46	6.51	16.25	42.18	25.94	48.81513	49.12363	50.08475
106.	41.03	42.88	12.03	18.55	48.81	30.26	19.34978	22.49046	26.80491
107.	8.33	10.35	4.11	14.09	30.54	16.45	87.25879	84.69382	77.45183
108.	11.16	13.42	4.61	16.58	44.30	27.72	66.84244	67.11318	70.62559
109.	15.15	18.70	7.48	15.03	35.39	20.36	48.93203	48.04143	43.29868
110.	8.91	11.11	4.50	13.93	29.61	15.67	81.26318	78.66277	70.39008
111.	9.35	11.26	3.87	16.68	44.79	28.11	79.67986	79.79383	84.21926
112.	12.88	15.66	5.70	15.77	39.94	24.18	57.8294	57.48667	57.0016
113.	12.88	15.66	5.70	15.77	39.94	24.18	57.8294	57.48667	57.0016
114.	15.62	19.21	7.55	15.22	36.41	21.19	47.57248	46.89276	42.94244
115.	15.62	19.21	7.55	15.22	36.41	21.19	47.57248	46.89276	42.94244
116.	15.62	19.21	7.55	15.22	36.41	21.19	47.57248	46.89276	42.94244
117.	4.07	4.92	1.68	18.06	49.05	30.99	181.7346	181.1897	192.6363
118.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
119.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
120.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
121.	9.35	11.26	3.87	16.68	44.79	28.11	79.67986	79.79383	84.21926
122.	3.62	4.38	1.50	18.18	48.91	30.72	204.4426	203.5774	215.6478
123.	9.57	11.45	3.85	17.10	46.89	29.79	77.92675	78.48569	84.56764
124.	9.57	11.45	3.85	17.10	46.89	29.79	77.92675	78.48569	84.56764
125.	15.34	18.46	6.51	16.25	42.18	25.94	48.81513	49.12363	50.08475
126.	16.09	19.45	7.05	15.99	40.68	24.69	46.52641	46.62583	46.21936
127.	15.65	18.91	6.82	16.02	40.94	24.92	47.82044	47.92746	47.8014
128.	12.96	15.95	6.16	15.11	36.25	21.14	57.14068	56.16484	52.54146
129.	13.84	16.49	5.54	16.85	45.45	28.60	54.12082	54.91277	58.8238
130.	11.82	14.06	4.65	17.20	47.36	30.16	63.20152	64.15592	70.02927
131.	12.73	15.15	5.04	17.04	46.48	29.45	58.77205	59.65314	64.61918
132.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

(b) (6)
(b) (7) (c)

Sheet1

	Elevation (deg)	Elevation (deg)	Elevation (deg)	Explos. Delta Time	Explos. Delta Time	Explos. Delta Time	Time For Sound	Time For Sound	Time For Sound
Witness name	t=0	t=15	t=42	t=0 to 15	t=0 to 42	t=15 to 42	t=0	t=15	t=38.5
133.	11.28	14.07	5.80	14.21	31.11	16.90	64.7233	62.71554	55.04569
134.	15.77	19.04	6.85	16.05	41.08	25.02	47.47082	47.61358	47.58487
135.	12.95	15.41	5.14	17.00	46.28	29.28	57.79188	58.65531	63.40862
136.	15.02	18.57	7.46	14.98	35.11	20.14	49.29632	47.20823	43.38548
137.	12.72	15.14	5.04	17.03	46.46	29.43	58.81482	59.68941	64.63489
138.	2.83	3.43	1.19	18.41	47.96	29.55	261.2018	259.4355	272.5546
139.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
140.	7.74	9.30	3.15	17.17	47.04	29.87	96.17417	96.44489	103.3372
141.	11.28	14.07	5.80	14.21	31.11	16.90	64.7233	62.71554	55.04569
142.	15.77	19.03	6.83	16.07	41.17	25.10	47.48393	47.6431	47.69143
143.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
144.	15.25	18.34	6.45	16.28	42.36	26.09	49.11168	49.4453	50.57019
145.	11.06	13.51	4.96	15.57	39.03	23.46	67.0834	66.36495	65.50591
146.	6.91	8.52	3.22	14.65	33.50	18.86	106.0632	103.6749	99.63993
147.	13.03	15.50	5.17	16.99	46.23	29.24	57.44273	58.30514	63.00378
148.	14.86	18.38	7.40	14.94	34.94	19.99	49.80479	48.81257	43.72539
149.	6.85	8.22	2.77	17.52	48.53	31.01	108.556	108.9267	117.4797
150.	15.72	19.32	7.56	15.27	36.69	21.42	47.29566	46.67146	42.94311
151.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
152.	12.22	14.53	4.82	17.12	46.95	29.83	61.20166	62.11936	67.57364
153.	7.47	8.97	3.02	17.37	47.98	30.61	99.53155	99.93501	107.7188
154.	7.49	8.98	3.02	17.38	48.01	30.63	99.35318	99.76589	107.5692
155.	15.46	19.02	7.49	15.19	36.28	21.09	48.05274	47.33623	43.30025
156.	12.23	15.21	6.18	14.51	32.80	18.29	60.01584	58.39393	51.96317
157.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
158.	6.44	7.97	3.09	14.13	30.15	16.02	110.3262	107.3636	100.6152
159.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
160.	9.35	11.26	3.87	16.68	44.79	28.11	79.67986	79.79383	84.21926
161.	15.83	19.11	6.87	16.06	41.11	25.05	47.30993	47.46334	47.45286
162.	12.78	15.42	5.43	16.21	42.31	26.10	58.41447	58.49379	60.00086
163.	12.78	15.42	5.43	16.21	42.31	26.10	58.41447	58.49379	60.00086
164.	12.02	14.34	4.80	16.98	46.27	29.29	62.17083	62.93013	67.86794
165.	11.91	14.39	5.07	16.18	42.25	26.06	62.63052	62.60177	64.24367

	Elevation (deg)	Elevation (deg)	Elevation (deg)	Explos. Delta Time	Explos. Delta Time	Explos. Delta Time	Time For Sound	Time For Sound	Time For Sound
Witness name	t=0	t=15	t=42	t=0 to 15	t=0 to 42	t=15 to 42	t=0	t=15	t=38.5
166.	8.60	10.72	4.31	13.96	29.74	15.79	84.2208	81.58476	73.54408
167.	13.96	17.34	7.12	14.67	33.45	18.78	52.80159	51.47933	45.26902
168.	9.08	11.31	4.57	14.02	30.14	16.12	79.96466	77.47476	69.61097
169.	3.05	3.70	1.30	17.37	43.39	26.03	243.7571	241.312	250.1095
170.	7.37	9.16	3.64	13.88	29.13	15.26	98.01472	95.03488	86.99424
171.	8.20	10.12	3.86	14.71	34.15	19.44	89.5228	87.52053	83.43225
172.	2.35	2.86	0.99	18.88	48.31	29.43	313.3698	311.0505	326.1133
173.	13.69	16.63	6.05	15.82	40.12	24.30	54.45784	54.23089	53.7371
174.	9.35	11.66	4.74	13.98	29.89	15.91	77.61369	75.13131	66.95992
175.	7.58	9.44	3.76	13.86	29.05	15.19	95.16522	92.22182	84.00501
176.	8.02	9.88	3.74	14.81	34.67	19.87	91.66155	89.71211	86.14448
177.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
178.	14.24	17.62	7.10	14.86	34.59	19.72	51.90658	50.7949	45.51444
179.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
180.	11.99	14.84	5.88	14.73	34.19	19.46	61.41084	59.98261	54.80152
181.	8.02	9.59	3.20	17.49	48.64	31.16	92.78311	93.43123	101.51
182.	7.86	9.45	3.20	17.15	46.99	29.83	94.6538	94.93883	101.7313
183.	6.56	8.01	2.87	15.82	39.76	23.94	112.8318	111.4519	112.9061
184.	14.85	18.37	7.41	14.92	34.81	19.89	49.82632	48.81194	43.6137
185.	10.07	12.14	4.21	16.48	43.82	27.34	73.99705	74.03055	77.43308
186.	9.61	11.94	4.78	14.24	31.49	17.24	75.96952	73.77578	66.89999
187.	12.76	15.43	5.47	16.11	41.79	25.68	58.45032	58.43214	59.51244
188.	4.35	5.37	2.03	14.10	28.43	14.33	163.5816	159.5638	153.1717
189.	15.06	18.12	6.39	16.24	42.17	25.93	49.72462	50.00434	50.99824
190.	14.90	18.43	7.42	14.94	34.93	19.99	49.67477	48.68563	43.5873
191.	14.24	17.62	7.10	14.86	34.59	19.72	51.90658	50.7949	45.51444
192.	7.84	9.75	3.88	13.94	29.57	15.63	92.36042	89.54781	81.67046
193.	13.07	15.55	5.19	16.98	46.18	29.20	57.27736	58.13386	62.78415
194.	12.84	15.27	5.09	17.01	46.37	29.36	58.29157	59.16151	64.01332
195.	8.68	10.53	3.72	16.14	41.96	25.82	85.60395	85.07151	87.37834
196.	13.26	15.77	5.27	16.96	46.06	29.10	56.47977	57.33252	61.85056
197.	15.57	18.56	6.32	16.65	44.25	27.59	48.20717	48.92625	51.5632
198.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

(b) (6)
(b) (7) (c)

Sheet1

	Elevation (deg)	Elevation (deg)	Elevation (deg)	Explos. Delta Time	Explos. Delta Time	Explos. Delta Time	Time For Sound	Time For Sound	Time For Sound
Witness name	t=0	t=15	t=42	t=0 to 15	t=0 to 42	t=15 to 42	t=0	t=15	t=38.5
199.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
200.	5.10	6.13	2.07	17.99	49.86	31.87	145.1743	145.2852	156.1851
201.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
202.	7.34	8.82	2.99	17.20	47.10	29.90	101.4057	101.6038	108.7348
203.	12.73	15.86	6.57	14.42	32.13	17.71	57.61546	55.9487	48.83522
204.	4.75	5.73	1.96	17.70	48.12	30.42	156.3013	155.9058	165.7541
205.	15.80	19.39	7.53	15.33	37.05	21.72	47.09274	46.53664	43.10703
206.	16.01	19.32	6.94	16.07	41.17	25.09	46.785	46.96519	46.97717
207.	12.77	15.41	5.42	16.21	42.32	26.11	58.47369	58.5545	60.07701
208.	3.50	4.30	1.57	15.20	33.18	17.98	209.2925	205.4223	204.5781
209.	12.73	15.86	6.57	14.42	32.13	17.71	57.61546	55.9487	48.83522
210.	9.35	11.26	3.87	16.68	44.79	28.11	79.67986	79.79383	84.21926
211.	10.83	13.42	5.29	14.62	33.67	19.05	67.82078	66.15905	60.81297
212.	13.82	17.10	6.82	14.89	34.84	19.95	53.4569	52.34258	47.35208
213.	11.99	14.84	5.88	14.73	34.19	19.46	61.44161	60.0134	54.83758
214.	12.87	15.32	5.10	17.02	46.37	29.36	58.13101	59.00564	63.85369
215.	11.83	14.19	4.85	16.65	44.63	27.98	63.15476	63.56875	67.19742
216.	14.27	17.71	7.24	14.74	33.82	19.08	51.70223	50.47155	44.52366
217.	14.78	17.90	6.46	15.96	40.73	24.78	50.54613	50.53699	50.37485
218.	44.50	45.77	12.71	18.62	48.66	30.04	18.18698	21.42183	25.44709
219.	12.81	15.24	5.08	17.03	46.44	29.41	58.394	59.27479	64.18579
220.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
221.	4.98	6.00	2.03	18.01	49.86	31.85	148.5032	148.5681	159.5785
222.	13.71	16.95	6.74	14.91	34.97	20.06	53.89873	52.79366	47.93494
223.	10.83	13.42	5.29	14.62	33.67	19.05	67.82078	66.15905	60.81297
224.	6.85	8.22	2.77	17.52	48.53	31.01	108.556	108.9267	117.4797
225.	4.43	5.35	1.82	18.05	49.48	31.43	166.9131	166.6505	177.9583
226.	8.41	10.04	3.32	17.63	49.40	31.77	88.38634	89.26467	97.79958
227.	4.74	5.72	1.95	17.88	49.00	31.12	156.3302	156.1113	166.6791
228.	10.83	13.42	5.29	14.62	33.67	19.05	67.82078	66.15905	60.81297
229.	5.82	6.99	2.35	17.88	49.82	31.94	127.2126	127.5687	137.8285
230.	8.34	10.40	4.20	13.85	29.08	15.23	86.55074	83.76755	75.25108
231.	8.34	10.40	4.20	13.85	29.08	15.23	86.55074	83.76755	75.25108

(b)(6)
(b)(7)(c)

	Witness name	Elevation (deg) t=0	Elevation (deg) t=15	Elevation (deg) t=42	Explos. Delta Time t=0 to 15	Explos. Delta Time t=0 to 42	Explos. Delta Time t=15 to 42	Time For Sound t=0	Time For Sound t=15	Time For Sound t=38.5
	232. [redacted]	16.03	19.35	6.95	16.07	41.14	25.07	46.7245	46.90156	46.88777
	233. [redacted]	14.78	17.90	6.46	15.96	40.73	24.78	50.54613	50.53699	50.37485
		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
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		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

Sheet1

TWA800 @ t=-12			USAIR FLT217 @ t=-12			USAIR FLT217 @ t=0			Distance From Witnes		
Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	TWA800 t=-12	TWA800 t=0	FLT217 t=-12
40.6397	**72.7144**	**13800**	**40.5953**	**72.7183**	**21695**	**40.6183**	**72.7097**	**21700**	63439	56687	78665
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47640	48691	63504
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52365	59503	64720
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	108935	119657	114374
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	122663	134462	124409
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	188971	178506	201090
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47675	48723	63540
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52162	59644	64172
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	54194	62143	65611
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	61797	64827	76827
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	61797	64827	76827
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	61537	55335	76985
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	59907	60200	75851
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	56074	51337	71949
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52974	52407	69083
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52365	59503	64720
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52365	59503	64720
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	153391	158158	166711
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	263754	254694	277568
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	86001	77465	100223
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52701	53172	68651
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	77229	79184	92578
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	218821	230939	218273
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	63430	59814	79528
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	49427	54923	63257
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	41421	43901	56968
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	181553	193774	180337
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	72718	66377	88149
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52383	59819	64434
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	94641	85001	107870
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	103386	114185	108704
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52769	49282	68858
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	56570	60697	71114

Sheet1

TWA800 @ t=-12			USAIR FLT217 @ t=-12			USAIR FLT217 @ t=0			Distance From Witnes		
Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	TWA800 t=-12	TWA800 t=0	FLT217 t=-12
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	153473	158247	166786
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	94813	85533	108406
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	48205	49119	64095
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52365	59503	64720
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	162124	150855	172787
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47766	47445	63868
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	57707	52182	73375
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	59450	54473	75280
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	58878	67078	69838
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	60638	54377	76060
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47755	50408	63136
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	176201	164504	185723
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	109335	110740	124746
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	72878	81393	83051
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	59298	53325	74822
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	97981	87741	110494
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	97981	87741	110494
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	51844	48616	67961
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	68018	62584	83751
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	107516	117873	113844
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	125262	136127	130143
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	58557	52787	74149
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	61088	55916	76873
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	68633	64000	84572
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	89303	90376	104905
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	55976	64279	66898
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47640	48691	63504
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	67834	62424	83573
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	66118	58771	81061

Sheet1

TWA800 @ t=-12			USAIR FLT217 @ t=-12			USAIR FLT217 @ t=0			Distance From Witnes		
									TWA800	TWA800	FLT217
Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	t=-12	t=0	t=-12
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47640	48691	63504
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	65816	69768	80318
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	94704	104563	102256
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47640	48691	63504
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	135950	146398	141770
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	59139	58555	75230
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47882	50512	63269
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	90739	100322	98873
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	60875	60735	76895
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	56525	60651	71069
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	64302	69720	77858
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	69971	70007	85923
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	58258	53631	74167
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	57800	60729	72925
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	150935	162975	151200
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	61401	55483	76953
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52321	51862	68420
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	68627	63999	84567
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	8485	15813	7909
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	46312	47512	62155
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	87188	97703	93478
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	54783	63019	65831
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47040	47762	62981
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	247845	254842	258743
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	226184	227565	241403
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	236203	229485	251609

TWA800 @ t=-12			USAIR FLT217 @ t=-12			USAIR FLT217 @ t=0			Distance From Witnes		
									TWA800	TWA800	FLT217
Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	t=-12	t=0	t=-12
40.6397	**72.7144**	**13800**	**40.5953**	**72.7183**	**21695**	**40.6183**	**72.7097**	**21700**	232498	234552	247394
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	232498	234552	247394
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	229393	225471	245539
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	239829	246857	250708
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47782	50144	63268
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	8485	15813	7909
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	102990	93981	116835
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	64302	69720	77858
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	55626	50829	71485
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	97981	87741	110494
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	77281	83560	89900
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	59907	60200	75851
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	59907	60200	75851
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	53062	49211	69100
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	53062	49211	69100
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	53062	49211	69100
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	181414	193169	182938
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	77281	83560	89900
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	205637	217491	206609
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	73123	81640	83287
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	73123	81640	83287
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47782	50144	63268
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47141	47702	63113
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	48205	49119	64095
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	63430	59814	79528
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	49475	55841	62630
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	56949	65726	67199
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	53212	60905	64956
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!

	TWA800 @ t=-12			USAIR FLT217 @ t=-12			USAIR FLT217 @ t=0			Distance From Witnes		
	Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	TWA800 t=-12	TWA800 t=0	FLT217 t=-12
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	77712	69003	91791
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47675	48723	63540
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52408	59838	64463
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	56324	51265	72119
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	53289	60951	65065
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	266253	277963	267687
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	92280	101253	101411
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	77712	69003	91791
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47582	48732	63424
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47881	50461	63287
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	70736	70378	86757
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	118915	113587	134763
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52091	59458	64225
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	57062	51851	72820
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	104035	114622	109876
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52462	48876	68536
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	55269	63549	66245
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	94937	104896	102287
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	94719	104706	102015
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	53717	49759	69739
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	70503	63466	85618
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	133836	121954	134952
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	77281	83560	89900
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	47469	48543	63330
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	57756	60666	72890
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	57756	60666	72890
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	57077	64603	68883
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	62263	65261	77301

TWA800 @ t=-12			USAIR FLT217 @ t=-12			USAIR FLT217 @ t=0			Distance From Witnes		
									TWA800	TWA800	FLT217
Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	t=-12	t=0	t=-12
40.6397	**72.7144**	**13800**	**40.5953**	**72.7183**	**21695**	**40.6183**	**72.7097**	**21700**	100971	90943	113752
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	61944	55371	77243
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	95687	86101	108973
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	251129	258633	261404
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	117101	106430	128962
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	100444	95493	116367
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	322324	334616	320027
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	56154	56491	72110
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	93520	83599	106435
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	114188	103352	125779
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	102046	97703	118093
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	59706	54228	75396
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	70366	64784	86061
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	87188	97703	93478
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	90726	99621	100004
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	118013	119601	133325
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	57230	51890	72951
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	72403	77478	86083
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	89420	81310	103952
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	58401	60738	73763
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	193253	180930	197112
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	48758	51148	64220
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	56929	51707	72682
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	59706	54228	75396
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	110117	99975	122747
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	51974	59278	64175
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52831	60382	64745
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	86774	90114	101405
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	51262	58409	63646
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	44653	49379	59113
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!

TWA800 @ t=-12			USAIR FLT217 @ t=-12			USAIR FLT217 @ t=0			Distance From Witnes		
									TWA800	TWA800	FLT217
Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	t=-12	t=0	t=-12
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	142223	154226	142763
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	97750	106863	106576
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	68694	60922	83403
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	154909	165675	159809
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	51844	48616	67961
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	46847	47958	62705
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	57800	60729	72925
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	228690	224827	244841
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	68694	60922	83403
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	77281	83560	89900
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	77858	71910	93451
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	61088	55916	76873
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	70394	64818	86090
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52656	60207	64574
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	60026	65708	73462
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	60342	54098	75769
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	51314	52143	67199
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	5645	14005	10700
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	52863	60493	64689
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	145781	157807	146161
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	61416	56390	77240
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	77858	71910	93451
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	104035	114622	109876
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	165511	177431	166345
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	81888	93061	86545
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	154417	165903	157153
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	77858	71910	93451
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	123058	134899	124600
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	104749	93844	116239
40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	104749	93844	116239

	TWA800 @ t=-12			USAIR FLT217 @ t=-12			USAIR FLT217 @ t=0			Distance From Witnes		
	Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	Latitude	Longitude	Altitude	TWA800 t=-12	TWA800 t=0	FLT217 t=-12
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	46815	47893	62681
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	51314	52143	67199
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!
	40.6397	72.7144	13800	40.5953	72.7183	21695	40.6183	72.7097	21700	#VALUE!	#VALUE!	#VALUE!

(b) (6)
(b) (7) (c)

Sheet1

			AT TIME= -12 SEC				AT TIME= 0 SEC			
FLT217			Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation
t=0		Witness Name	TWA800	TWA800	USA217	USA217	TWA800	TWA800	USA217	USA217
70294		1.	202.24	12.27	197.79	15.42	192.34	13.64	198.86	17.16
55534		2.	166.74	16.15	170.09	18.86	152.05	15.78	167.28	21.34
58932		3.	134.25	14.76	144.55	18.53	123.87	13.02	138.79	20.21
112522		4.	105.43	7.22	113.26	10.74	102.34	6.56	109.07	10.92
124536		5.	92.16	6.42	99.62	9.89	90.51	5.84	95.72	9.88
193878		6.	223.43	4.18	220.27	6.16	221.38	4.41	221.57	6.39
55570		7.	166.75	16.14	170.09	18.85	152.07	15.77	167.28	21.33
58575		8.	132.15	14.82	142.91	18.68	122.03	12.99	136.95	20.33
60348		9.	128.97	14.29	140.02	18.30	119.62	12.49	133.95	19.78
69468		10.	155.51	12.59	160.51	15.77	144.65	11.98	157.20	17.35
69468		11.	155.51	12.59	160.51	15.77	144.65	11.98	157.20	17.35
68564		12.	199.54	12.64	195.52	15.74	189.03	13.96	196.34	17.56
67813		13.	168.79	12.97	171.16	15.96	156.98	12.88	168.99	17.74
63466		14.	192.80	13.83	189.95	16.78	180.58	15.00	190.10	18.88
60873		15.	173.58	14.60	175.08	17.43	160.13	14.71	173.19	19.62
58932		16.	134.25	14.76	144.55	18.53	123.87	13.02	138.79	20.21
58932		17.	134.25	14.76	144.55	18.53	123.87	13.02	138.79	20.21
160488		18.	143.48	5.14	146.77	7.41	139.28	4.97	144.75	7.70
269703		19.	212.65	3.00	210.87	4.47	210.79	3.09	211.53	4.60
92162		20.	211.10	9.12	206.33	12.21	204.83	10.07	207.91	13.25
60607		21.	168.77	14.67	171.40	17.54	155.37	14.51	169.00	19.70
85010		22.	159.60	10.13	163.09	13.19	150.65	9.86	160.61	14.32
219707		23.	85.42	3.61	89.67	5.68	84.80	3.41	87.48	5.64
71060		24.	186.71	12.27	185.35	15.26	175.70	12.96	184.94	16.98
56620		25.	144.05	15.60	152.67	18.93	131.85	14.06	147.61	20.97
49238		26.	160.94	18.43	166.25	20.85	144.61	17.40	162.47	23.78
182084		27.	82.72	4.35	87.83	6.86	82.15	4.06	85.20	6.80
79736		28.	199.47	10.75	195.97	13.83	190.71	11.71	196.72	15.22
58815		29.	132.41	14.76	143.09	18.61	122.30	12.95	137.17	20.25
100165		30.	218.06	8.30	212.77	11.37	213.11	9.20	214.73	12.22
106903		31.	104.76	7.60	113.03	11.29	101.59	6.87	108.62	11.47
60388		32.	187.23	14.66	185.54	17.49	173.87	15.60	185.07	19.77
64061		33.	150.50	13.71	156.92	16.97	139.09	12.77	152.92	18.71

(b) (6)
(b) (7) (c)

Sheet1

			AT TIME= -12 SEC				AT TIME= 0 SEC			
FLT217			Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation
t=0		Witness Name	TWA800	TWA800	USA217	USA217	TWA800	TWA800	USA217	USA217
160567		34.	143.44	5.14	146.73	7.41	139.24	4.97	144.71	7.70
100569		35.	215.58	8.28	210.61	11.32	210.38	9.14	212.39	12.18
56103		36.	167.30	15.98	170.48	18.70	152.75	15.65	167.75	21.15
58932		37.	134.25	14.76	144.55	18.53	123.87	13.02	138.79	20.21
166176		38.	231.21	4.87	227.04	7.16	229.35	5.21	228.84	7.44
55668		39.	173.18	16.11	174.90	18.76	158.27	16.17	172.80	21.30
64913		40.	196.49	13.45	192.91	16.47	184.92	14.77	193.43	18.48
66800		41.	193.62	13.07	190.72	16.08	182.21	14.18	190.96	18.00
64846		42.	126.95	13.19	137.61	17.26	118.51	11.59	131.76	18.50
67644		43.	199.92	12.82	195.78	15.92	189.28	14.20	196.64	17.79
55528		44.	158.99	16.12	164.25	18.96	144.85	15.27	160.62	21.35
179621		45.	236.41	4.48	232.27	6.66	235.07	4.78	234.12	6.89
117141		46.	160.86	7.19	163.29	9.87	154.46	7.08	161.50	10.49
78543		47.	124.00	10.72	133.28	14.64	117.33	9.60	128.18	15.44
66386		48.	198.58	13.10	194.64	16.17	187.54	14.47	195.37	18.10
103065		49.	222.44	8.02	216.78	11.11	218.16	8.91	218.98	11.89
103065		50.	222.44	8.02	216.78	11.11	218.16	8.91	218.98	11.89
59501		51.	186.13	14.91	184.67	17.70	172.48	15.80	184.08	20.04
75282		52.	195.16	11.47	192.27	14.52	185.40	12.40	192.66	16.08
111514		53.	108.86	7.31	116.58	10.79	105.42	6.66	112.43	11.01
128623		54.	103.77	6.29	110.70	9.46	101.18	5.77	107.00	9.58
#VALUE!		55.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!		56.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
65700		57.	197.63	13.26	193.85	16.31	186.34	14.61	194.49	18.28
68397		58.	194.42	12.73	191.42	15.76	183.40	13.82	191.74	17.60
76087		59.	191.18	11.37	189.06	14.39	181.26	12.13	189.08	15.92
97153		60.	163.16	8.78	165.72	11.68	155.30	8.66	163.76	12.59
61914		61.	126.48	13.85	137.68	17.97	117.72	12.08	131.57	19.31
#VALUE!		62.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
55534		63.	166.74	16.15	170.09	18.86	152.05	15.78	167.28	21.34
#VALUE!		64.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
75104		65.	195.06	11.50	192.18	14.55	185.26	12.43	192.56	16.12
72765		66.	205.24	11.79	200.36	14.98	196.09	13.18	201.69	16.61

(b) (6)
(b) (7) (c)

Sheet1

FLT217			AT TIME= -12 SEC				AT TIME= 0 SEC			
			Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation
t=0		Witness Name	TWA800	TWA800	USA217	USA217	TWA800	TWA800	USA217	USA217
55534		67.	166.74	16.15	170.09	18.86	152.05	15.78	167.28	21.34
73303		68.	150.57	11.84	156.24	15.12	140.66	11.16	152.67	16.49
99237		69.	113.35	8.29	121.70	11.98	109.06	7.50	117.18	12.33
55534		70.	166.74	16.15	170.09	18.86	152.05	15.78	167.28	21.34
139765		71.	107.62	5.80	113.85	8.70	104.93	5.37	110.50	8.83
67042		72.	172.96	13.13	174.47	16.09	160.92	13.22	172.67	17.94
55656		73.	159.08	16.08	164.31	18.93	144.98	15.24	160.69	21.30
#VALUE!		74.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
95528		75.	115.64	8.65	124.12	12.38	110.95	7.81	119.52	12.80
68784		76.	170.72	12.77	172.66	15.76	159.05	12.77	170.69	17.51
64016		77.	150.51	13.72	156.93	16.98	139.09	12.78	152.92	18.73
71416		78.	143.03	12.11	150.19	15.57	133.51	11.16	145.95	16.90
#VALUE!		79.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
77879		80.	169.13	11.16	171.16	14.17	159.00	11.12	169.27	15.57
65682		81.	192.03	13.33	189.43	16.31	180.26	14.39	189.51	18.28
65499		82.	156.38	13.43	161.47	16.57	144.75	12.77	158.07	18.33
152147		83.	87.51	5.22	93.65	8.17	86.49	4.83	90.47	8.12
68512		84.	198.11	12.67	194.37	15.74	187.44	13.93	195.05	17.57
60222		85.	173.17	14.78	174.78	17.59	159.55	14.86	172.82	19.82
76082		86.	191.16	11.37	189.04	14.39	181.24	12.13	189.06	15.92
#VALUE!		87.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
583		88.	351.19	58.41	0.00	69.97	42.08	41.03	0.00	88.46
#VALUE!		89.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!		90.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!		91.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!		92.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
54203		93.	166.25	16.59	169.79	19.24	151.18	16.15	166.87	21.82
91112		94.	107.85	8.99	117.33	13.07	103.82	8.02	112.27	13.40
60773		95.	127.03	14.14	138.33	18.24	118.03	12.32	132.16	19.65
54944		96.	168.40	16.35	171.35	19.01	153.44	16.07	168.70	21.55
253991		97.	130.51	3.19	133.21	4.79	128.18	3.09	131.64	4.88
233949		98.	159.21	3.49	160.56	5.14	156.11	3.46	159.58	5.30
243220		99.	198.63	3.34	197.46	4.93	196.07	3.43	197.75	5.10

(b) (6)
(b) (7) (c)

Sheet1

			AT TIME= -12 SEC				AT TIME= 0 SEC			
FLT217			Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation
t=0		Witness.Name	TWA800	TWA800	USA217	USA217	TWA800	TWA800	USA217	USA217
240169	100.		155.97	3.40	157.49	5.01	152.98	3.36	156.44	5.16
240169	101.		155.97	3.40	157.49	5.01	152.98	3.36	156.44	5.16
237085	102.		184.27	3.44	184.00	5.05	181.32	3.49	183.82	5.23
245965	103.		130.38	3.29	133.18	4.95	127.99	3.19	131.56	5.04
#VALUE!	104.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
55587	105.		160.41	16.11	165.33	18.93	146.18	15.34	161.84	21.32
583	106.		351.19	58.41	0.00	69.97	42.08	41.03	0.00	88.46
108915	107.		213.60	7.63	209.21	10.52	208.67	8.33	210.76	11.27
71416	108.		143.03	12.11	150.19	15.57	133.51	11.16	145.95	16.90
63003	109.		193.14	13.93	190.19	16.88	180.84	15.15	190.37	19.01
103065	110.		222.44	8.02	216.78	11.11	218.16	8.91	218.98	11.89
84030	111.		137.48	10.12	144.45	13.57	129.88	9.35	140.41	14.48
67813	112.		168.79	12.97	171.16	15.96	156.98	12.88	168.99	17.74
67813	113.		168.79	12.97	171.16	15.96	156.98	12.88	168.99	17.74
60620	114.		188.91	14.58	186.83	17.43	175.71	15.62	186.55	19.70
60620	115.		188.91	14.58	186.83	17.43	175.71	15.62	186.55	19.70
60620	116.		188.91	14.58	186.83	17.43	175.71	15.62	186.55	19.70
183265	117.		92.44	4.35	97.51	6.76	91.27	4.07	94.85	6.75
#VALUE!	118.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	119.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
#VALUE!	120.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
84030	121.		137.48	10.12	144.45	13.57	129.88	9.35	140.41	14.48
207246	122.		90.71	3.84	95.21	5.99	89.76	3.62	92.86	5.98
78784	123.		123.98	10.69	133.23	14.60	117.33	9.57	128.15	15.40
78784	124.		123.98	10.69	133.23	14.60	117.33	9.57	128.15	15.40
55587	125.		160.41	16.11	165.33	18.93	146.18	15.34	161.84	21.32
55049	126.		169.14	16.32	171.91	18.97	154.18	16.09	169.34	21.51
56103	127.		167.30	15.98	170.48	18.70	152.75	15.65	167.75	21.15
71060	128.		186.71	12.27	185.35	15.26	175.70	12.96	184.94	16.98
56382	129.		139.14	15.59	148.86	19.11	127.57	13.84	143.32	21.05
62584	130.		123.13	13.62	134.75	17.89	114.97	11.82	128.46	19.12
59510	131.		130.71	14.54	141.59	18.47	120.97	12.73	135.59	20.03
#VALUE!	132.		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

			AT TIME= -12 SEC				AT TIME= 0 SEC			
FLT217			Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation
t=0		Witness Name	TWA800	TWA800	USA217	USA217	TWA800	TWA800	USA217	USA217
83770		133.	212.49	10.07	207.07	13.30	205.62	11.28	208.88	14.52
55570		134.	166.75	16.14	170.09	18.85	152.07	15.77	167.28	21.33
58842		135.	132.44	14.75	143.11	18.60	122.32	12.95	137.19	20.24
63642		136.	194.33	13.77	191.15	16.74	182.28	15.02	191.46	18.83
59602		137.	130.90	14.52	141.72	18.44	121.14	12.72	135.75	20.01
268118		138.	92.72	2.97	96.18	4.63	91.89	2.83	94.37	4.63
#VALUE!		139.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
97527		140.	120.10	8.51	128.02	12.08	115.06	7.74	123.67	12.54
83770		141.	212.49	10.07	207.07	13.30	205.62	11.28	208.88	14.52
55472		142.	166.28	16.17	169.74	18.88	151.60	15.77	166.88	21.36
#VALUE!		143.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
55662		144.	159.33	16.08	164.50	18.92	145.20	15.25	160.91	21.30
78645		145.	170.91	11.04	172.59	14.04	160.86	11.06	170.87	15.43
126284		146.	192.58	6.62	191.09	9.15	187.08	6.91	191.23	9.75
58559		147.	132.87	14.84	143.50	18.66	122.64	13.03	137.60	20.33
64346		148.	195.00	13.60	191.71	16.59	183.18	14.86	192.09	18.64
107798		149.	106.81	7.56	114.91	11.17	103.46	6.85	110.58	11.38
60064		150.	187.73	14.74	185.91	17.57	174.31	15.72	185.50	19.86
#VALUE!		151.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
61228		152.	126.69	14.02	137.98	18.13	117.81	12.22	131.82	19.51
99377		153.	112.53	8.27	120.92	11.97	108.32	7.47	116.39	12.32
99133		154.	112.29	8.29	120.72	12.01	108.10	7.49	116.18	12.35
61258		155.	189.34	14.41	187.18	17.28	176.33	15.46	186.95	19.51
77279		156.	203.27	11.07	199.00	14.22	194.56	12.23	200.11	15.68
#VALUE!		157.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
132834		158.	269.81	5.89	262.93	9.13	271.34	6.44	266.44	9.28
#VALUE!		159.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
84030		160.	137.48	10.12	144.45	13.57	129.88	9.35	140.41	14.48
55363		161.	166.66	16.21	170.03	18.91	151.92	15.83	167.21	21.40
65458		162.	156.49	13.44	161.56	16.58	144.84	12.78	158.16	18.34
65458		163.	156.49	13.44	161.56	16.58	144.84	12.78	158.16	18.34
63419		164.	131.43	13.59	141.56	17.48	122.17	12.02	135.93	18.89
69938		165.	155.62	12.50	160.57	15.68	144.83	11.91	157.28	17.24

			AT TIME= -12 SEC				AT TIME= 0 SEC			
FLT217			Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation
t=0		Witness Name	TWA800	TWA800	USA217	USA217	TWA800	TWA800	USA217	USA217
106223		166.	220.74	7.78	215.43	10.80	216.42	8.60	217.47	11.55
68855		167.	201.43	12.56	197.05	15.69	191.17	13.96	198.05	17.49
101249		168.	217.65	8.21	212.46	11.26	212.73	9.08	214.38	12.10
257012		169.	127.52	3.15	130.32	4.74	125.31	3.05	128.71	4.83
121812		170.	225.71	6.72	220.57	9.55	222.51	7.37	222.66	10.10
107883		171.	191.20	7.82	189.65	10.56	184.57	8.20	189.72	11.37
322404		172.	79.67	2.45	82.53	3.88	79.44	2.35	81.07	3.85
64061		173.	168.98	13.81	171.43	16.74	156.39	13.69	169.17	18.71
98847		174.	220.11	8.39	214.50	11.52	215.33	9.35	216.63	12.38
118737		175.	227.23	6.89	221.82	9.79	224.09	7.58	224.04	10.36
109612		176.	188.15	7.70	187.04	10.41	181.51	8.02	186.90	11.20
#VALUE!		177.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
66932		178.	196.06	13.01	192.66	16.05	184.88	14.24	193.14	17.96
#VALUE!		179.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
77598		180.	195.74	11.10	192.82	14.15	186.37	11.99	193.26	15.62
91112		181.	107.85	8.99	117.33	13.07	103.82	8.02	112.27	13.40
96036		182.	120.70	8.65	128.68	12.24	115.53	7.86	124.30	12.73
125793		183.	159.75	6.67	162.15	9.24	153.84	6.56	160.42	9.79
64482		184.	195.62	13.56	192.20	16.56	183.88	14.85	192.64	18.60
79581		185.	144.31	10.79	150.59	14.15	135.68	10.07	146.82	15.25
95793		186.	208.43	8.77	204.19	11.79	202.16	9.61	205.53	12.76
66176		187.	159.22	13.29	163.67	16.39	147.52	12.76	160.56	18.15
193692		188.	258.98	4.08	254.36	6.28	259.27	4.35	256.64	6.39
56556		189.	160.13	15.80	165.04	18.67	146.18	15.06	161.57	20.99
64210		190.	195.07	13.63	191.76	16.62	183.22	14.90	192.14	18.67
66932		191.	196.06	13.01	192.66	16.05	184.88	14.24	193.14	17.96
115285		192.	221.45	7.14	216.46	10.02	217.59	7.84	218.40	10.66
58471		193.	133.27	14.87	143.84	18.68	122.96	13.07	137.96	20.36
59204		194.	131.65	14.64	142.40	18.53	121.71	12.84	136.45	20.13
94326		195.	152.38	9.04	156.61	12.08	144.67	8.68	153.87	12.96
57838		196.	134.31	15.07	144.78	18.82	123.74	13.26	138.94	20.57
52089		197.	148.89	17.17	157.01	20.15	134.92	15.57	152.09	22.62
#VALUE!		198.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

			AT TIME= -12 SEC				AT TIME= 0 SEC			
FLT217			Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation
t=0		Witness Name	TWA800	TWA800	USA217	USA217	TWA800	TWA800	USA217	USA217
#VALUE!		199.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
143554		200.	88.32	5.54	94.83	8.64	87.18	5.10	91.45	8.60
#VALUE!		201.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
102872		202.	118.95	8.04	126.57	11.51	114.27	7.34	122.39	11.91
75175		203.	207.43	11.36	202.32	14.58	198.91	12.73	203.82	16.10
158323		204.	104.44	5.09	110.06	7.73	102.26	4.75	107.05	7.80
59501		205.	186.13	14.91	184.67	17.70	172.48	15.80	184.08	20.04
54740		206.	166.58	16.41	170.01	19.08	151.66	16.01	167.15	21.62
65499		207.	156.38	13.43	161.47	16.57	144.75	12.77	158.07	18.33
236391		208.	183.99	3.45	183.73	5.06	181.02	3.50	183.54	5.24
75175		209.	207.43	11.36	202.32	14.58	198.91	12.73	203.82	16.10
84030		210.	137.48	10.12	144.45	13.57	129.88	9.35	140.41	14.48
85006		211.	197.15	10.05	194.23	13.07	188.85	10.83	194.77	14.32
68397		212.	194.42	12.73	191.42	15.76	183.40	13.82	191.74	17.60
77627		213.	195.71	11.09	192.80	14.14	186.34	11.99	193.23	15.62
59030		214.	131.66	14.69	142.44	18.57	121.69	12.87	136.48	20.18
67082		215.	141.93	12.95	149.72	16.45	131.90	11.83	145.16	17.93
67352		216.	199.86	12.88	195.71	15.98	189.15	14.27	196.57	17.86
59213		217.	167.26	15.05	170.30	17.89	153.57	14.78	167.70	20.13
2271		218.	348.98	67.75	174.21	63.75	50.58	44.50	174.41	84.03
59196		219.	131.15	14.63	141.99	18.54	121.28	12.81	136.00	20.13
#VALUE!		220.	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
147040		221.	87.82	5.41	94.18	8.44	86.74	4.98	90.88	8.40
68761		222.	193.68	12.66	190.85	15.69	182.67	13.71	191.09	17.52
85006		223.	197.15	10.05	194.23	13.07	188.85	10.83	194.77	14.32
107798		224.	106.81	7.56	114.91	11.17	103.46	6.85	110.58	11.38
167015		225.	89.77	4.77	95.35	7.43	88.67	4.43	92.44	7.40
85022		226.	101.18	9.57	111.74	14.07	97.71	8.41	106.16	14.32
156814		227.	96.42	5.11	102.29	7.86	94.79	4.74	99.20	7.88
85006		228.	197.15	10.05	194.23	13.07	188.85	10.83	194.77	14.32
124834		229.	91.43	6.40	98.89	9.88	89.86	5.82	95.00	9.86
109227		230.	228.00	7.51	222.08	10.57	224.64	8.34	224.51	11.24
109227		231.	228.00	7.51	222.08	10.57	224.64	8.34	224.51	11.24

(b)(6)
(b)(7)(c)

				AT TIME= -12 SEC				AT TIME= 0 SEC		
FLT217			Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation	Azimuth	Elevation
t=0		Witness Name	TWA800	TWA800	USA217	USA217	TWA800	TWA800	USA217	USA217
54709		232. [redacted]	166.75	16.42	170.13	19.09	151.80	16.03	167.29	21.64
59213		233. [redacted]	167.26	15.05	170.30	17.89	153.57	14.78	167.70	20.13
#VALUE!			#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
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	Witness Location		Primary Shooter Location		Ground Distance	Azimuth
Witness Name	Latitude	Longitude	Latitude	Longitude	(ft)	(deg)
1.	40.8008	72.6276	40.60833	72.64667	70363	184.30
2.	40.7669	72.7539	40.60833	72.64667	64964	152.82
3.	40.74	72.85	40.60833	72.64667	73924	130.42
4.	40.7198	73.094	40.60833	72.64667	130206	108.04
5.	40.6532	73.1575	40.60833	72.64667	142277	96.44
6.	41.0171	72.2448	40.60833	72.64667	185746	216.78
7.	40.767	72.7539	40.60833	72.64667	64997	152.83
8.	40.7358	72.8542	40.60833	72.64667	73839	128.93
9.	40.7333	72.8667	40.60833	72.64667	76007	126.75
10	40.794	72.807	40.60833	72.64667	80902	146.74
11	40.794	72.807	40.60833	72.64667	80902	146.74
12	40.7988	72.64	40.60833	72.64667	69461	181.52
13	40.8009	72.7565	40.60833	72.64667	76483	156.58
14	40.7897	72.6695	40.60833	72.64667	66420	174.54
15	40.7841	72.7358	40.60833	72.64667	68650	158.94
16	40.74	72.85	40.60833	72.64667	73924	130.42
17	40.74	72.85	40.60833	72.64667	73924	130.42
18	40.9783	73.0444	40.60833	72.64667	173900	140.73
19	41.25	72.2	40.60833	72.64667	264303	207.89
20	40.8418	72.5538	40.60833	72.64667	88896	196.81
21	40.7815	72.7515	40.60833	72.64667	69462	155.31
22	40.8383	72.8117	40.60833	72.64667	95434	151.41
23	40.5945	73.5029	40.60833	72.64667	237053	88.50
24	40.8125	72.6876	40.60833	72.64667	75286	171.35
25	40.7495	72.8193	40.60833	72.64667	70189	137.10
26	40.7471	72.7633	40.60833	72.64667	59992	147.45
27	40.5784	73.3654	40.60833	72.64667	199264	86.63
28	40.8278	72.6268	40.60833	72.64667	80197	183.93
29	40.7367	72.8542	40.60833	72.64667	74046	129.13
30	40.8443	72.5035	40.60833	72.64667	94682	204.74
31	40.7125	73.0758	40.60833	72.64667	124604	107.60
32	40.7833	72.6904	40.60833	72.64667	64921	169.25
33	40.7748	72.8151	40.60833	72.64667	76489	142.45

	Witness Location		Primary Shooter Location		Ground Distance	Azimuth
Witness Name	Latitude	Longitude	Latitude	Longitude	(ft)	(deg)
34	40.9783	73.0449	40.60833	72.64667	173988	140.69
35	40.8514	72.515	40.60833	72.64667	95788	202.36
36	40.7687	72.7527	40.60833	72.64667	65399	153.34
37	40.74	72.85	40.60833	72.64667	73924	130.42
38	40.9192	72.2576	40.60833	72.64667	156156	223.60
39	40.7698	72.7349	40.60833	72.64667	63717	157.46
40	40.7915	72.6552	40.60833	72.64667	66817	177.97
41	40.7982	72.6638	40.60833	72.64667	69380	176.08
42	40.7369	72.8845	40.60833	72.64667	80754	125.40
43	40.7961	72.6397	40.60833	72.64667	68479	181.61
44	40.762	72.7763	40.60833	72.64667	66503	147.35
45	40.9083	72.1838	40.60833	72.64667	168214	229.60
46	40.9231	72.844	40.60833	72.64667	127030	154.54
47	40.7517	72.9328	40.60833	72.64667	94813	123.36
48	40.7939	72.6461	40.60833	72.64667	67650	180.13
49	40.8383	72.4754	40.60833	72.64667	96269	209.50
50	40.8383	72.4754	40.60833	72.64667	96269	209.50
51	40.7811	72.6944	40.60833	72.64667	64351	168.15
52	40.8198	72.6501	40.60833	72.64667	77098	179.29
53	40.7356	73.0822	40.60833	72.64667	129054	110.93
54	40.7223	73.1542	40.60833	72.64667	146368	106.33
55	?	?	40.60833	72.64667	#VALUE!	#VALUE!
56	?	?	40.60833	72.64667	#VALUE!	#VALUE!
57	40.7928	72.6503	40.60833	72.64667	67257	179.14
58	40.802	72.6594	40.60833	72.64667	70691	177.14
59	40.8244	72.6663	40.60833	72.64667	78956	176.05
60	40.8742	72.8079	40.60833	72.64667	106666	155.27
61	40.7311	72.8771	40.60833	72.64667	77865	125.01
62	?	?	40.60833	72.64667	#VALUE!	#VALUE!
63	40.7669	72.7539	40.60833	72.64667	64964	152.82
64	?	?	40.60833	72.64667	#VALUE!	#VALUE!
65	40.8194	72.6507	40.60833	72.64667	76955	179.17
66	40.8038	72.6125	40.60833	72.64667	71882	187.56

Sheet1

Witness Name	Witness Location Latitude	Witness Location Longitude	Primary Shooter Location Latitude	Primary Shooter Location Longitude	Ground Distance (ft)	Azimuth (deg)
67.	40.7669	72.7539	40.60833	72.64667	64964	152.82
68.	40.797	72.8313	40.60833	72.64667	85642	143.37
69.	40.7431	73.0287	40.60833	72.64667	116494	114.82
70.	40.7669	72.7539	40.60833	72.64667	64964	152.82
71.	40.7535	73.1828	40.60833	72.64667	157386	109.47
72.	40.8007	72.7406	40.60833	72.64667	74780	159.66
73.	40.7624	72.7762	40.60833	72.64667	66611	147.44
74.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
75.	40.7478	73.0101	40.60833	72.64667	112612	116.72
76.	40.8045	72.7499	40.60833	72.64667	76995	158.22
77.	40.7747	72.815	40.60833	72.64667	76444	142.45
78.	40.7807	72.8542	40.60833	72.64667	85084	137.54
79.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
80.	40.8282	72.7621	40.60833	72.64667	88267	158.26
81.	40.796	72.6705	40.60833	72.64667	68732	174.49
82.	40.785	72.7981	40.60833	72.64667	76811	146.93
83.	40.623	73.2595	40.60833	72.64667	169676	91.61
84.	40.7998	72.6454	40.60833	72.64667	69802	180.29
85.	40.7822	72.7369	40.60833	72.64667	68115	158.49
86.	40.8244	72.6664	40.60833	72.64667	78958	176.03
87.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
88.	40.6167	72.7097	40.60833	72.64667	17709	99.90
89.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
90.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
91.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
92.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
93.	40.7631	72.7542	40.60833	72.64667	63774	152.18
94.	40.7134	73.0144	40.60833	72.64667	108670	110.52
95.	40.7303	72.8725	40.60833	72.64667	76659	125.38
96.	40.7661	72.7486	40.60833	72.64667	64047	153.87
97.	41.0833	73.3956	40.60833	72.64667	269518	129.73
98.	41.2201	73.0046	40.60833	72.64667	243852	156.03
99.	41.254	72.4417	40.60833	72.64667	242059	193.55

Witness Name	Witness Location		Primary Shooter Location		Ground Distance	Azimuth
	Latitude	Longitude	Latitude	Longitude	(ft)	(deg)
100.	41.2227	73.0566	40.60833	72.64667	250833	153.11
101.	41.2227	73.0566	40.60833	72.64667	250833	153.11
102.	41.2672	72.6526	40.60833	72.64667	240202	179.61
103.	41.0678	73.3748	40.60833	72.64667	261511	129.59
104.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
105.	40.7632	72.7723	40.60833	72.64667	66285	148.36
106.	40.6167	72.7097	40.60833	72.64667	17709	99.90
107.	40.8752	72.5084	40.60833	72.64667	104516	201.48
108.	40.7807	72.8542	40.60833	72.64667	85084	137.54
109.	40.7883	72.6687	40.60833	72.64667	65891	174.69
110.	40.8383	72.4754	40.60833	72.64667	96269	209.50
111.	40.7961	72.9032	40.60833	72.64667	98552	133.91
112.	40.8009	72.7565	40.60833	72.64667	76483	156.58
113.	40.8009	72.7565	40.60833	72.64667	76483	156.58
114.	40.7835	72.6847	40.60833	72.64667	64718	170.64
115.	40.7835	72.6847	40.60833	72.64667	64718	170.64
116.	40.7835	72.6847	40.60833	72.64667	64718	170.64
117.	40.6627	73.3696	40.60833	72.64667	200981	95.42
118.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
119.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
120.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
121.	40.7961	72.9032	40.60833	72.64667	98552	133.91
122.	40.6491	73.4577	40.60833	72.64667	224888	93.53
123.	40.752	72.9336	40.60833	72.64667	95058	123.34
124.	40.752	72.9336	40.60833	72.64667	95058	123.34
125.	40.7632	72.7723	40.60833	72.64667	66285	148.36
126.	40.7667	72.7465	40.60833	72.64667	63991	154.42
127.	40.7687	72.7527	40.60833	72.64667	65399	153.34
128.	40.8125	72.6876	40.60833	72.64667	75286	171.35
129.	40.7424	72.8314	40.60833	72.64667	70694	133.68
130.	40.7252	72.8868	40.60833	72.64667	78895	122.61
131.	40.735	72.8602	40.60833	72.64667	74956	127.96
132.	?	?	40.60833	72.64667	#VALUE!	#VALUE!

	Witness Location		Primary Shooter Location		Ground Distance	Azimuth
Witness Name	Latitude	Longitude	Latitude	Longitude	(ft)	(deg)
133.	40.8196	72.5635	40.60833	72.64667	80375	196.64
134.	40.767	72.7539	40.60833	72.64667	64997	152.83
135.	40.7368	72.8542	40.60833	72.64667	74069	129.15
136.	40.7894	72.664	40.60833	72.64667	66183	175.84
137.	40.7355	72.86	40.60833	72.64667	75025	128.10
138.	40.6784	73.6758	40.60833	72.64667	285821	94.79
139.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
140.	40.767	73.003	40.60833	72.64667	114231	120.31
141.	40.8196	72.5635	40.60833	72.64667	80375	196.64
142.	40.7665	72.7552	40.60833	72.64667	65000	152.48
143.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
144.	40.7626	72.7755	40.60833	72.64667	66568	147.61
145.	40.8313	72.7548	40.60833	72.64667	86602	159.78
146.	40.9581	72.6208	40.60833	72.64667	127711	183.21
147.	40.737	72.8524	40.60833	72.64667	73730	129.44
148.	40.7909	72.661	40.60833	72.64667	66674	176.59
149.	40.7228	73.0744	40.60833	72.64667	125426	109.29
150.	40.7823	72.6889	40.60833	72.64667	64487	169.56
151.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
152.	40.7304	72.8746	40.60833	72.64667	77153	125.15
153.	40.7399	73.0314	40.60833	72.64667	116689	114.14
154.	40.7387	73.0312	40.60833	72.64667	116460	113.96
155.	40.7851	72.6829	40.60833	72.64667	65216	171.15
156.	40.8174	72.6137	40.60833	72.64667	76760	186.83
157.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
158.	40.6419	72.2306	40.60833	72.64667	115772	264.07
159.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
160.	40.7961	72.9032	40.60833	72.64667	98552	133.91
161.	40.7664	72.754	40.60833	72.64667	64815	152.72
162.	40.785	72.7977	40.60833	72.64667	76751	147.00
163.	40.785	72.7977	40.60833	72.64667	76751	147.00
164.	40.7434	72.8691	40.60833	72.64667	78783	128.61
165.	40.7953	72.8073	40.60833	72.64667	81344	146.87

	Witness Location		Primary Shooter Location		Ground Distance	Azimuth
Witness Name	Latitude	Longitude	Latitude	Longitude	(ft)	(deg)
166.	40.8498	72.4762	40.60833	72.64667	99835	208.20
167.	40.7979	72.6326	40.60833	72.64667	69218	183.22
168.	40.8477	72.5031	40.60833	72.64667	95854	204.49
169.	41.0615	73.4344	40.60833	72.64667	272949	126.99
170.	40.8644	72.4114	40.60833	72.64667	113746	214.92
171.	40.91	72.6439	40.60833	72.64667	109978	180.40
172.	40.4868	73.8607	40.60833	72.64667	339211	82.10
173.	40.7909	72.7532	40.60833	72.64667	72779	156.10
174.	40.8361	72.4966	40.60833	72.64667	92811	206.58
175.	40.8528	72.4114	40.60833	72.64667	110305	216.18
176.	40.9168	72.6621	40.60833	72.64667	112535	177.82
177.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
178.	40.7971	72.6547	40.60833	72.64667	68853	178.15
179.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
180.	40.8255	72.6454	40.60833	72.64667	79171	180.25
181.	40.7134	73.0144	40.60833	72.64667	108670	110.52
182.	40.7671	72.9964	40.60833	72.64667	112680	120.79
183.	40.9435	72.86205	40.60833	72.64667	135888	153.98
184.	40.7909	72.6587	40.60833	72.64667	66640	177.14
185.	40.8011	72.8671	40.60833	72.64667	93005	139.01
186.	40.8555	72.5605	40.60833	72.64667	93198	194.83
187.	40.7895	72.7893	40.60833	72.64667	76917	149.12
188.	40.7431	72.0287	40.60833	72.64667	177782	254.16
189.	40.7655	72.7743	40.60833	72.64667	67289	148.33
190.	40.7905	72.6609	40.60833	72.64667	66527	176.61
191.	40.7971	72.6547	40.60833	72.64667	68853	178.15
192.	40.8664	72.4509	40.60833	72.64667	108515	209.95
193.	40.7375	72.8512	40.60833	72.64667	73591	129.72
194.	40.7361	72.8571	40.60833	72.64667	74532	128.61
195.	40.8507	72.8598	40.60833	72.64667	106179	146.25
196.	40.738	72.847	40.60833	72.64667	72820	130.41
197.	40.7446	72.7978	40.60833	72.64667	64915	139.88
198.	?	?	40.60833	72.64667	#VALUE!	#VALUE!

(b) (6)
(b) (7) (c)

Sheet1

Witness Name	Witness Location Latitude	Witness Location Longitude	Primary Shooter Location Latitude	Primary Shooter Location Longitude	Ground Distance (ft)	Azimuth (deg)
199.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
200.	40.6294	73.2283	40.60833	72.64667	161133	92.54
201.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
202.	40.7699	73.0236	40.60833	72.64667	119691	119.36
203.	40.807	72.6	40.60833	72.64667	73565	190.11
204.	40.7469	73.2567	40.60833	72.64667	176063	106.47
205.	40.7811	72.6944	40.60833	72.64667	64351	168.15
206.	40.7647	72.7537	40.60833	72.64667	64227	152.53
207.	40.785	72.7981	40.60833	72.64667	76811	146.93
208.	41.2655	72.6569	40.60833	72.64667	239593	179.32
209.	40.807	72.6	40.60833	72.64667	73565	190.11
210.	40.7961	72.9032	40.60833	72.64667	98552	133.91
211.	40.8438	72.6314	40.60833	72.64667	85945	182.82
212.	40.802	72.6594	40.60833	72.64667	70691	177.14
213.	40.8256	72.6455	40.60833	72.64667	79207	180.23
214.	40.7358	72.8566	40.60833	72.64667	74356	128.61
215.	40.7694	72.8482	40.60833	72.64667	80941	136.44
216.	40.7954	72.6403	40.60833	72.64667	68220	181.48
217.	40.777	72.7553	40.60833	72.64667	68429	153.94
218.	40.6245	72.7105	40.60833	72.64667	18622	108.43
219.	40.7352	72.8583	40.60833	72.64667	74588	128.25
220.	?	?	40.60833	72.64667	#VALUE!	#VALUE!
221.	40.6257	73.241	40.60833	72.64667	164591	92.01
222.	40.8034	72.6619	40.60833	72.64667	71238	176.61
223.	40.8438	72.6314	40.60833	72.64667	85945	182.82
224.	40.7228	73.0744	40.60833	72.64667	125426	109.29
225.	40.6394	73.3127	40.60833	72.64667	184639	93.30
226.	40.6836	73.0048	40.60833	72.64667	102793	105.37
227.	40.6884	73.2691	40.60833	72.64667	174621	99.42
228.	40.8438	72.6314	40.60833	72.64667	85945	182.82
229.	40.649	73.1591	40.60833	72.64667	142553	95.80
230.	40.8323	72.433	40.60833	72.64667	100757	215.94
231.	40.8323	72.433	40.60833	72.64667	100757	215.94

(b)(6)
(b)(7)(c)

Sheet1

					Primary Shooter		Ground	
			Witness Location		Location		Distance	Azimuth
		Witness Name	Latitude	Longitude	Latitude	Longitude	(ft)	(deg)
		232. [redacted]	40.7647	72.7532	40.60833	72.64667	64163	152.64
		233. [redacted]	40.777	72.7553	40.60833	72.64667	68429	153.94
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!
			?	?	40.60833	72.64667	#VALUE!	#VALUE!

62

[redacted] (b)(4) (b)(6)

From: [redacted] (b)(3)
Expert in aerodynamics and all things physical

Tom,

I send this note along with a trajectory simulation program input in an effort to clarify what I have been up to.

1) The H (altitude) variable loaded into the ITVT table (when using a -15 value in the third column) causes event #20 (the last event) to occur at the input value (zero). The CRVT table (just below) associates an "observation" (time=50 sec) to be to be linked to this event. Thus the effect is an "observation" (data) point of "water impact at 50 seconds.

2) VRF means "variable to be replaced". Thus VRF2 causes ARG2 (pitching moment coefficient" to replace the variable CM1T. CM1T is a multiplier for the CM1T table (see above--the table with 1.0's). Thus the calculation of the multiplier (ARG2) is shifted into the pitching moment table (CM1T) multiplier (which only contains 1.0 values) and the output of the CM1T is the pitching moment used in the trajectory calculations.

---------- Remaining comments refer to the plots ----------

3) "AZMUTH" is the azmuth of the nose tip. I have trird trajectories that pitched through many hundreds of degrees. This plot helped determine when the vehicle passes through a pitch angle of +/- 90 degrees. Not of much use here.

4) I include plots of CL, CD vs both time and angle of attack plus CL vs CD. Note that these values are what was calculated by the program and are not (direct) inputs.

5) RDOT is range rate. The plotted values are the average range rate between the radar data points.

Ten seconds ago a fellow left my office after dropping a table on me.

Time of first occurence (sec)	Distance (Nm)
31:11.88	0.0
31:16.65	0.485
31:21.25	0.96
31:30.48	1.67
31:39.72	1.93
31:48.96	2.24
31:61.88 (Impact +/- 2s?)	2.52

Distance is measured along the (best estimate) flight path so that a plainer analysis applies.

This set is "a best estimate" -- not done by me--but is (apparently) a set that both CIA and the FBI will/can live with. Note that I have added these points to my curves and that these curves, while developed using the least squares process, did not use this data. I will be rerunning against this data set. These data suggest that my minimum velocity (at t=20s) may be a little high. The final conclusion -- a good trajectory -- probably will not change.

[redacted] (b)(3)

TRAJECTORY PROGRAM INPUT

```
0  BUCKET SIZE REQUESTED IS=00061
0 CPU TIME AT CALL TO INPIM =     0.0
1
 ********H     RUN DETUE FOR TWA FLIGHT 800 ANALYSIS                    ******
 ********H     [redacted]                                               (b)(4)
 ********H     AERO CENTER OF PRESSURE IS INPUT (SEE ARG1)
 ********H     EVENT 13 STARTS PROBLEM                                  ******
 ********H     EVENTS 15/16 START POINT MASS (WING BREAK                 ******
        2L      0 0.                    11.0              D     2  G1
          D     3GMT                    4 0.0             D     5FP1
                6 0.0                   7 0.0                   8 0.0
        3L      0 0.                    11.0              D     2  G1
          D     3TLP                    4 0.0             D     5FP1
                6 0.0                   7 0.0                   8 0.0
       10L      0 0.                    11.0              D     2  G1
          D     3TLP                    4 0.0             D     5FP1
                6 0.0                   7 0.0                   8 0.0
       11L      0 0.                    11.0              D     2  G1
          D     3TLP                    4 0.0             D     5FP1
                6 0.0                   7 0.0                   8 0.0
       12L      0 0.                    11.0              D     2  G1
          D     3TLP                    4 0.0             D     5FP1
                6 0.0                   7 0.0                   8 0.0
       13L      0 0.                    11.0              D     2  G1
          D     3TLP                    4 0.0             D     5FP1
                6 0.0                   7 0.0                   8 0.0
       15L      0 0.                    11.0              D     2  G7
          D     3H                      4 9350.0          D     5VDR
                6 0.0                   7 0.0                   8 0.0
       16L      0 0.0                   11.0              D     2  G1
          D     3TDURP                  4 0.0             D     5FP1
                6 0.0                   7 0.0                   8 0.0
       20L      0 0.                    11.0              D     2  G7
          D     3H                      4 60.0            D     5VDR
                6 0.0                   7 0.0                   8 0.0
                6 0.0                   7 0.0                   8 0.0
       20L      0 0.                    12.0              D     2  G1
          D     3TC1                    4 60.             D     5FP1
                6 0.0                   7 0.0                   8 0.0
TSPXM  2  FESN   20.
********** ********************************************************** ********
********** ********************************************************** ********
ITIEM  2  T1VAL  1.0          T2VAL  1.0          T3VAL  1.0
PFRPM  0  RSED1F 1.0          MAXKF  9.0          OINPF  2.0
PFRPM  0  COVF   1.0          ITPRF  -9.0         PINF   0.0
PFRPM  0  I1FL   2.0          T1MD   -1.0         T2MD   -1.0
PFRPM  0TDT1CVT GMT           D      GMT
                RANG          D      RANG
        *   T1MD SECOND AND THIRD VALUES ARE THE NUMBER OF POINTS IN THE
        *   T1VAL TABLE FOLLOWED BY THE INVERSE OF THE SIGMA ACCURACY
        *   (IN THIS CASE IT IS 1/0.05 NAUTICAL MILES).
PFRPM0C0T T1MD  1.                    3.                    20.
PFRPM  0  BNDS   200.                 1 100.                2 200.
PFRPM  0         3 200.               4 200.                5 200.
PFRPM  0         6 200.               7 200.
MPEXM000  ITRF  0.0 *
ITERM0000 ITVT  1.0                   20:                   13.
          D     ARG1T                 -4.                   0.001
                0.                    0.                    0.
                0.                    0.                    0.
                2.0                   20.                   13.
          D     ARG1T                 -5.                   0.01
                0.                    0.                    0.
                0.                    0.                    0.
                3.0                   20.                   13.
          D     ARG1T                 -6.                   0.001
                0.                    0.                    0.
                0.                    0.                    0.
```

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* ITRF=0 (NO ITERATION)
= 1 USE LEAST SQUARE ITERATION

ITVT CONTAINS THE VARIABLES TO BE INCLUDED IN THE LEAST SQUARES SEARCH
SEE ARG1T BELOW (1= CENTER OF PRESS

```
                4.0                     20.                     13.
          D     ARG1T                   -7.                     0.01
                0.                      0.                      0.
                0.                      0.                      0.
                5.0                     20.                     13.
          D     ARG1T                   -8.                     0.001
                0.                      0.                      0.
                0.                      0.                      0.
                6.0                     20.                     13.
          D     ARG1T                   -10.                    0.001
                0.                      0.                      0.
                0.                      0.                      0.
                7.0                     20.                     13.
          D     ARG1T                   -12.                    0.001
                0.                      0.                      0.
                0.                      0.                      0.
                8.0                     20.                     -15.
          D     H (ALTITUDE)            0.                      100.
                0.                      0.(VALUE)               0.
                0.                      0.                      0.
ITIEM   0  T1VAL 1.0
ITIEM   0T T1VAL 22.7                   2.05
                 34.7                   2.50
                 46.7                   2.69
ITIEM000T CVRT   1.                     0.                      20.
                 0.             D       TC1                     .0
                 50.0                   .0                      .0
                 .0                     .0                      .0
PERPM000  MD1T   1.             MD2T    1.
PERPM000T MD1T   1.                     1.                      0.5
*****************************************************************
-----------------------------------------------------------------
ENVEM   2T GRAVTT 2.00000000             0.0                     0.00108271604
                  0.0                    3.00000000              0.0
                  -0.2630140E-05         0.0                     4.00000000
                  0.0                    -0.2349500E-05          0.0
SERVM   2 LITPR2T 6.
INFXM   2ICTPRI2T 0.3
INFXM   2  TPRV2T -10.
INFXM   2TDTPRV2T TC1           D       H               D       MACH
          D       Q             D       RANG            D       VAMI
          D       CZ            D       CX              D       CM
          D       FAZB          D       FAXB            D       OMYB
          D       ASZB          D       FTXB            D       DOMYB
          D       ALFA          D       MAYB            D       IYY
          D       GAMA          D       LATV            D       LONV
          D       ELRLH         D       AZRLN           D       GMT
          D       CXB           D       VDR             D       RB1
          D       ARG1          D       ARG2            D       CM1T
          D       ARG3          D       ARG4            D       ARG5
          D       WT            D       ASXB            D       DVDR
          D       ARG6          D       VCAL            D       ARG7
          D       ARG8          D       ARG9
        0E
CYCXM   2  DTEA   0.10          QOP1    1.0             TC1     0.0
CYCXM   2  LFDT1  0.10          TC4     0.0
CYCXM   2  NOISB  0.0
OPGXM  12 IGCF    0.0           TRKF    0.0
ENVRM   2  ATCF   1.0           ATUF    0.0             AWT     1.0
ENVRM   2  GRVDF  1.0           VWF     -1.0
ENVRM   2I VWT    TC1     6
                  -100.0                  4.8
                  20000.0 APPROVED FOR RELEASE
ENVRM   2I AWT    TC1     6 DATE: JUN 2005
                  -100.0                  70.
                  20000.0                 70.
INTXM   2 INTV    50.0          DTMAX   2.0             INTGF 2.0
PROPM   2 DL0     0
```

(1) SEE NOTE

TC1 IS TIME FROM FIRST EVENT (i.e. IN THE MODEL AT 50 SEC) "OBSERVED DATA"

FT65

```
RMOTM   2  ETA2    0.0            ETA3    70.93          DR1     2
RMOTM   2 DIN     C
SERVM   2 IITPRNT 6.0
**********  BEFORE BOOM CRUISE VELOCITY=667.5 FT/SEC (330 KNOTS IAS)
TMOTM   2  ABL    70.93          VAMI0   667.5          DIN     C
TMOTM   2  LATL   40.0449        DL0     1              LONL    -72.6806
TMOTM   2  AZVA0  70.93          GAMA0   0.6            HSLL    13820.0
TMOTM   2  ALFA0  2.942          OMYB0   -0.
TMOTM  10 DL0     1              TMTF    1.00000000     HSLL    0.0
INFXM   2  EVPF   0.00000000     PLOTT   -1.00000000
PROPM  11 DL0     1
TMOTM  12 DL0     1
AERMM   9 DIN     C              DL0     2                                    (b)(4)
AERMM  10 DIN     C              DL0     2
AERMM   2  CLDF   0.0            CNSF    6.0            CMSF    0.0
AERMM   2  CMSF   0.0            CMOMT   0.0
AERMM   2  S      5500.0         RB1     27.31
```

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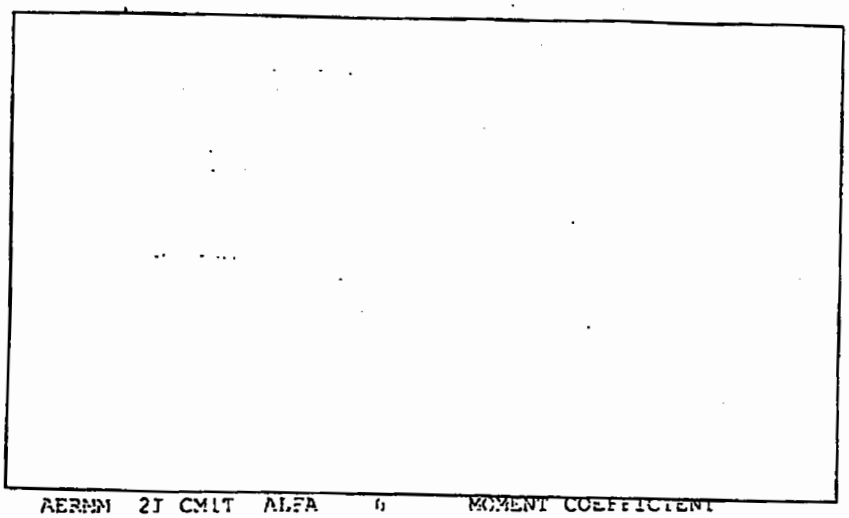

(b)(4)

```
AERMM  2I CM1T  ALFA     6        MOMENT COEFFICIENT
                  -181.0                  1.0
                   181.0                  1.0
AERMM 13ICCM0MT 1.0
SERVM 13  ARG1T 1.0
SERVM 131 ARG1T TCI      6        CENTER OF PRESSURE (FT) (CG AT 120.67)
                  -100.                  120.3
                   0.0                   119.675430
                   10.291653             121.806901
                   24.401291             120.571152
                   40.0                  120.412972
                   50.00                 121.388077
SERVM 13I ARG2T ALFA     6        NORMAL FORCE MULTIPLIER
                  -181.0                 -1.0
                   181.0                 -1.0
SERVM 13I ARG3T ALFA     6        AXIAL FORCE MULTIPLIER
                  -181.0                 -1.0
                   181.0                 -1.0
********H     NOTE: CX BIAS IS CALCULATED AS ARG1 AND SHIFTED INTO CXB.
********H           USING CXB=-K1*COS(ALFA)-K2*COS(ALFA)**2
********H           ARG2 CALCULATES CM--A2C1=1/RB1, A2C2=CGREF/RB1 AND
********H           ARG1T = CENTER OF PRESSURE (FT)
********H           ARG3 CALCULATES THRUST MULTIPLIER, F(ALFA)
********H           ARG6 CALCULATES RANGE RATE
********H           ARG7 CALCULATES LIFT COEFFICIENT
********H           ARG8 CALCULATES DRAG COEFFICIENT
********H           ARG9 CALCULATES MOMENT COEFF ABOUT 1/4C OF MAC
JUNKM 10 DIN      0              DL0    1
JUNKM 13  VRF1  3.0              DVTBR1 CXB            DRVAR1 ARG1
JUNKM 13  VRF2  3.0              DVTBR2 CM1T           DRVAR2 ARG2
JUNKM 13  VRF3  3.0              DVTBR3 FTT            DRVAR3 ARG3
JUNKM 13  VRF4  3.0              DVTBR4 CZ1T           DRVAR4 ARG4
JUNKM 13  VRF5  3.0              DVTBR5 CX1T           DRVAR5 ARG5
SERVM 13  A1C1  -0.041           DA1V1  ALFA            A1FV1 4.0
SERVM 13  A1C2  -0.025           DA1V3  ALFA            A1FV3 1504.
SERVM 13  A2C1  0.03662          DA2V1  ARG1T           A2FV1 9.0
SERVM 13  A2C2  -1.4185          DA2V2  CZ              DA2V3  CZ
SERVM 13  A3C1  0.45             DA3V1  ALFA            A3FV1 4.0
SERVM 13  A3C2  0.05             DA3V3  ALFA            A3FV3 1504.
SERVM 13  A3D   0.5
SERVM 13  A4C1  1.0              DA4V1  ARG2T           A4FV1 9.0
SERVM 13  A5C1  1.0              DA5V1  ARG3T           A5FV1 9.0
SERVM 13  A6C1  1.0              DA6V1  VAMI            DA6V2  GAMA
SERVM 13  A6FV2 4.
SERVM 13  A7C1  -1.0             DA7V1  CZ              DA7V2  ALFA
SERVM 13  A7C2  1.0              DA7V3  CX              DA7V4  ALFA
SERVM 13  A7FV2 4.0               A7FV4 3.
SERVM 13  A8C1  -1.0             DA8V1  CZ              DA8V2  ALFA
SERVM 13  A8C2  -1.0             DA8V3  CX              DA8V4  ALFA
SERVM 13  A8FV2 3.0               A8FV4 4.
```

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DATE: JUN 2005

* BOTH TIME & CP VALUES FROM ITERATION RUNS -- NOTE LARGEST CP-CG = ONLY 1.14 FT

$\Delta C_{X_{BUSTED\ NOSE}}$

$CXB = C_{X\ BIAS}$ (+R SHIFT)

→ ARG2 = $C_{M_{\alpha}} = \frac{(CG - CP)C_N}{b}$

CG = 120.67

b = RB1 = 27.31

CP = ARG1T

```
SERVM 13  A0C1   1.0          DAPV1  CM          DAPV2  CM
SERVM 13  A0C2   -0.5E+06
PROPN  2 DIN     C            DEN    0
PROPM  2  WF1    200000.0
STRTM 13  IBM    294606.
PROPM  2  DWT    1.0
PROPM 21 FTT     TC1    F
                 -100.0                70620.0
                 20000.0               70620.0
PROPM 21 DWT     TC1    G
                 -100.0                10.0
                 20000.0               10.0
STRTM 21 IXT     TC1    H
                  -100.0                1000000000.0
                  20000.0               1000000000.0
STRTM 21 IYT     TC1    I
                  -100.0                15780000.0
                  20000.0               15780000.0
STRTM 21 IZT     TC1    J
                  -100.0                1000000000.0
                  20000.0               1000000000.0
--------H     FOLLOWING INPUTS CAUSE SWITCH TO BALLISTIC TRAJ  ********
--------H     ARG2T IS BALLISTIC DRAG COEFFICIENT              ********
AERMM 15  CZ1T  0.0          CN1T  0.0
AERMM 15ICCX1T  1.0
SERVM 15  ARG2T 0.0          ARG3T 0.086          A2C1   0.0
SERVM 15  A1C1  0.0          A1C2  0.0            CMONT  0.0
RMOTM 15 DHI    5            DEN    E             RMTY   1.
RMOTM 15  OMYB  0.
DPGXM 15 IGCF   1.
        C       0.0
```

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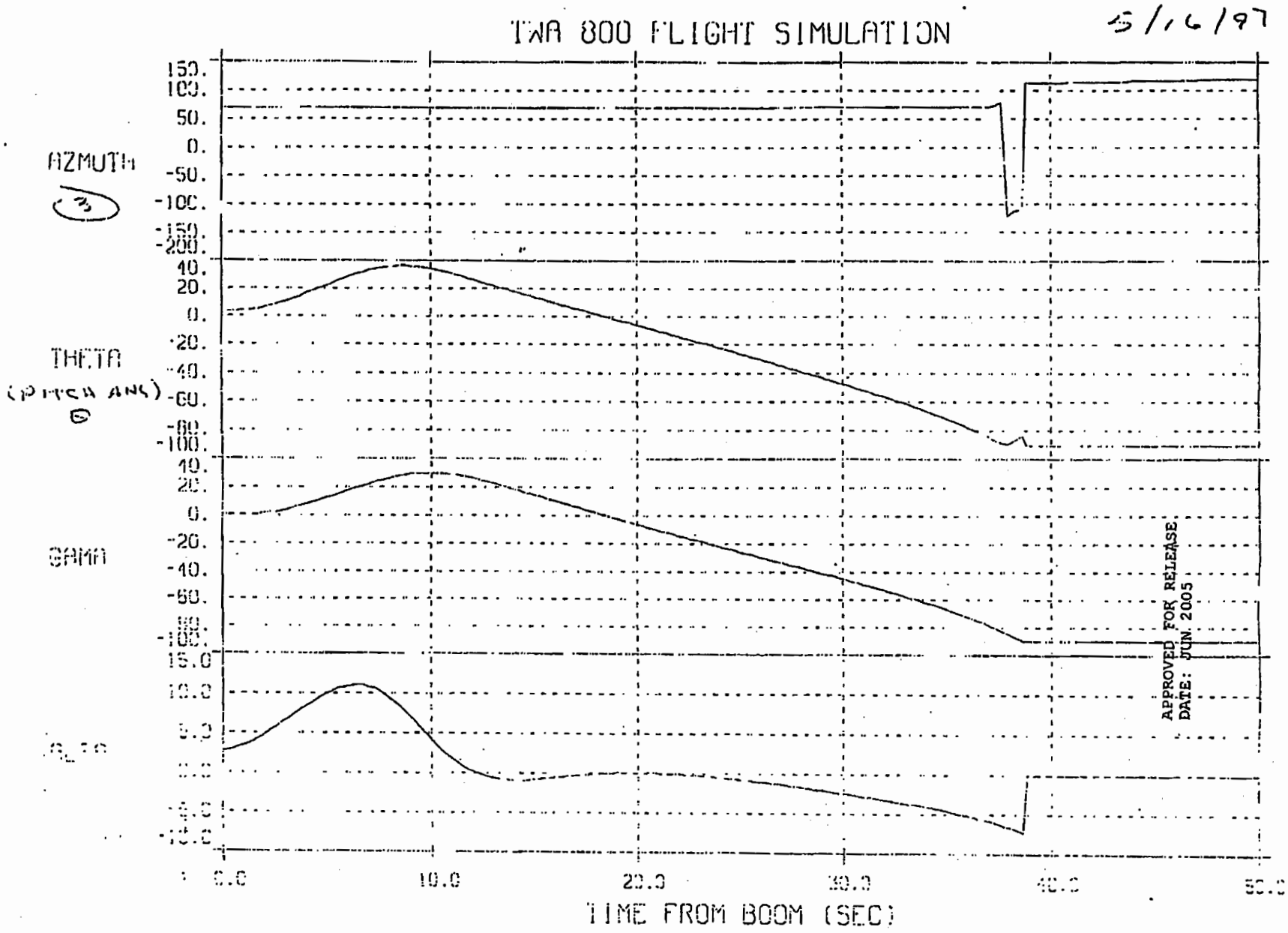
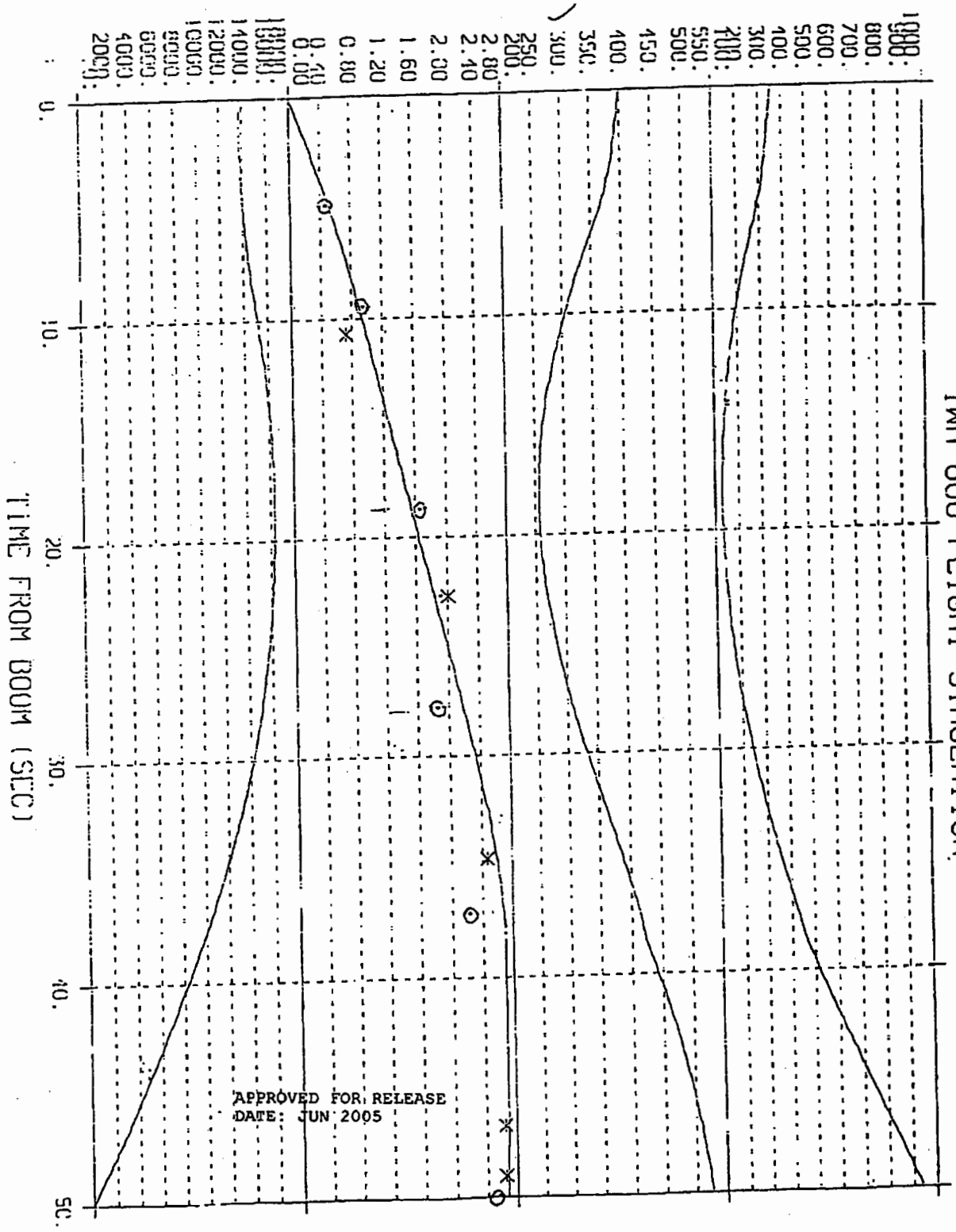
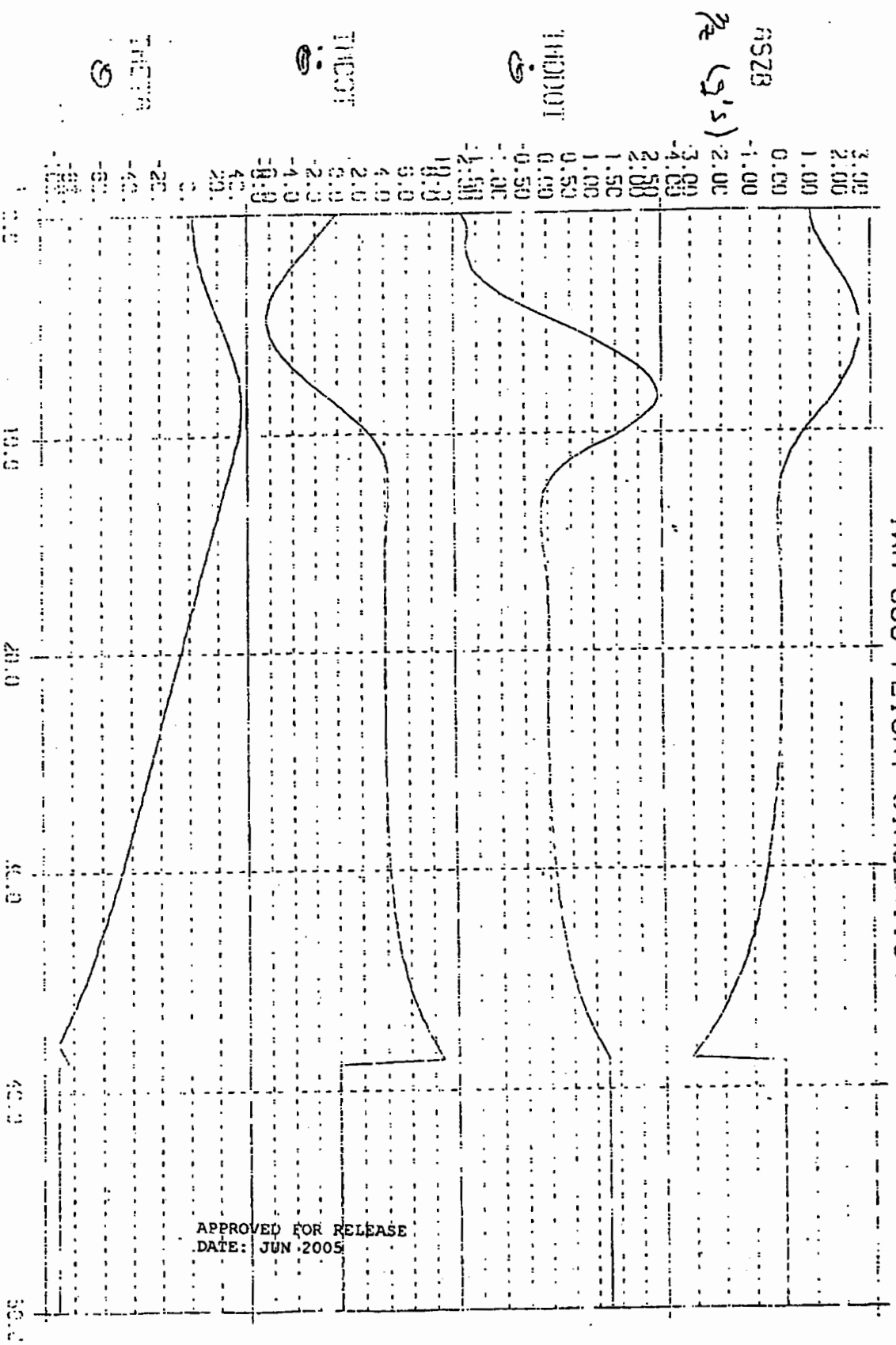
DATE: JUN 2005

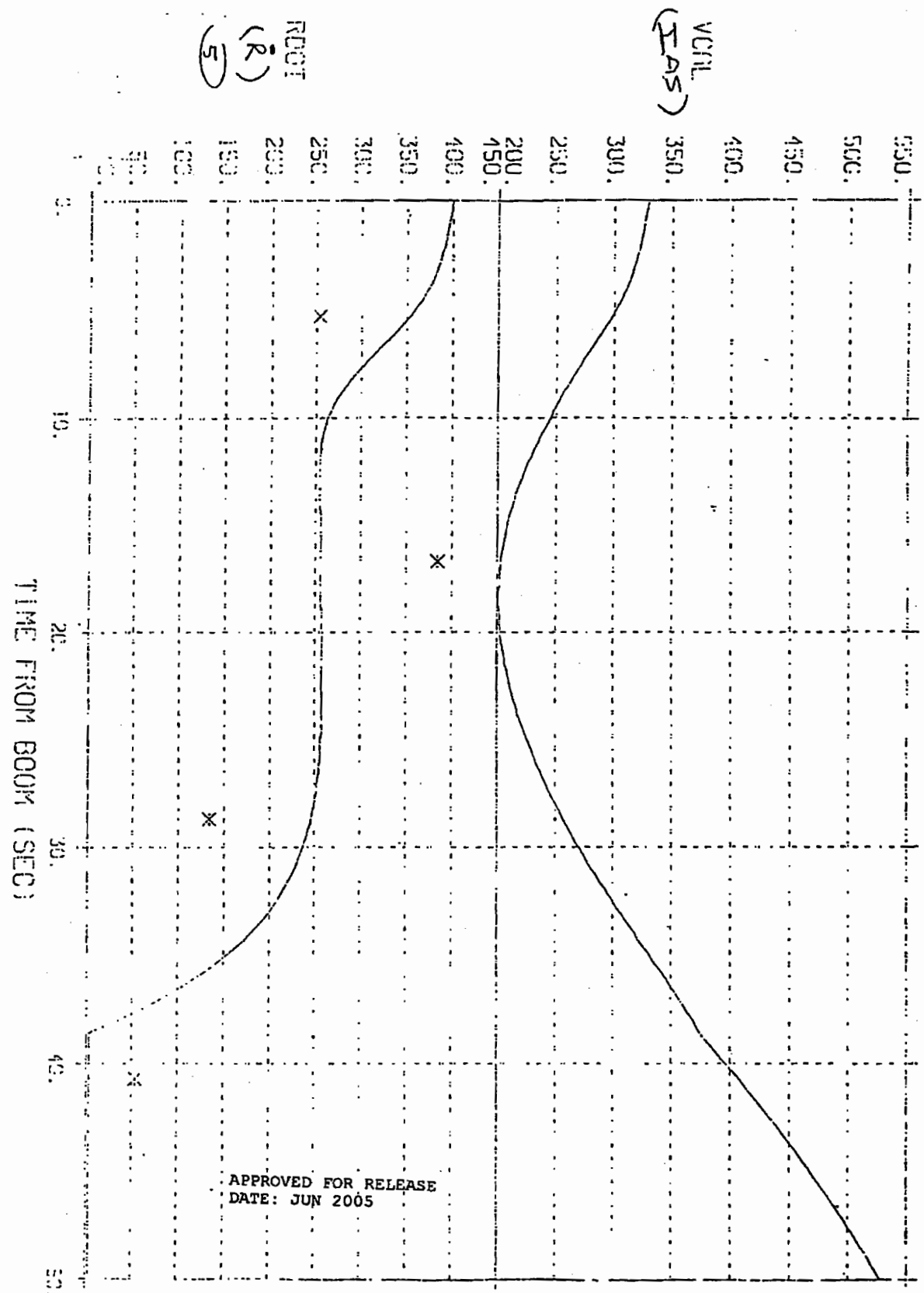
5/16/97

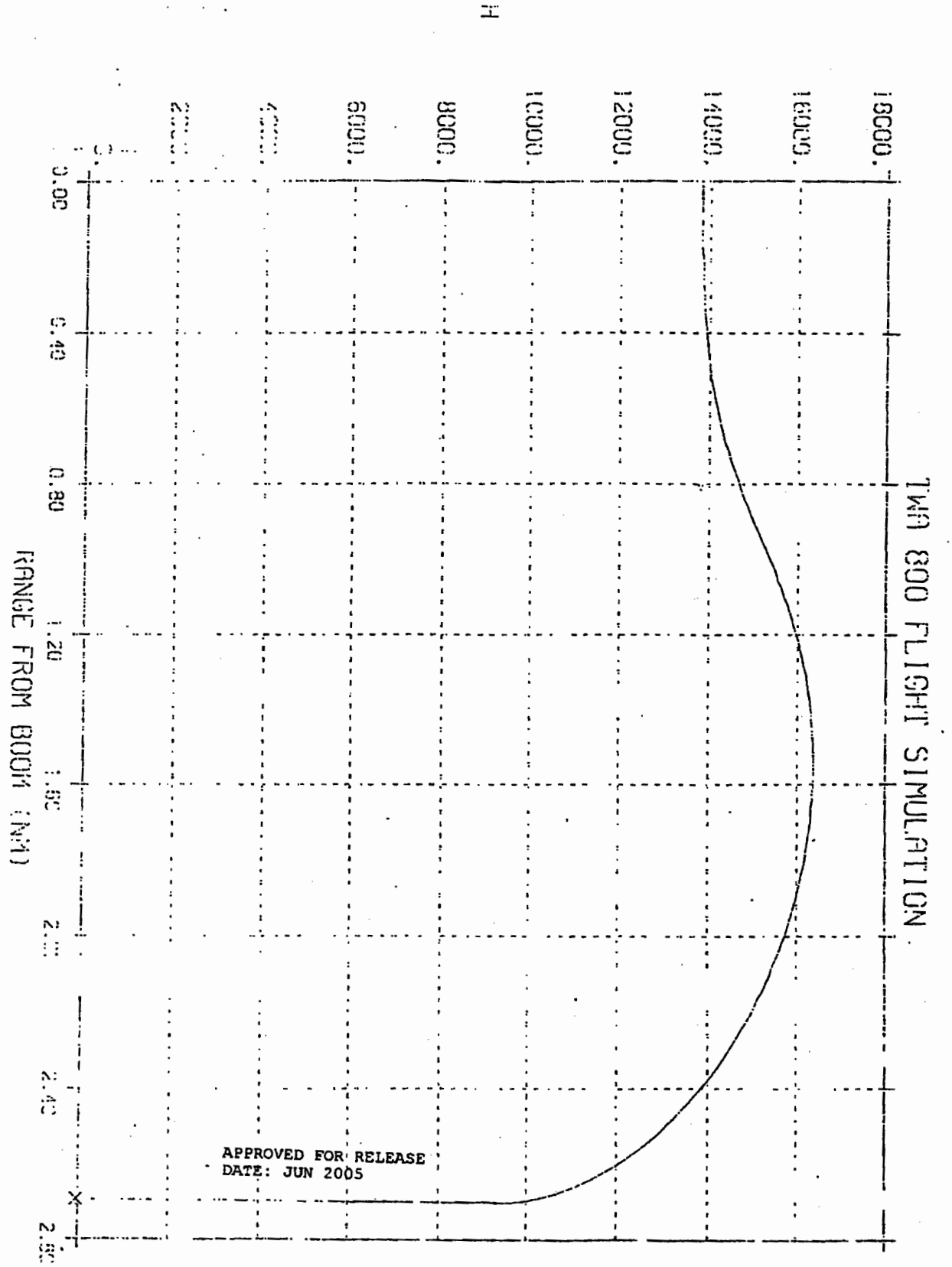




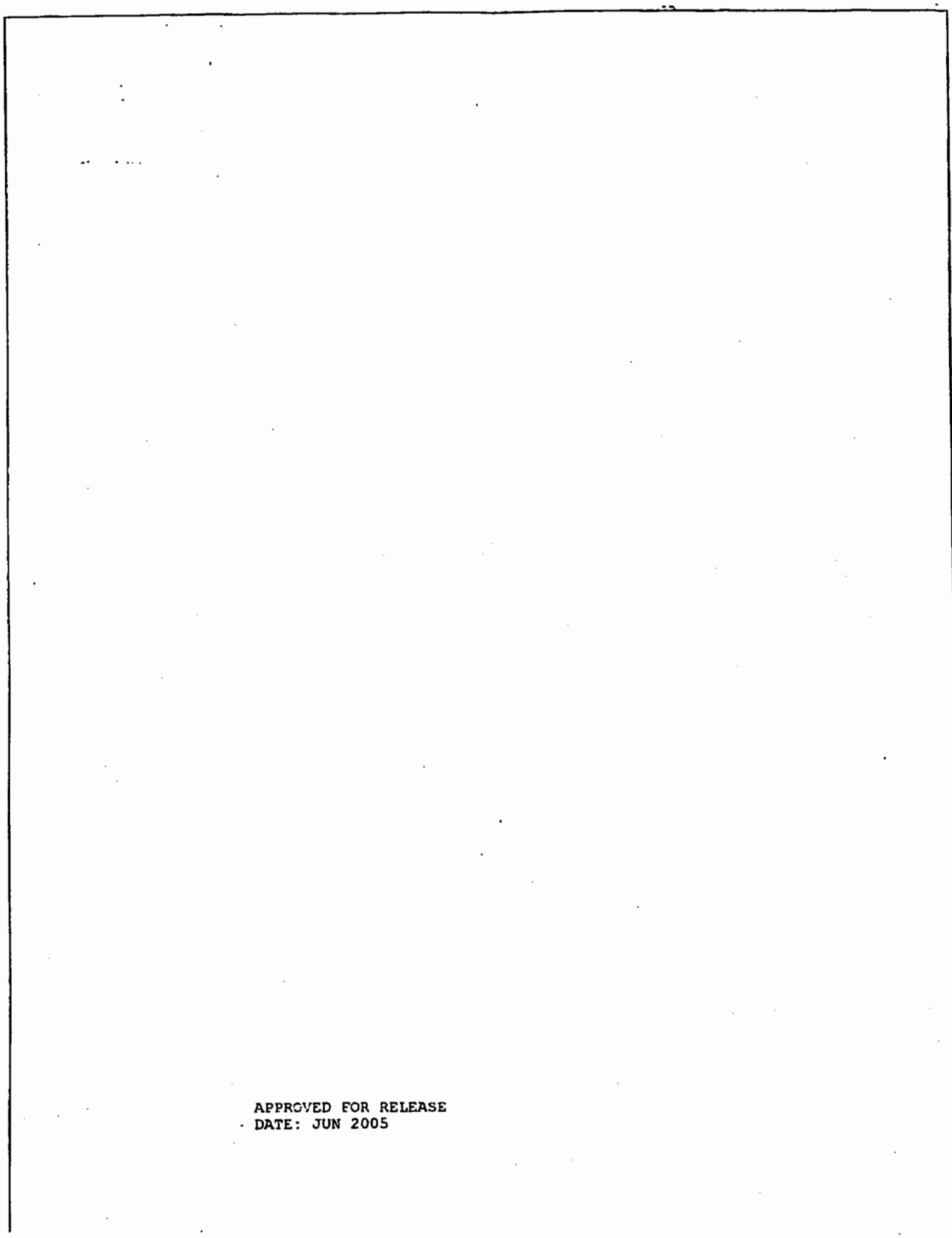


(b)(4)

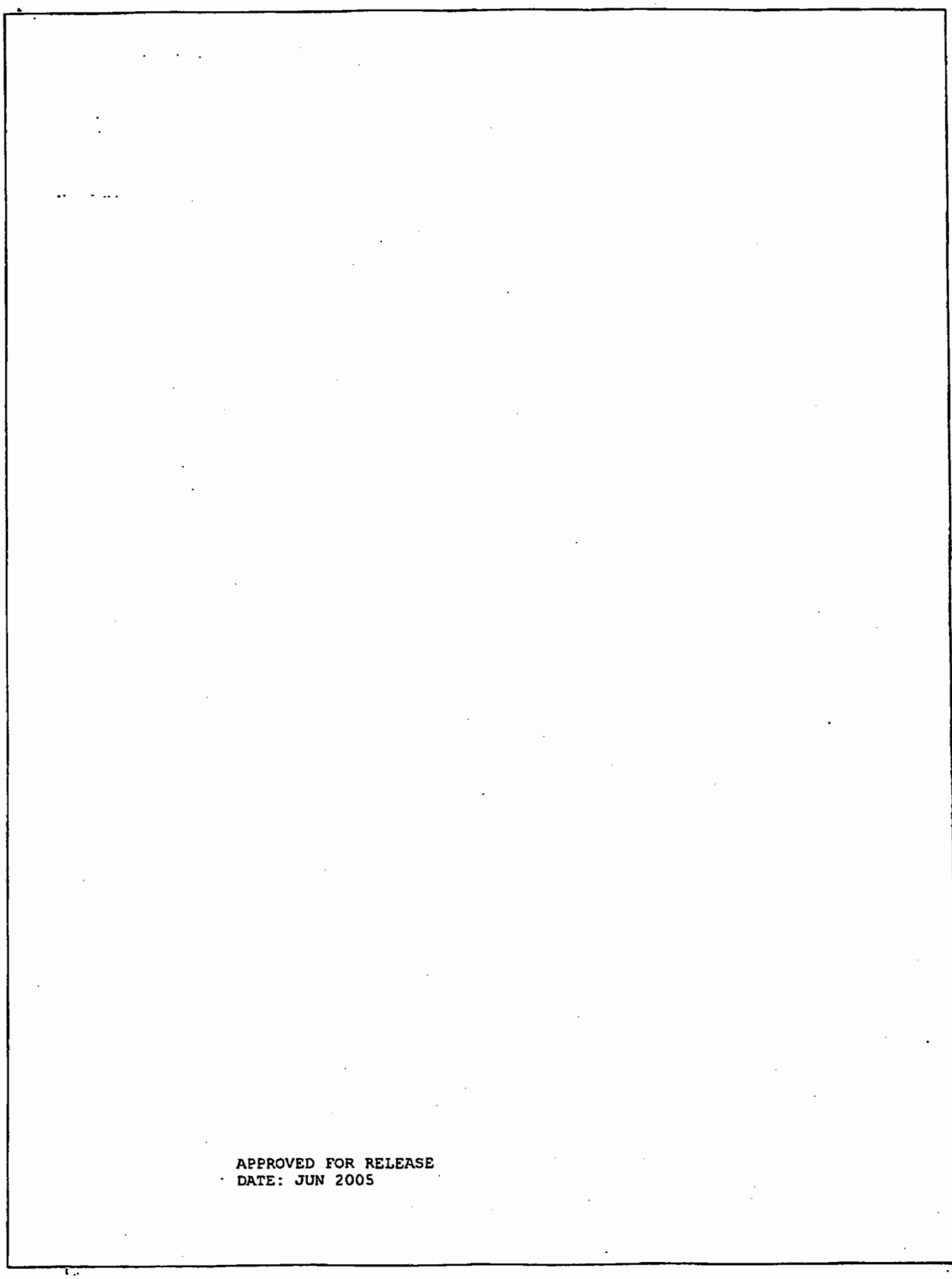




(b)(4)



(b)(4)



TILL

TWA 801

Δt	RADAR RANGE	R_{CALC}	ΔR
10.7	0.76	1.0	−0.24
22.7	2.05	1.84	−0.21
34.7	2.50	2.60	+0.10
46.7	2.69	2.69	0

Δt = 49.9 @ R = 2.69

ΔR_{AVG} = 0.137

65

UNCLASSIFIED

NOTE FOR: [redacted] (b) (3)
FROM:
OFFICE: OTI
DATE: 03-27-98 01:46:30 PM
SUBJECT: TWA Flight 800 Exhibit: Excerpts from Air Traffic Controller Conversations (Revised 27 March 98)

[redacted] here's the FINAL version of the transcript I gave you yesterday for the TWA exhibit. Please use this version instead of any of the earlier ones. (b) (3)

When you've got some time, perhaps we can get together and select an appropriate air traffic controller "still" from the NBC footage to accompany this.

[redacted] (b) (3)

Excerpts From Conversations Between an Air Traffic Controller and Pilots in the Area of the TWA Flight 800 Explosion — July 17, 1996
(All times approximate)

8:30:14 p.m., Boston Air Traffic Center: TWA eight hundred, climb and maintain one five thousand *[15,000 feet].*

8:30:17, TWA Flight 800: TWA's eight hundred heavy, climb and maintain one five thousand, leaving one three thousand.

8:31:12: *[TWA Flight 800 explodes at an altitude of 13,760 feet, based on post-crash analysis.]*

8:31:50, Eastwind Flight 507: We just saw an explosion out here on Stinger Bee five oh seven.

8:31:51: *[Infrared sensor aboard US satellite detects large heat source in the vicinity of Flight 800 crash.]*

8:31:57, Boston: Stinger Bee five oh seven, I'm sorry. I missed it. Ah, you're on eighteen. Did you say something else?

8:32:00: *[TWA Flight 800 hits water, based on post-crash analysis.]*

8:32:01, Eastwind 507: We just saw an explosion up ahead of us here something [like] about sixteen thousand feet or something like that. It just went down — to the water.

8:32:09, Alitalia Flight 609: Alitalia six oh nine [unintelligible].

8:32:25, Virgin Atlantic Flight 009: Boston, Virgin zero zero nine, I can confirm that, out of my [unintelligible], my nine o'clock position, we just had an ex..., it looked like an explosion out there about five miles away, six miles away.

8:32:36, Boston: Virgin zero zero nine, I'm sorry, your transmission broke up. What did you say?

8:32:40, Virgin 009: Ah, ah, the nine o'clock position, sir. It looked like an explosion of some sort about

maybe six to five, six mi..., miles out on my nine o'clock position.

8:32:48, Boston: An explosion six miles out at your nine o'clock position. Thank you very much, sir. Contact New York approach one two five point seven.

8:32:54, Virgin 009: Two five seven.

8:32:56, Boston: TWA eight hundred, [call] center.

8:33:00, Unknown: ....investigate that explosion....

8:33:04, Boston: TWA eight hundred, center.

8:33:09, Boston: TWA eight hundred, if you hear center ident[ify].

8:33:17, Boston: Stinger Bee, ah, five zero seven, you reported an explosion, is that correct, sir?

8:33:21, Eastwind 507: Yes sir, about, ah, five miles at my eleven o'clock here.

8:33:27, Alitalia 609: Boston Center, six zero nine.

8:33:31, Boston: Alitalia six oh nine, contact Boston now on, ah, one two four point five two *[124.52 MHz]*.

8:33:36, Alitalia 609: One two four point five two, and just for your information, sir, we are just overhead the explosion, right overhead at this time. They're a hundred and three miles from JFK. About forty-eight miles from JFK on the one zero two radial.

8:33:48, Eastwind 507: [unintelligible] Stinger Bee, ah [unintelligible] Boston, we are directly over the site where that airplane or whatever it was just exploded and went into the water. *[Then, from a second operator...]* [unintelligible] eighteen, ah, nineteen miles on the two thirty-six radial [unintelligible] Hampton.

8:34:01, Boston: Roger that. Thank you very much, sir, we're investigating that right now. TWA eight hundred, center. TWA eight zero zero, if you hear center, ident.

8:35:36, Boston: TWA eight hundred, center.

8:35:43, Unknown: I think that was him.

8:35:45, Boston: I think so.

8:35:48, Unknown: God bless him.

8:36:57, Boston: Stinger Bee five oh seven, thanks for that report, ah, New York on one three three point zero five *[133.05 MHz]*. Good day, sir.

8:37:05, Eastwind 507: Thirty-three oh five, so long Stinger five oh seven. Anything we can do for you before we go?

8:37:11, Boston: Well, I just want to confirm that, ah, that you saw the, ah, splash in the water approximately, ah, twenty *[20 miles]* southwest of Hampton, is that right?

8:37:20, Eastwind 507: Ah, yes sir. It, it blew up in the air, and then we saw two fireballs go down to the, to the water and there was a big [unintelligible] smoke form, ah, coming up from that. Also, ah, there seemed to be a light. I, I thought it was a landing light [unintelligible] it was coming right at us at,

about, I don't know, about fifteen thousand feet or something like that, and I pushed my landing lights, ah, you know, so I saw him, and then it blew.

8:37:40, Boston: Roger that, sir, ah, that was a seven forty-seven out there you had a visual on that. Anything else in the area when it happened?

8:37:47, Eastwind 507: I didn't see anything. He seemed to be alone. I thought he had a landing light on. Maybe it was a fire. I don't know.

8:37:52, Boston: Stinger Bee five oh seven, ah, roger that. Anything else comes to your mind, ah, you can use your other radio, come back to this frequency and tell me about it.

8:37:59, Eastwind 507: That's all I can think of at this time.

8:38:01, Boston: United two, Boston one two four point five two.

8:38:06, Boston: United two, Boston on one two four point five two.

8:38:08, United Airlines Flight 2: One two four five two, is that airplane right in front of us now?

8:38:12, Boston: Ah, he should be right undernea...neath you. They reported a splashdown right underneath you, about, ah, twelve and, ah, four miles.

8:38:18, United 2: It's still burning down there.

8:38:20, Boston: In the water?

8:38:21, United 2: Well, there's, ah, bright red, and there's, ah, smoke coming up.

8:38:25, Boston: I'm sorry, say that again. Give me that report again.

8:38:27, United 2: There's fire with smoke.

8:38:30, Boston: Fire with smoke coming out of the water?

8:38:33, United 2: [unintelligible] our position right now. I can give you a lat long if you want.

8:38:35, Boston: Absolutely, thank you.

8:38:40, Boston: Air France zero zero seven, stand by one. United two go.

8:38:44, United 2: It's, ah, north forty thirty-nine point one, west zero seven two three eight point zero *[40 degrees, 39.1 minutes north latitude; 72 degrees, 38.0 minutes west longitude].*

8:38:51, Boston: All right, we got forty thirty-nine point one, west zero seven two three eight point zero.

8:38:56, United 2: That's correct.

8:38:58, Boston: All right, thanks for the report. Boston one two four point five two.

CIA Analyst Comment

The Eastwind pilot first reported an "explosion" about 40 seconds after Flight 800 is known

to have exploded. He most likely was reporting the conflagration produced when Flight 800's left wing detached -- producing two "fireballs" -- about 10 seconds before the burning debris hit the water. This large heat source was detected by an infrared sensor aboard a US satellite almost exactly when the Eastwind pilot made his first report.

The "landing light" he reported seeing earlier was probably a fire produced after the initial explosion and described by some eyewitnesses on the ground as a "streak of light in the sky" that preceded Flight 800's "explosion." It was this "streak of light" that led some people to think that a missile was used to shoot down Flight 800.

Based on sound propagation analysis -- juxtaposing what eyewitnesses saw with what they heard -- CIA analysts concluded that this "streak of light" was, in fact, the burning Boeing 747 after the first explosion had already occurred...not a missile.

CC:
Sent on 27 March 1998 at 01:46:30 PM

```
1
********H    RUN SETUP FOR TWA FLIGHT 800 ANALYSIS                    ******
********H    USES BOEING'S SECOND ESTIMATE CL-CD DATA
********H    AERO CENTER OF PRESSURE IS INPUT (SEE ARG2)
********H    EVENT 13 STARTS PROBLEM                                  ******
********H    EVENT 30 STARTS POINT MASS (WING BREAK)                  ******
********H    EVENTS 21 MARKS MAXIMUM ALTITUDE                        ******
********H    Forces altitude up using CRVT table                     ******
********H    Uses Rich's 15 Jan 98 radar data                        ******
       2L      0 0.                  11.0            D     2  G1
         D     3GMT                  4 0.0           D     5FP1
               6 0.0                 7 0.0                 8 0.0
       3L      0 0.                  11.0            D     2  G1
         D     3TLP                  4 0.0           D     5FP1
               6 0.0                 7 0.0                 8 0.0
      10L      0 0.                  11.0            D     2  G1
         D     3TLP                  4 0.0           D     5FP1
               6 0.0                 7 0.0                 8 0.0
      11L      0 0.                  11.0            D     2  G1
         D     3TLP                  4 0.0           D     5FP1
               6 0.0                 7 0.0                 8 0.0
      12L      0 0.                  11.0            D     2  G1
         D     3TLP                  4 0.0           D     5FP1
               6 0.0                 7 0.0                 8 0.0
      13L      0 0.                  11.0            D     2  G1
         D     3TLP                  4 0.0           D     5FP1
               6 0.0                 7 0.0                 8 0.0
      20L      0 0.                  11.0            D     2  G7
         D     3VDR                  4 0.0           D     5DVDR
               6 0.0                 7 0.0                 8 0.0
      30L      0 0.                  11.0            D     2  G1
         D     3H                    4 1100.         D     5VDR
               6 0.0                 7 0.0                 8 0.0
      40L      0 0.0                 11.0            D     2  G1
         D     3TDURP                4 0.0           D     5FP1
               6 0.0                 7 0.0                 8 0.0
      50L      0 0.                  11.0            D     2  G7
         D     3H                    4 60.0          D     5VDR
               6 0.0                 7 0.0                 8 0.0
      50L      0 0.                  12.0            D     2  G1
         D     3TC1                  4 80.           D     5FP1
               6 0.0                 7 0.0                 8 0.0
MPEXM000  ITRF  0.0
TSPXM  2  FESN   50.
**************************************************************************
**************************************************************************
TRAKM  2 DIN     B            DGEN    1
TRAKM  2  CTSID  2.0           HSLR   30.0          LATR   40.8008
TRAKM  2  LONR   -72.6276      ELRK   -1.0          ELRCC  90.0
ITIFM  2  T1VAL  1.0           T2VAL  1.0          T3VAL  1.0
PFRPM  0  RSED1F 1.0           MAXKF  9.0          QIMPF  2.0
PFRPM  0  COVF   1.0           ITPRF  -9.0         PINF   0.0
PFRPM  0  I1FL   2.0           T1MD   -1.0         T2MD   -1.0
PFRPM  0TDT1CVT GMT           D      GMT
```

MVS TRAJECTORY PROGRAM

2D STUDY

DATED ≈ 3/98

(b) (3)

[redacted]

3/15/04

[redacted]

ALT_{MAX} = 16602 FT

Δh = 2842 FT

(b) (4)

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MORI DocID: 1215202

```
                RANG          D      RANG
          *   T1MD SECOND AND THIRD VALUES ARE THE NUMBER OF POINTS IN THE
          *   T1VAL TABLE FOLLOWED BY THE INVERSE OF THE SIGMA ACCURACY
          *   (IN THIS CASE IT IS 1/0.05 NAUTICAL MILES).
PFRPM000T T1MD  1.                  7.0                   20.
PFRPM  0  BNDS   200.               1 200.                2 200.
PFRPM  0       3 200.               4 200.                5 200.
PFRPM  0       6 200.               7 200.                8 200.
PFRPM  0       9 200.              10 200.               11 200.
PFRPM  0      12 200.              13 200.               14 200.
ITERM000T ITVT  1.0                  50.                   13.
          D     ARG1T                -4.                   0.001
                0.                   0.                    0.
                0.                   0.                    0.
                2.0                  50.                   13.
          D     ARG1T                -6.                   0.001
                0.                   0.                    0.
                0.                   0.                    0.
                3.0                  50.                   13.
          D     ARG1T                -8.                   0.001
                0.                   0.                    0.
                0.                   0.                    0.
                4.0                  50.                   13.
          D     ARG1T                -10.                  0.001
                0.                   0.                    0.
                0.                   0.                    0.
                5.0                  50.                   13.
          D     ARG1T                -12.                  0.001
                0.                   0.                    0.
                0.                   0.                    0.
                6.0                  50.                   13.
          D     ARG1T                -14.                  0.001
                0.                   0.                    0.
                0.                   0.                    0.
                7.0                  50.                   13.
          D     ARG1T                -16.                  0.001
                0.                   0.                    0.
                0.                   0.                    0.
                8.0                  50.                   13.
          D     ARG1T                -18.                  0.001
                0.                   0.                    0.
                0.                   0.                    0.
                9.0                  50.                   13.
          D     ARG1T                -20.                  0.001
                0.                   0.                    0.
                0.                   0.                    0.
ITIFM  0  T1VAL 1.0
ITIFM  0T T1VAL 22.8                 1.90
                27.5                 2.02
                32.2                 2.21
                36.9                 2.39
                41.6                 2.48
                46.3                 2.56
                51.0                 2.51
```

```
ITIFM000T CVRT  1.                      0.                  50.
                0.              D       TC1                 .0
                49.0                    .0                  .0
                .0                      .0                  .0
                2.                      0.                  50.
                0.              D       RANG                .0
                2.51                    .0                  .0
                .0                      .0                  .0
                3.                      0.                  20.
                0.              D       H                   .0
                17000.                  .0                  .0
                .0                      .0                  .0
PFRPM000  MD1T  1.               MD2T   1.
PFRPM000T MD1T  1.                      1.                  1.0
PFRPM000T MD2T  1.                      1.                  32.
PFRPM000T MD3T  1.                      1.                  0.005
*****************************************************************************
*****************************************************************************
ENVRM   2T GRAVTT 2.00000000            0.0                 0.00108271604
                   0.0                  3.00000000           0.0
                  -0.2630140E-05        0.0                 4.00000000
                   0.0                  -0.2349500E-05       0.0
SERVM   2 IITPR2T 6
INFXM   2ICTPRI2T 0.3
INFXM   2  TPRV2T 1.
INFXM   2T TPRV2T TC1                   H                   MACH
                Q                       RANG                VAMI
                ALFA                    MAYB
                GAMA                    LATV                L0NV
                ELRLH                   AZRLN               GMT
                VDR                     RB1
                DVDR                    VCAL
                BANK
                OMXB                    D0MXB
                ELR                     BETA
                MAZB                    MAXB
                AZR                     RGR
INFXM   2  PL0T2T -1
INFXM   2ICPLIN2T 0.3
INFXM   2T PL0T2T TC1                   H                   MACH
                Q                       RANG                VAMI
                CZ                      CX                  CM
                FAZB                    FAXB                OMYB
                ASZB                    FTXB                D0MYB
                ALFA                    MAYB                IYY
                GAMA                    LATV                L0NV
                ELRLH                   AZRLN               GMT
                CXB                     VDR                 RB1
                CM1T                    CL                  CD
                ASXB                    DVDR                VCAL
                ARGA                    ARGB                BANK
                ARGF                    OMXB                D0MXB
                ELR                     BETA                CN
                MAZB                    MAXB                ARGC
```

```
                ARGD                    ARGE                    ARGF
                ARGG                    ARGH                    ARGI
                AZR                     RGR
CYCXM  2  DTEA   0.10          Q0P1    1.0           TC1    0.0
CYCXM  2  LFDT1 0.10           TC4     0.0
CYCXM  2  NOISB  0.0
DPGXM 12 IGCF    0.0           TRKF    0.0
ENVRM  2  ATCF   4.0           ATUF    0.0           AWT    1.0
ENVRM  2  GRVDF  1.0           VWF    -1.0
ENVRM  2I VWT   H      6
                 0.0                    12.0
                 1000.0                 12.0
                 2000.0                 14.0
                 3000.0                 17.0
                 4000.0                 17.0
                 5000.0                 19.0
                 6000.0                 19.0
                 7000.0                 17.0
                 8000.0                 16.0
                 9000.0                 12.0
                 10000.0                12.0
                 11000.0                12.0
                 12000.0                16.0
                 13000.0                16.0
                 14000.0                17.0
                 15000.0                19.0
                 16000.0                21.0
                 17000.0                29.0
                 18000.0                33.0
ENVRM  2I AWT   H      6
                 0.0                    270.0
                 1000.0                 270.0
                 2000.0                 280.0
                 3000.0                 285.0
                 4000.0                 290.0
                 5000.0                 303.0
                 6000.0                 310.0
                 7000.0                 315.0
                 8000.0                 320.0
                 9000.0                 330.0
                 10000.0                335.0
                 11000.0                320.0
                 12000.0                295.0
                 13000.0                290.0
                 14000.0                300.0
                 15000.0                303.0
                 16000.0                305.0
                 17000.0                315.0
                 18000.0                315.0
INTXM  2 INIV    50.0          DTMAX   2.0           INTGF 2.0
PROPM  2 DL0    U
RMOTM  2  ETA2   0.0           ETA3    70.93         DHI    2
RMOTM  2 DIN    C
SERVM  2 IITPRNT 6.0
```

```
**********  BEFORE BOOM CRUISE VELOCITY=619.05 FT/SEC (366.8 KNOTS).
**********  THIS IS BASED ON IAS=292 KNOTS AND THE ATMOSPHERE AND
**********  AND WINDS USED HERE.
TM0TM  2  AZL    70.93          VAMI0  644.0        DIN     C
TM0TM  2  LATL   40.65          DL0    1             LONL    -72.67
TM0TM  2  AZVA0  70.93          GAMA0  2.1           HSLL    13760.0
TM0TM  2  ALFA0  4.02559        OMYB0  -0.
TM0TM 10 DL0     1              TMTF   1.00000000    HSLL  0.0
INFXM  2  EVPF    0.00000000    PL0TT -1.00000000
PR0PM 11 DL0     1
TM0TM 12 DL0     1
AERMM  2 DIN     C             DL0    2
AERMM 10 DIN     C             DL0    2
AERMM  2  CLDF   0.0            CNSF   6.0           CMSF  0.0
AERMM  2  CXSF   0.0            CM0MT  0.0
AERMM  2  S      5500.0         RB1    27.31
AERMM  2I CZ1T   ALFA    6     NORMAL FORCE COEFFICIENT
**********************************************************
Boeing proprietary information removed
**********************************************************
AERMM  2  CX1T   -1.0           CZ1T   -1.0          CM1T  0.0
AERMM  2I CX1T   ALFA    6     AXIAL FORCE COEFFICIENT
**********************************************************
Boeing proprietary information removed
**********************************************************
AERMM  2I CM1T   ALFA    6     MOMENT COEFFICIENT
                -181.0                 1.0
                 181.0                 1.0

AERMM 13ICCM0MT 1.0
SERVM 13  ARG1T 1.0
SERVM 13I ARG1T TC1      6     CENTER OF PRESSURE (FT) (CG AT 120.67)
                -100.                  120.3
                   0.                  119.0253480
                   2.5                 120.4804453
                   5.0                 120.9063451
                   7.0                 121.1161539
                  21.9593068           122.6962042
                  23.7958938           119.7737504
                  27.9065998           119.9909770
                  34.6842718           121.6788974
                  40.                  122.2024562
                  50.                  122.
  SERVM 13I ARG2T ALFA    6     NORMAL FORCE MULTIPLIER
                -181.0                 -1.0
                 181.0                 -1.0
  SERVM 13I ARG3T ALFA    6     AXIAL FORCE MULTIPLIER
                -181.0                 -1.0
                 181.0                 -1.0
  SERVM 13I ARG4T TC1     6     AXIAL FORCE BIAS MULTIPLIER
                   0.0                   0.0
                   0.5                   0.0381
                   1.0                   0.1464
                   1.5                   0.3087
                   2.0                   0.5
```

```
                2.5                     0.6913
                3.0                     0.8535
                3.5                     0.9619
                4.0                     1.0
                100.0                   1.0
********H    NOTE: CX BIAS IS CALCULATED AS ARG1 AND SHIFTED INTO CXB.
********H          USING CXB=-K1*COS(ALFA)-K2*COS(ALFA)**2
********H         ARG2 CALCULATES CM--A2C1=1/RB1, A2C2=CGREF/RB1 AND
********H         ARG1T = CENTER OF PRESSURE (FT)
********H         ARG3 CALCULATES THRUST MULTIPLIER, F(ALFA)
********H         ARG6 CALCULATES RANGE RATE
********H         ARG7 CALCULATES LIFT COEFFICIENT
********H         ARG8 CALCULATES DRAG COEFFICIENT
********H         ARG9 CALCULATES MOMENT COEFF ABOUT 1/4C OF MAC
JUNKM 10 DIN      U             DL0    1
JUNKM 13  VRF1  3.0             DVTBR1 CXB            DRVAR1 ARG1
JUNKM 13  VRF2  3.0             DVTBR2 CM1T           DRVAR2 ARG2
JUNKM 13  VRF3  3.0             DVTBR3 FTT            DRVAR3 ARG3
JUNKM 13  VRF4  3.0             DVTBR4 CZ1T           DRVAR4 ARG4
JUNKM 13  VRF5  3.0             DVTBR5 CX1T           DRVAR5 ARG5
SERVM 13  A1C1  -0.041          DA1V1  ALFA            A1FV1 4.0
SERVM 13  A1C2  -0.025          DA1V3  ALFA            A1FV3 1504.
SERVM 13 DA1V2  ARG4T           DA1V4  ARG4T           A1FV2 9.0
SERVM 13  A1FV4 9.0
SERVM 13  A2C1  0.03662         DA2V1  ARG1T           A2FV1 9.0
SERVM 13  A2C2  -4.4185         DA2V2  CZ             DA2V3  CZ
SERVM 13  A3C1  0.45            DA3V1  ALFA            A3FV1 4.0
SERVM 13  A3C2  0.05            DA3V3  ALFA            A3FV3 1504.
SERVM 13  A3B   0.5
SERVM 13  A4C1  1.0             DA4V1  ARG2T           A4FV1 9.0
SERVM 13  A5C1  1.0             DA5V1  ARG3T           A5FV1 9.0
SERVM 13  A6C1  1.0             DA6V1  VAMI           DA6V2  GAMA
SERVM 13  A6FV2 4.
SERVM 13  A7C1  -1.0            DA7V1  CZ             DA7V2  ALFA
SERVM 13  A7C2  1.0             DA7V3  CX             DA7V4  ALFA
SERVM 13  A7FV2 4.0              A7FV4 3.
SERVM 13  A8C1  -1.0            DA8V1  CZ             DA8V2  ALFA
SERVM 13  A8C2  -1.0            DA8V3  CX             DA8V4  ALFA
SERVM 13  A8FV2 3.0              A8FV4 4.
SERVM 13  A9C1  1.0             DA9V1  CM             DA9V3  CZ
SERVM 13  A9C2  -0.32955
PROPM  2 DIN    C               DL0    U
PROPM  2  WPI   200000.0
STRTM 13  IDW   294606.0
PROPM  2  DWT   1.0
PROPM  2I FTT   TC1    6
                -100.0                  Boeing proprietary information removed
                20000.0                 Boeing proprietary information removed
PROPM  2I DWT   TC1    6
                -100.0                  10.0
                20000.0                 10.0
STRTM  2I IXT   TC1    6
                 -100.0                  Boeing proprietary information removed
                 20000.0                 Boeing proprietary information removed
```

```
STRTM  2I IYT    TC1    6
                 -100.0              Boeing proprietary information removed
                 20000.0             Boeing proprietary information removed
STRTM  2I IZT    TC1    6
                 -100.0              Boeing proprietary information removed
                 20000.0             Boeing proprietary information removed
********H     FOLLOWING INPUTS CAUSE SWITCH TO BALLISTIC TRAJ  ********
********H     ARG3T IS BALLISTIC DRAG COEFFICIENT               ********
AERMM 30  CZ1T  0.0            CM1T  0.0
AERMM 30ICCX1T  1.0
SERVM 30  ARG2T 0.0            ARG3T 0.066          A2C1   0.0
SERVM 30  A1C1  0.0            A1C2  0.0            CM0MT  0.0
RM0TM 30 DHI    5              DIN    E             RMTF   1.
RM0TM 30 OMYB   0.
DPGXM 30 IGCF   1.
       C        0.0
-------------------------------------- CONTROL CARD  0.00 ---------------------------------------
1                          M O D U L A R I Z E D   V E H I C L E   S I M U L A T I O N

                              VERSION: 02.01  NEW REALTIME/PC MVS BASELINE: 2002/11/10

                            13:36:12                  CASE   1              15-03-04

                         ** TYPE OF DATA **                                          SIZE

                          EVENT CRITERIA                                              143
                           TABULAR INPUT                                             1117
                           GENERAL INPUT                                              700
                                  TOTAL                                              1960


RUN DESCRIPTION -                                                  ******
             RUN SETUP FOR TWA FLIGHT 800 ANALYSIS
             USES BOEING'S SECOND ESTIMATE CL-CD DATA
             AERO CENTER OF PRESSURE IS INPUT (SEE ARG2)           ******
             EVENT 13 STARTS PROBLEM                               ******
             EVENT 30 STARTS POINT MASS (WING BREAK)               ******
             EVENTS 21 MARKS MAXIMUM ALTITUDE                      ******
             Forces altitude up using CRVT table                   ******
             Uses Rich's 15 Jan 98 radar data
             NOTE: CX BIAS IS CALCULATED AS ARG1 AND SHIFTED INTO CXB.
                   USING CXB=-K1*COS(ALFA)-K2*COS(ALFA)**2
                  ARG2 CALCULATES CM--A2C1=1/RB1, A2C2=CGREF/RB1 AND
                  ARG1T = CENTER OF PRESSURE (FT)
                  ARG3 CALCULATES THRUST MULTIPLIER, F(ALFA)
                  ARG6 CALCULATES RANGE RATE
                  ARG7 CALCULATES LIFT COEFFICIENT
                  ARG8 CALCULATES DRAG COEFFICIENT
                  ARG9 CALCULATES MOMENT COEFF ABOUT 1/4C OF MAC
              FOLLOWING INPUTS CAUSE SWITCH TO BALLISTIC TRAJ  ********
              ARG3T IS BALLISTIC DRAG COEFFICIENT               ********

  %BTO - BEGIN TRAJECTORY OUTPUT
```

```
1  START CASE       1.

-------------------------------------------------------------------------------------------------
     EVENT ESN     2                                                  DATE / TIME   15-03-04  13:36:12
     TIME =        0.000          TYPE = PRIMARY-ORDERED          CASE = 1.     CP =  0.000   CYCLES =      0.
-------------------------------------------------------------------------------------------------

   TC1     0.0000E+00 H      13760.0000 MACH  0.588258172 Q      304.150923 RANG   0.1654E-10 VAMI   624.941295 ALFA   3.892323
   MAYB    0.0000E+00 GAMA   2.16407328 LATV   40.6500000 LONV  -72.6700000 ELRLH  6.06344569 AZRLN  70.9108163 GMT    0.0000E+(
   VDR     23.5985484 RB1    27.3100000 DVDR   60.2876608 VCAL   514.300460 BANK   -.180690086 OMXB  0.0000E+00 DOMXB  0.0000E+(
   ELR     13.6404341 BETA   1.87996988 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR    -167.921938 RGR   57898.8039

   TC1     0.0000E+00 H      13760.0000 MACH  0.588258172 Q      304.150923 RANG   0.1654E-10 VAMI   624.941295 ALFA   3.892323
   MAYB    0.0000E+00 GAMA   2.16407328 LATV   40.6500000 LONV  -72.6700000 ELRLH  6.06344569 AZRLN  70.9108163 GMT    0.0000E+(
   VDR     23.5985484 RB1    27.3100000 DVDR   60.2876608 VCAL   514.300460 BANK   -.180690086 OMXB  0.0000E+00 DOMXB  0.0000E+(
   ELR     13.6404341 BETA   1.87996988 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR    -167.921938 RGR   57898.8039


-------------------------------------------------------------------------------------------------
     EVENT ESN     3                                                  DATE / TIME   15-03-04  13:36:12
     TIME =        0.000          TYPE = PRIMARY-ORDERED          CASE = 1.     CP =  0.016   CYCLES =      0.
           EVENT CAUSED BY
                                    TLP    =  0.00000000E+00                    TG MODEL - G1
-------------------------------------------------------------------------------------------------

   TC1     0.0000E+00 H      13760.0000 MACH  0.588258172 Q      304.150923 RANG   0.1654E-10 VAMI   624.941295 ALFA   3.892323
   MAYB    0.0000E+00 GAMA   2.16407328 LATV   40.6500000 LONV  -72.6700000 ELRLH  6.06344569 AZRLN  70.9108163 GMT    0.0000E+(
   VDR     23.5985484 RB1    27.3100000 DVDR   60.2876608 VCAL   514.300460 BANK   -.180690086 OMXB  0.0000E+00 DOMXB  0.0000E+(
   ELR     13.6404341 BETA   1.87996988 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR    -167.921938 RGR   57898.8039

   TC1     0.0000E+00 H      13760.0000 MACH  0.588258172 Q      304.150923 RANG   0.1654E-10 VAMI   624.941295 ALFA   3.892323
   MAYB    0.0000E+00 GAMA   2.16407328 LATV   40.6500000 LONV  -72.6700000 ELRLH  6.06344569 AZRLN  70.9108163 GMT    0.0000E+(
   VDR     23.5985484 RB1    27.3100000 DVDR   60.2876608 VCAL   514.300460 BANK   -.180690086 OMXB  0.0000E+00 DOMXB  0.0000E+(
   ELR     13.6404341 BETA   1.87996988 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR    -167.921938 RGR   57898.8039


-------------------------------------------------------------------------------------------------
     EVENT ESN    10                                                  DATE / TIME   15-03-04  13:36:12
     TIME =        0.000          TYPE = PRIMARY-ORDERED          CASE = 1.     CP =  0.016   CYCLES =      0.
           EVENT CAUSED BY
                                    TLP    =  0.00000000E+00                    TG MODEL - G1
-------------------------------------------------------------------------------------------------

   TC1     0.0000E+00 H      13760.0000 MACH  0.588258172 Q      304.150923 RANG   0.1654E-10 VAMI   624.941295 ALFA   3.892323
   MAYB    0.0000E+00 GAMA   2.16407328 LATV   40.6500000 LONV  -72.6700000 ELRLH  6.06344569 AZRLN  70.9108163 GMT    0.0000E+(
   VDR     23.5985484 RB1    27.3100000 DVDR   60.2876608 VCAL   514.300460 BANK   -.180690086 OMXB  0.0000E+00 DOMXB  0.0000E+(
   ELR     13.6404341 BETA   1.87996988 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR    -167.921938 RGR   57898.8039
```

```
TC1    0.0000E+00 H      13760.0000 MACH  0.588258172 Q      304.150923 RANG   0.1654E-10 VAMI   624.941295 ALFA   3.892323
MAYB   0.0000E+00 GAMA   2.16407328 LATV   40.6500000 LONV  -72.6700000 ELRLH  6.06344569 AZRLN  70.9108163 GMT    0.0000E+(
VDR    23.5985484 RB1    27.3100000 DVDR   60.2876608 VCAL   514.300460 BANK   -.180690086 OMXB  0.0000E+00 DOMXB  0.0000E+(
ELR    13.6404341 BETA   1.87996988 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR    -167.921938 RGR   57898.8039

-------------------------------------------------------------------------------------------------------------------------------
                                                                                DATE / TIME   15-03-04  13:36:12
    EVENT ESN    11
    TIME =         0.000          TYPE = PRIMARY-ORDERED          CASE = 1.     CP =  0.016   CYCLES =      0.
          EVENT CAUSED BY
                                      TLP    =  0.00000000E+00                  TG MODEL - G1
-------------------------------------------------------------------------------------------------------------------------------

TC1    0.0000E+00 H      13760.0000 MACH  0.588258172 Q      304.150923 RANG   0.1654E-10 VAMI   624.941295 ALFA   3.892323
MAYB   0.0000E+00 GAMA   2.16407328 LATV   40.6500000 LONV  -72.6700000 ELRLH  6.06344569 AZRLN  70.9108163 GMT    0.0000E+(
VDR    23.5985484 RB1    27.3100000 DVDR   61.4876814 VCAL   514.300460 BANK   -.180690086 OMXB  0.0000E+00 DOMXB  0.0000E+(
ELR    13.6404341 BETA   1.87996988 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR    -167.921938 RGR   57898.8039

TC1    0.0000E+00 H      13760.0000 MACH  0.588258172 Q      304.150923 RANG   0.1654E-10 VAMI   624.941295 ALFA   3.892323
MAYB   0.0000E+00 GAMA   2.16407328 LATV   40.6500000 LONV  -72.6700000 ELRLH  6.06344569 AZRLN  70.9108163 GMT    0.0000E+(
VDR    23.5985484 RB1    27.3100000 DVDR   61.4876814 VCAL   514.300460 BANK   -.180690086 OMXB  0.0000E+00 DOMXB  0.0000E+(
ELR    13.6404341 BETA   1.87996988 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR    -167.921938 RGR   57898.8039

-------------------------------------------------------------------------------------------------------------------------------
                                                                                DATE / TIME   15-03-04  13:36:12
    EVENT ESN    12
    TIME =         0.000          TYPE = PRIMARY-ORDERED          CASE = 1.     CP =  0.031   CYCLES =      0.
          EVENT CAUSED BY
                                      TLP    =  0.00000000E+00                  TG MODEL - G1
-------------------------------------------------------------------------------------------------------------------------------

TC1    0.0000E+00 H      13760.0000 MACH  0.588258172 Q      304.150923 RANG   0.1654E-10 VAMI   624.941295 ALFA   3.892323
MAYB   0.0000E+00 GAMA   2.16407328 LATV   40.6500000 LONV  -72.6700000 ELRLH  6.06344569 AZRLN  70.9108163 GMT    0.0000E+(
VDR    23.5985484 RB1    27.3100000 DVDR   61.4876814 VCAL   514.300460 BANK   -.180690086 OMXB  0.0000E+00 DOMXB  0.0000E+(
ELR    13.6404341 BETA   1.87996988 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR    -167.921938 RGR   57898.8039

TC1    0.0000E+00 H      13760.0000 MACH  0.588258172 Q      304.150923 RANG   0.1654E-10 VAMI   624.941295 ALFA   3.892323
MAYB   0.0000E+00 GAMA   2.16407328 LATV   40.6500000 LONV  -72.6700000 ELRLH  6.06344569 AZRLN  70.9108163 GMT    0.0000E+(
VDR    23.5985484 RB1    27.3100000 DVDR   61.4876814 VCAL   514.300460 BANK   -.180690086 OMXB  0.0000E+00 DOMXB  0.0000E+(
ELR    13.6404341 BETA   1.87996988 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR    -167.921938 RGR   57898.8039

-------------------------------------------------------------------------------------------------------------------------------
                                                                                DATE / TIME   15-03-04  13:36:12
    EVENT ESN    13
    TIME =         0.000          TYPE = PRIMARY-ORDERED          CASE = 1.     CP =  0.031   CYCLES =      0.
          EVENT CAUSED BY
                                      TLP    =  0.00000000E+00                  TG MODEL - G1
```

TC1	0.0000E+00	H	13760.0000	MACH	0.588258172	Q	304.150923	RANG	0.1654E-10	VAMI	624.941295	ALFA	3.892323
MAYB	-942571.002	GAMA	2.16407328	LATV	40.6500000	LONV	-72.6700000	ELRLH	6.06344569	AZRLN	70.9108163	GMT	0.0000E+(
VDR	23.5985484	RB1	27.3100000	DVDR	5.78457828	VCAL	514.300460	BANK	-.180690086	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	13.6404341	BETA	1.87996988	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-167.921938	RGR	57898.8039		
TC1	0.300000000	H	13767.5385	MACH	0.588457222	Q	304.265351	RANG	0.031745471	VAMI	625.134888	ALFA	3.889433(
MAYB	-841418.479	GAMA	2.31605065	LATV	40.6501730	LONV	-72.6693428	ELRLH	6.21263293	AZRLN	70.9115535	GMT	0.3000000(
VDR	25.2627648	RB1	27.3100000	DVDR	5.75561857	VCAL	514.406426	BANK	-.181054113	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	13.6712131	BETA	1.88171437	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-168.090568	RGR	57803.9537		
TC1	0.600000000	H	13775.6115	MACH	0.588563057	Q	304.276873	RANG	0.063493798	VAMI	625.228179	ALFA	4.130056(
MAYB	-783980.799	GAMA	2.50004841	LATV	40.6503461	LONV	-72.6686855	ELRLH	6.63737332	AZRLN	70.9114104	GMT	0.6000000(
VDR	27.2725979	RB1	27.3100000	DVDR	7.93136262	VCAL	514.423154	BANK	-.181518987	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	13.7024930	BETA	1.88399061	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-168.259813	RGR	57709.7185		
TC1	0.900000000	H	13784.4095	MACH	0.588494628	Q	304.099449	RANG	0.095236241	VAMI	625.134628	ALFA	4.543471]
MAYB	-740430.911	GAMA	2.76623554	LATV	40.6505191	LONV	-72.6680283	ELRLH	7.31714418	AZRLN	70.9104435	GMT	0.9000000(
VDR	30.1697248	RB1	27.3100000	DVDR	11.5932708	VCAL	514.275800	BANK	-.182096845	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	13.7344517	BETA	1.88714148	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-168.429626	RGR	57616.1738		
TC1	1.20000000	H	13794.2583	MACH	0.588180408	Q	303.655544	RANG	0.126958420	VAMI	624.777508	ALFA	5.079298:
MAYB	-692170.301	GAMA	3.14981702	LATV	40.6506920	LONV	-72.6673715	ELRLH	8.23679304	AZRLN	70.9086893	GMT	1.2000000(
VDR	34.3296441	RB1	27.3100000	DVDR	16.2686386	VCAL	513.896845	BANK	-.182811243	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	13.7673954	BETA	1.89154089	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-168.599929	RGR	57523.4443		
TC1	1.50000000	H	13805.5756	MACH	0.587518352	Q	302.835662	RANG	0.158639331	VAMI	624.047470	ALFA	5.697861:
MAYB	-626108.841	GAMA	3.67426402	LATV	40.6508646	LONV	-72.6667156	ELRLH	9.38013285	AZRLN	70.9061842	GMT	1.5000000(
VDR	39.9914958	RB1	27.3100000	DVDR	21.5471312	VCAL	513.190497	BANK	-.183693151	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	13.8017159	BETA	1.89770640	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-168.770607	RGR	57431.6968		
TC1	1.80000000	H	13818.8325	MACH	0.586428829	Q	301.554073	RANG	0.190250934	VAMI	622.858884	ALFA	6.364757:
MAYB	-532639.321	GAMA	4.35231745	LATV	40.6510369	LONV	-72.6660612	ELRLH	10.7255162	AZRLN	70.9029781	GMT	1.8000000(
VDR	47.2682854	RB1	27.3100000	DVDR	26.9214556	VCAL	512.080822	BANK	-.184776453	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	13.8378539	BETA	1.90611750	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-168.941505	RGR	57341.1313		
TC1	2.10000000	H	13834.5105	MACH	0.584851465	Q	299.746563	RANG	0.221758527	VAMI	621.146586	ALFA	7.049438:
MAYB	-408351.308	GAMA	5.18427553	LATV	40.6512086	LONV	-72.6654088	ELRLH	12.2427019	AZRLN	70.8991456	GMT	2.1000000(
VDR	56.1263474	RB1	27.3100000	DVDR	32.0824406	VCAL	510.509388	BANK	-.186091926	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	13.8762581	BETA	1.91721129	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-169.112430	RGR	57251.9695		
TC1	2.40000000	H	13853.0713	MACH	0.582738376	Q	297.364277	RANG	0.253121632	VAMI	618.858779	ALFA	7.716066:
MAYB	-253266.238	GAMA	6.16576231	LATV	40.6513795	LONV	-72.6647595	ELRLH	13.8914858	AZRLN	70.8947921	GMT	2.4000000(
VDR	66.4686950	RB1	27.3100000	DVDR	36.7544645	VCAL	508.429518	BANK	-.187659890	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	13.9173557	BETA	1.93139578	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-169.283156	RGR	57164.4445		
TC1	2.70000000	H	13874.9285	MACH	0.580055018	Q	294.375243	RANG	0.284294533	VAMI	615.958005	ALFA	8.336018:
MAYB	-162227.512	GAMA	7.27743759	LATV	40.6515494	LONV	-72.6641141	ELRLH	15.6239079	AZRLN	70.8900508	GMT	2.7000000(
VDR	78.0258657	RB1	27.3100000	DVDR	39.7766586	VCAL	505.807394	BANK	-.189483983	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	13.9615259	BETA	1.94903873	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-169.453423	RGR	57078.7918		
TC1	3.00000000	H	13900.3579	MACH	0.576766115	Q	290.751372	RANG	0.315228578	VAMI	612.406423	ALFA	8.925200:
MAYB	-108033.094	GAMA	8.47265388	LATV	40.6517180	LONV	-72.6634737	ELRLH	17.4092150	AZRLN	70.8850000	GMT	3.0000000(

VDR	90.2303439	RB1	27.3100000	DVDR	41.4940571	VCAL	502.610303	BANK	-.191569277	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.0090126	BETA	1.97047913	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-169.622954	RGR	56995.2204		
TC1	3.30000000	H	13929.5165	MACH	0.572902643	Q	286.535621	RANG	0.345874368	VAMI	608.236884	ALFA	9.479582
MAYB	-49637.0723	GAMA	9.73760341	LATV	40.6518850	LONV	-72.6628393	ELRLH	19.2295763	AZRLN	70.8796761	GMT	3.300000(
VDR	102.874914	RB1	27.3100000	DVDR	42.7068425	VCAL	498.866571	BANK	-.193924935	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.0599447	BETA	1.99580731	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-169.791462	RGR	56913.9106		
TC1	3.60000000	H	13962.5122	MACH	0.568514666	Q	281.791802	RANG	0.376184242	VAMI	603.502660	ALFA	9.990292
MAYB	11907.3093	GAMA	11.0621668	LATV	40.6520503	LONV	-72.6622118	ELRLH	21.0660124	AZRLN	70.8741216	GMT	3.600000(
VDR	115.796448	RB1	27.3100000	DVDR	43.3588537	VCAL	494.622335	BANK	-.196552618	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.1144039	BETA	2.02504290	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-169.958669	RGR	56835.0235		
TC1	3.90000000	H	13999.4021	MACH	0.563674934	Q	276.606782	RANG	0.406113147	VAMI	598.281247	ALFA	10.44928(
MAYB	75355.2935	GAMA	12.4343656	LATV	40.6522134	LONV	-72.6615922	ELRLH	22.8985087	AZRLN	70.8683871	GMT	3.900000(
VDR	128.822570	RB1	27.3100000	DVDR	43.3865178	VCAL	489.944622	BANK	-.199444707	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.1724244	BETA	2.05811107	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-170.124306	RGR	56758.6983		
TC1	4.20000000	H	14040.1893	MACH	0.558297151	Q	270.912341	RANG	0.435619913	VAMI	592.481483	ALFA	10.84610(
MAYB	139351.550	GAMA	13.8440348	LATV	40.6523743	LONV	-72.6609813	ELRLH	24.7064164	AZRLN	70.8625320	GMT	4.200000(
VDR	141.768824	RB1	27.3100000	DVDR	42.8439453	VCAL	484.758833	BANK	-.202582854	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.2339893	BETA	2.09156606	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-170.288123	RGR	56685.0479		
TC1	4.50000000	H	14084.8256	MACH	0.552580020	Q	264.919485	RANG	0.464667895	VAMI	586.314827	ALFA	11.17492(
MAYB	202668.624	GAMA	15.2761183	LATV	40.6525328	LONV	-72.6603800	ELRLH	26.4688855	AZRLN	70.8566249	GMT	4.500000(
VDR	154.476945	RB1	27.3100000	DVDR	41.7920599	VCAL	479.245728	BANK	-.205936782	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.2990341	BETA	2.12834255	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-170.449894	RGR	56614.1576		
TC1	4.80000000	H	14133.2162	MACH	0.546578786	Q	258.695720	RANG	0.493225412	VAMI	579.840539	ALFA	11.42800(
MAYB	264073.401	GAMA	16.7177012	LATV	40.6526885	LONV	-72.6597888	ELRLH	28.1652714	AZRLN	70.8507447	GMT	4.800000(
VDR	166.794854	RB1	27.3100000	DVDR	40.2498801	VCAL	473.457842	BANK	-.209463430	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.3674509	BETA	2.16843123	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-170.609417	RGR	56546.0855		
TC1	5.10000000	H	14185.2227	MACH	0.540350502	Q	252.308497	RANG	0.521265957	VAMI	573.119870	ALFA	11.59858
MAYB	314427.943	GAMA	18.1555409	LATV	40.6528415	LONV	-72.6592083	ELRLH	29.7755826	AZRLN	70.8449797	GMT	5.100000(
VDR	178.582825	RB1	27.3100000	DVDR	38.2686643	VCAL	467.449491	BANK	-.213106747	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.4390916	BETA	2.21173272	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-170.766519	RGR	56480.8627		
TC1	5.40000000	H	14240.6670	MACH	0.533955532	Q	245.826059	RANG	0.548769002	VAMI	566.217624	ALFA	11.68374
MAYB	345404.800	GAMA	19.5764240	LATV	40.6529915	LONV	-72.6586390	ELRLH	31.2836820	AZRLN	70.8394152	GMT	5.400000(
VDR	189.719088	RB1	27.3100000	DVDR	35.9189841	VCAL	461.277965	BANK	-.216804662	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.5137721	BETA	2.25810476	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-170.921058	RGR	56418.4920		
TC1	5.70000000	H	14299.3383	MACH	0.527452828	Q	239.312554	RANG	0.575720431	VAMI	559.197127	ALFA	11.68537
MAYB	372755.773	GAMA	20.9679054	LATV	40.6531386	LONV	-72.6580811	ELRLH	32.6790269	AZRLN	70.8341234	GMT	5.700000(
VDR	200.105863	RB1	27.3100000	DVDR	33.2857154	VCAL	454.999200	BANK	-.220496322	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.5912792	BETA	2.30737692	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-171.072928	RGR	56358.9491		
TC1	6.00000000	H	14361.0001	MACH	0.520897290	Q	232.825461	RANG	0.602112571	VAMI	552.117393	ALFA	11.60589
MAYB	396205.805	GAMA	22.3185857	LATV	40.6532826	LONV	-72.6575348	ELRLH	33.9526381	AZRLN	70.8291780	GMT	6.000000(
VDR	209.670037	RB1	27.3100000	DVDR	30.4471403	VCAL	448.665323	BANK	-.224116435	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.6713778	BETA	2.35936020	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-171.222059	RGR	56302.1837		
TC1	6.30000000	H	14425.3974	MACH	0.514338770	Q	226.414772	RANG	0.627944012	VAMI	545.032051	ALFA	11.44798

MAYB	415579.563	GAMA	23.6180747	LATV	40.6534236	LONV	-72.6570000	ELRLH	35.0968033	AZRLN	70.8246547	GMT	6.300000(
VDR	218.360600	RB1	27.3100000	DVDR	27.4721963	VCAL	442.323707	BANK	-.227596472	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.7538178	BETA	2.41385162	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-171.368417	RGR	56248.1232		
TC1	6.60000000	H	14492.2630	MACH	0.507821390	Q	220.122616	RANG	0.653219274	VAMI	537.988608	ALFA	11.21469'
MAYB	430791.257	GAMA	24.8569474	LATV	40.6535616	LONV	-72.6564769	ELRLH	36.1051357	AZRLN	70.8206279	GMT	6.600000(
VDR	226.145735	RB1	27.3100000	DVDR	24.4198210	VCAL	436.016321	BANK	-.230867072	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.8383403	BETA	2.47063874	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-171.512001	RGR	56196.6743		
TC1	6.90000000	H	14561.3227	MACH	0.501383112	Q	213.983234	RANG	0.677948355	VAMI	531.027989	ALFA	10.90950(
MAYB	441833.878	GAMA	26.0267052	LATV	40.6536966	LONV	-72.6559650	ELRLH	36.9726038	AZRLN	70.8171689	GMT	6.900000(
VDR	233.009782	RB1	27.3100000	DVDR	21.3388252	VCAL	429.779346	BANK	-.233860787	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	14.9246821	BETA	2.52950418	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-171.652844	RGR	56147.7267		
TC1	7.20000000	H	14632.2994	MACH	0.495055554	Q	208.023236	RANG	0.702146197	VAMI	524.184326	ALFA	10.53634(
MAYB	448902.981	GAMA	27.1197385	LATV	40.6538287	LONV	-72.6554641	ELRLH	37.6955314	AZRLN	70.8143425	GMT	7.200000(
VDR	238.950243	RB1	27.3100000	DVDR	18.2682260	VCAL	423.643013	BANK	-.236514992	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	15.0125806	BETA	2.59023011	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-171.791007	RGR	56101.1555		
TC1	7.50000000	H	14704.9173	MACH	0.488864022	Q	202.262087	RANG	0.725832092	VAMI	517.485003	ALFA	10.09961(
MAYB	452029.991	GAMA	28.1292923	LATV	40.6539580	LONV	-72.6549739	ELRLH	38.2715459	AZRLN	70.8122046	GMT	7.500000(
VDR	243.974931	RB1	27.3100000	DVDR	15.2378941	VCAL	417.631659	BANK	-.238774657	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	15.1017759	BETA	2.65260227	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-171.926578	RGR	56056.8241		
TC1	7.80000000	H	14778.9032	MACH	0.482823950	Q	196.709684	RANG	0.749029054	VAMI	510.946888	ALFA	9.6049549
MAYB	450895.885	GAMA	29.0486893	LATV	40.6540847	LONV	-72.6544937	ELRLH	38.6995694	AZRLN	70.8107994	GMT	7.800000(
VDR	248.091634	RB1	27.3100000	DVDR	12.2041744	VCAL	411.760670	BANK	-.240595045	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	15.1920139	BETA	2.71643470	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-172.059669	RGR	56014.5864		
TC1	8.10000000	H	14853.9851	MACH	0.476939947	Q	191.366310	RANG	0.771763150	VAMI	504.575346	ALFA	9.0593612
MAYB	445980.605	GAMA	29.8712262	LATV	40.6542089	LONV	-72.6540232	ELRLH	38.9798842	AZRLN	70.8101569	GMT	8.100000(
VDR	251.304923	RB1	27.3100000	DVDR	9.23125592	VCAL	406.035762	BANK	-.241944238	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	15.2830425	BETA	2.78158275	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-172.190408	RGR	55974.2885		
TC1	8.40000000	H	14929.8956	MACH	0.471218776	Q	186.233582	RANG	0.794062855	VAMI	498.377974	ALFA	8.4687324
MAYB	437640.827	GAMA	30.5925781	LATV	40.6543306	LONV	-72.6535616	ELRLH	39.1140314	AZRLN	70.8102914	GMT	8.400000(
VDR	253.639460	RB1	27.3100000	DVDR	6.34719573	VCAL	400.464334	BANK	-.242804457	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	15.3746165	BETA	2.84787655	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-172.318941	RGR	55935.7714		
TC1	8.70000000	H	15006.3752	MACH	0.465659286	Q	181.306508	RANG	0.815958457	VAMI	492.353954	ALFA	7.8402309
MAYB	423715.461	GAMA	31.2082937	LATV	40.6544502	LONV	-72.6531084	ELRLH	39.1046807	AZRLN	70.8112018	GMT	8.700000(
VDR	255.113605	RB1	27.3100000	DVDR	3.31952457	VCAL	395.046708	BANK	-.243172458	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	15.4664990	BETA	2.91492687	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-172.445428	RGR	55898.8735		
TC1	9.00000000	H	15083.1465	MACH	0.460204148	Q	176.537137	RANG	0.837483233	VAMI	486.443092	ALFA	7.2028436
MAYB	400086.357	GAMA	31.6940827	LATV	40.6545678	LONV	-72.6526629	ELRLH	38.9563676	AZRLN	70.8128669	GMT	9.000000(
VDR	255.569310	RB1	27.3100000	DVDR	-.240859640	VCAL	389.734657	BANK	-.243062054	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	15.5584380	BETA	2.98032425	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-172.570045	RGR	55863.4207		
TC1	9.30000000	H	15159.8957	MACH	0.454857203	Q	171.926549	RANG	0.858673943	VAMI	480.649950	ALFA	6.5734101
MAYB	374850.303	GAMA	32.0404383	LATV	40.6546835	LONV	-72.6522243	ELRLH	38.6764585	AZRLN	70.8152416	GMT	9.300000(
VDR	254.993291	RB1	27.3100000	DVDR	-3.56037081	VCAL	384.533348	BANK	-.242506396	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	15.6501481	BETA	3.04667573	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-172.692991	RGR	55829.2202		

TC1	9.60000000	H	15236.3242	MACH	0.449608953	Q	167.465479	RANG	0.879566562	VAMI	474.964934	ALFA	5.956413
MAYB	348368.737	GAMA	32.2511405	LATV	40.6547976	LONV	-72.6517918	ELRLH	38.2731849	AZRLN	70.8182690	GMT	9.600000
VDR	253.456179	RB1	27.3100000	DVDR	-6.65414710	VCAL	379.436207	BANK	-.241549211	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	15.7413582	BETA	3.11390561	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-172.814465	RGR	55796.0852		
TC1	9.90000000	H	15312.1530	MACH	0.444457827	Q	163.150663	RANG	0.900195677	VAMI	469.386779	ALFA	5.358303
MAYB	320102.046	GAMA	32.3284613	LATV	40.6549103	LONV	-72.6513649	ELRLH	37.7552303	AZRLN	70.8218850	GMT	9.900000
VDR	251.014982	RB1	27.3100000	DVDR	-9.58095303	VCAL	374.443299	BANK	-.240241033	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	15.8318158	BETA	3.18188911	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-172.934656	RGR	55763.8380		
TC1	10.2000000	H	15387.1198	MACH	0.439401853	Q	158.978417	RANG	0.920594660	VAMI	463.913745	ALFA	4.784404
MAYB	291768.953	GAMA	32.2762748	LATV	40.6550217	LONV	-72.6509426	ELRLH	37.1317616	AZRLN	70.8260205	GMT	10.20000
VDR	247.731005	RB1	27.3100000	DVDR	-12.2743370	VCAL	369.554145	BANK	-.238636910	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	15.9212840	BETA	3.25050437	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-173.053750	RGR	55732.3089		
TC1	10.5000000	H	15460.9822	MACH	0.434436337	Q	154.943007	RANG	0.940794588	VAMI	458.541168	ALFA	4.237906
MAYB	263761.106	GAMA	32.1006914	LATV	40.6551320	LONV	-72.6505245	ELRLH	36.4120540	AZRLN	70.8306051	GMT	10.50000
VDR	243.672812	RB1	27.3100000	DVDR	-14.7438173	VCAL	364.765724	BANK	-.236792957	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.0095442	BETA	3.31965264	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-173.171922	RGR	55701.3394		
TC1	10.8000000	H	15533.5182	MACH	0.429563552	Q	151.043618	RANG	0.960823958	VAMI	453.271687	ALFA	3.721875
MAYB	236051.267	GAMA	31.8078499	LATV	40.6552413	LONV	-72.6501099	ELRLH	35.6052886	AZRLN	70.8355701	GMT	10.80000
VDR	238.906920	RB1	27.3100000	DVDR	-16.9899658	VCAL	360.080789	BANK	-.234763898	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.0963960	BETA	3.38918581	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-173.289331	RGR	55670.7838		
TC1	11.1000000	H	15604.5257	MACH	0.424804496	Q	147.292184	RANG	0.980709397	VAMI	448.127643	ALFA	3.239929
MAYB	209153.009	GAMA	31.4032272	LATV	40.6553499	LONV	-72.6496983	ELRLH	34.7205317	AZRLN	70.8408501	GMT	11.10000
VDR	233.500362	RB1	27.3100000	DVDR	-19.0193896	VCAL	355.517844	BANK	-.232601602	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.1816573	BETA	3.45880239	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-173.406128	RGR	55640.5067		
TC1	11.4000000	H	15673.8222	MACH	0.420161593	Q	143.687020	RANG	1.00047541	VAMI	443.111723	ALFA	2.793857
MAYB	183684.923	GAMA	30.8938738	LATV	40.6554577	LONV	-72.6492891	ELRLH	33.7666083	AZRLN	70.8463838	GMT	11.40000
VDR	227.515494	RB1	27.3100000	DVDR	-20.8468574	VCAL	351.079268	BANK	-.230353736	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.2651640	BETA	3.52833730	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-173.522453	RGR	55610.3839		
TC1	11.7000000	H	15741.2433	MACH	0.415636460	Q	140.225747	RANG	1.02014365	VAMI	438.225715	ALFA	2.384767
MAYB	159861.499	GAMA	30.2870652	LATV	40.6555651	LONV	-72.6488820	ELRLH	32.7518887	AZRLN	70.8521165	GMT	11.70000
VDR	221.011556	RB1	27.3100000	DVDR	-22.4813095	VCAL	346.766577	BANK	-.228062622	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.3467677	BETA	3.59763135	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-173.638428	RGR	55580.3035		
TC1	12.0000000	H	15806.6418	MACH	0.411232711	Q	136.907234	RANG	1.03973308	VAMI	433.473478	ALFA	2.013273
MAYB	137851.230	GAMA	29.5900314	LATV	40.6556719	LONV	-72.6484765	ELRLH	31.6842103	AZRLN	70.8579995	GMT	12.00000
VDR	214.045120	RB1	27.3100000	DVDR	-23.9316678	VCAL	342.582830	BANK	-.225764895	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.4263352	BETA	3.66650746	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-173.754163	RGR	55550.1661		
TC1	12.3000000	H	15869.8878	MACH	0.406961745	Q	133.735331	RANG	1.05926015	VAMI	428.867038	ALFA	1.679491
MAYB	117767.029	GAMA	28.8099136	LATV	40.6557784	LONV	-72.6480722	ELRLH	30.5708217	AZRLN	70.8639911	GMT	12.30000
VDR	206.673295	RB1	27.3100000	DVDR	-25.1854739	VCAL	338.537529	BANK	-.223491503	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.5037482	BETA	3.73471521	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-173.869753	RGR	55519.8830		
TC1	12.6000000	H	15930.8678	MACH	0.402835805	Q	130.714071	RANG	1.07873935	VAMI	424.419269	ALFA	1.383059
MAYB	99698.8804	GAMA	27.9536985	LATV	40.6558846	LONV	-72.6476690	ELRLH	29.4183432	AZRLN	70.8700559	GMT	12.60000
VDR	198.949880	RB1	27.3100000	DVDR	-26.2780338	VCAL	334.640704	BANK	-.221267963	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.5789033	BETA	3.80198694	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-173.985280	RGR	55489.3762		

TC1	12.9000000	H	15989.4837	MACH	0.398860414	Q	127.842846	RANG	1.09818306	VAMI	420.135928	ALFA	1.123192E
MAYB	83678.4814	GAMA	27.0281353	LATV	40.6559906	LONV	-72.6472664	ELRLH	28.2327388	AZRLN	70.8761646	GMT	12.90000(
VDR	190.921519	RB1	27.3100000	DVDR	-27.2201145	VCAL	330.896556	BANK	-.219114767	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	16.6517105	BETA	3.86810986	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-174.100817	RGR	55458.5771		
TC1	13.2000000	H	16045.6505	MACH	0.395004253	Q	125.097642	RANG	1.11760167	VAMI	415.983950	ALFA	0.8937160E
MAYB	69361.8866	GAMA	26.0420276	LATV	40.6560965	LONV	-72.6468644	ELRLH	27.0193137	AZRLN	70.8822934	GMT	13.20000(
VDR	182.629563	RB1	27.3100000	DVDR	-28.0396001	VCAL	327.278144	BANK	-.217047932	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	16.7220912	BETA	4.00346629	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-174.216425	RGR	55427.4263		
TC1	13.5000000	H	16099.2946	MACH	0.391315726	Q	122.505398	RANG	1.13700389	VAMI	412.014224	ALFA	0.6989978E
MAYB	57108.3627	GAMA	24.9979634	LATV	40.6562022	LONV	-72.6464627	ELRLH	25.7827829	AZRLN	70.8884234	GMT	13.50000(
VDR	174.111462	RB1	27.3100000	DVDR	-28.7257702	VCAL	323.825706	BANK	-.215079682	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	16.7899768	BETA	4.15163045	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-174.332154	RGR	55395.8724		
TC1	13.8000000	H	16150.3542	MACH	0.387810297	Q	120.071382	RANG	1.15639687	VAMI	408.242907	ALFA	0.5381046(
MAYB	46911.4348	GAMA	23.9016030	LATV	40.6563078	LONV	-72.6460612	ELRLH	24.5272128	AZRLN	70.8945402	GMT	13.80000(
VDR	165.406621	RB1	27.3100000	DVDR	-29.2866944	VCAL	320.551519	BANK	-.213218876	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	16.8553087	BETA	4.29593795	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-174.448047	RGR	55363.8712		
TC1	14.1000000	H	16198.7788	MACH	0.384493527	Q	117.794558	RANG	1.17578641	VAMI	404.675706	ALFA	0.4084850E
MAYB	38648.6851	GAMA	22.7589256	LATV	40.6564134	LONV	-72.6456597	ELRLH	23.2559953	AZRLN	70.9006336	GMT	14.10000(
VDR	156.550666	RB1	27.3100000	DVDR	-29.7353652	VCAL	317.459448	BANK	-.211471498	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	16.9180386	BETA	4.43577654	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-174.564137	RGR	55331.3859		
TC1	14.4000000	H	16244.5279	MACH	0.381370699	Q	115.673800	RANG	1.19517710	VAMI	401.318029	ALFA	0.3073731(
MAYB	32177.6637	GAMA	21.5754813	LATV	40.6565189	LONV	-72.6452582	ELRLH	21.9718870	AZRLN	70.9066968	GMT	14.40000(
VDR	147.575330	RB1	27.3100000	DVDR	-30.0847145	VCAL	314.553088	BANK	-.209841225	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	16.9781270	BETA	4.57055076	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-174.680451	RGR	55298.3856		
TC1	14.7000000	H	16287.5701	MACH	0.378446678	Q	113.707847	RANG	1.21457262	VAMI	398.174837	ALFA	0.2318388:
MAYB	27340.2033	GAMA	20.3563856	LATV	40.6566245	LONV	-72.6448566	ELRLH	20.6770550	AZRLN	70.9127262	GMT	14.70000(
VDR	138.508491	RB1	27.3100000	DVDR	-30.3474838	VCAL	311.835662	BANK	-.208329944	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.0355422	BETA	4.69968649	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-174.797013	RGR	55264.8448		
TC1	15.0000000	H	16327.8815	MACH	0.375725822	Q	111.895277	RANG	1.23397583	VAMI	395.250551	ALFA	0.1788394:
MAYB	23966.4230	GAMA	19.1063199	LATV	40.6567300	LONV	-72.6444548	ELRLH	19.3731280	AZRLN	70.9187207	GMT	15.00000(
VDR	129.374251	RB1	27.3100000	DVDR	-30.5360969	VCAL	309.309961	BANK	-.206938206	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.0902595	BETA	4.82263501	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-174.913837	RGR	55230.7426		
TC1	15.3000000	H	16365.4452	MACH	0.373211922	Q	110.234518	RANG	1.25338901	VAMI	392.548995	ALFA	0.1452685(
MAYB	21878.3656	GAMA	17.8295369	LATV	40.6568356	LONV	-72.6440528	ELRLH	18.0612516	AZRLN	70.9246813	GMT	15.30000(
VDR	120.193047	RB1	27.3100000	DVDR	-30.6625414	VCAL	306.978311	BANK	-.205665621	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.1422603	BETA	4.93887678	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-175.030939	RGR	55196.0620		
TC1	15.6000000	H	16400.2497	MACH	0.370908184	Q	108.723863	RANG	1.27281394	VAMI	390.073381	ALFA	0.1280048E
MAYB	20893.2459	GAMA	16.5298704	LATV	40.6569412	LONV	-72.6436505	ELRLH	16.7421464	AZRLN	70.9306108	GMT	15.60000(
VDR	110.981796	RB1	27.3100000	DVDR	-30.7382657	VCAL	304.842569	BANK	-.204511194	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.1915307	BETA	5.04792464	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-175.148329	RGR	55160.7890		
TC1	15.9000000	H	16432.2880	MACH	0.368817232	Q	107.361508	RANG	1.29225205	VAMI	387.826314	ALFA	0.1239580:
MAYB	20826.3135	GAMA	15.2107491	LATV	40.6570469	LONV	-72.6432479	ELRLH	15.4161670	AZRLN	70.9365133	GMT	15.90000(
VDR	101.754074	RB1	27.3100000	DVDR	-30.7740913	VCAL	302.904140	BANK	-.203473606	OMXB	0.0000E+00	DOMXB	0.0000E+(

ELR	17.2380611	BETA	5.14932653	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-175.266016	RGR	55124.9125			
TC1	16.2000000	H	16461.5570	MACH	0.366941136	Q	106.145587	RANG	1.31170449	VAMI	385.809824	ALFA	0.1301121(	
MAYB	21493.3507	GAMA	13.8752138	LATV	40.6571526	LONV	-72.6428451	ELRLH	14.0833630	AZRLN	70.9423939	GMT	16.20000(	
VDR	92.5203158	RB1	27.3100000	DVDR	-30.7801426	VCAL	301.164008	BANK	-.202551445	OMXB	0.0000E+00	DOMXB	0.0000E+(	
ELR	17.2818450	BETA	5.24266760	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-175.384006	RGR	55088.4233			
TC1	16.5000000	H	16488.0560	MACH	0.365281450	Q	105.074215	RANG	1.33117224	VAMI	384.025405	ALFA	0.1435666(	
MAYB	22712.8438	GAMA	12.5259374	LATV	40.6572584	LONV	-72.6424419	ELRLH	12.7435386	AZRLN	70.9482588	GMT	16.50000(	
VDR	83.2880267	RB1	27.3100000	DVDR	-30.7657924	VCAL	299.622781	BANK	-.201743398	OMXB	0.0000E+00	DOMXB	0.0000E+(	
ELR	17.3228782	BETA	5.32757192	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-175.502306	RGR	55051.3140			
TC1	16.8000000	H	16511.7863	MACH	0.363839263	Q	104.145537	RANG	1.35065616	VAMI	382.474077	ALFA	0.1615732(	
MAYB	24307.8706	GAMA	11.1652474	LATV	40.6573642	LONV	-72.6420383	ELRLH	11.3963123	AZRLN	70.9541145	GMT	16.80000(	
VDR	74.0620203	RB1	27.3100000	DVDR	-30.7396214	VCAL	298.280736	BANK	-.201048391	OMXB	0.0000E+00	DOMXB	0.0000E+(	
ELR	17.3611579	BETA	5.40370357	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-175.620920	RGR	55013.5784			
TC1	17.1000000	H	16532.7500	MACH	0.362615248	Q	103.357765	RANG	1.37015701	VAMI	381.156433	ALFA	0.1815704	
MAYB	26107.7528	GAMA	9.79515093	LATV	40.6574700	LONV	-72.6416344	ELRLH	10.0411747	AZRLN	70.9599680	GMT	17.10000(	
VDR	64.8446578	RB1	27.3100000	DVDR	-30.7093898	VCAL	297.137873	BANK	-.200465708	OMXB	0.0000E+00	DOMXB	0.0000E+(	
ELR	17.3966825	BETA	5.47076738	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-175.739855	RGR	54975.2112			
TC1	17.4000000	H	16550.9500	MACH	0.361609721	Q	102.709220	RANG	1.38967551	VAMI	380.072703	ALFA	0.2012130	
MAYB	27949.5217	GAMA	8.41736103	LATV	40.6575760	LONV	-72.6412301	ELRLH	8.67754465	AZRLN	70.9658266	GMT	17.40000(	
VDR	55.6360983	RB1	27.3100000	DVDR	-30.6820183	VCAL	296.193965	BANK	-.199995068	OMXB	0.0000E+00	DOMXB	0.0000E+(	
ELR	17.4294500	BETA	5.52850924	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-175.859114	RGR	54936.2080			
TC1	17.7000000	H	16566.3886	MACH	0.360822688	Q	102.198364	RANG	1.40921236	VAMI	379.222810	ALFA	0.2183982(	
MAYB	29679.2446	GAMA	7.03332518	LATV	40.6576820	LONV	-72.6408254	ELRLH	7.30482240	AZRLN	70.9716975	GMT	17.70000(	
VDR	46.4345519	RB1	27.3100000	DVDR	-30.6635760	VCAL	295.448601	BANK	-.199636684	OMXB	0.0000E+00	DOMXB	0.0000E+(	
ELR	17.4594584	BETA	5.57671615	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-175.978701	RGR	54896.5644			
TC1	18.0000000	H	16579.0675	MACH	0.360253891	Q	101.823831	RANG	1.42876824	VAMI	378.606414	ALFA	0.2312879]	
MAYB	31153.2521	GAMA	5.64425462	LATV	40.6577880	LONV	-72.6404203	ELRLH	5.92244052	AZRLN	70.9775880	GMT	18.00000(	
VDR	37.2365364	RB1	27.3100000	DVDR	-30.6592746	VCAL	294.901233	BANK	-.199391285	OMXB	0.0000E+00	DOMXB	0.0000E+(	
ELR	17.4867044	BETA	5.61521596	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-176.098621	RGR	54856.2766			
TC1	18.3000000	H	16588.9869	MACH	0.359902852	Q	101.584449	RANG	1.44834379	VAMI	378.222959	ALFA	0.2383257	
MAYB	32239.3041	GAMA	4.25115494	LATV	40.6578942	LONV	-72.6400148	ELRLH	4.52991106	AZRLN	70.9835051	GMT	18.30000(	
VDR	28.0371355	RB1	27.3100000	DVDR	-30.6734655	VCAL	294.551207	BANK	-.199260131	OMXB	0.0000E+00	DOMXB	0.0000E+(	
ELR	17.5111833	BETA	5.64387693	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-176.218879	RGR	54815.3406			
TC1	18.6000000	H	16596.1457	MACH	0.359768902	Q	101.479260	RANG	1.46793962	VAMI	378.071705	ALFA	0.2382506(	
MAYB	32817.7222	GAMA	2.85485729	LATV	40.6580004	LONV	-72.6396088	ELRLH	3.12686910	AZRLN	70.9894556	GMT	18.60000(	
VDR	18.8302562	RB1	27.3100000	DVDR	-30.7096400	VCAL	294.397799	BANK	-.199244996	OMXB	0.0000E+00	DOMXB	0.0000E+(	
ELR	17.5328884	BETA	5.66260717	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-176.339477	RGR	54773.7527			
TC1	18.9000000	H	16600.5406	MACH	0.359851208	Q	101.507528	RANG	1.48755630	VAMI	378.151759	ALFA	0.2301051(	
MAYB	32782.5133	GAMA	1.45605014	LATV	40.6581067	LONV	-72.6392024	ELRLH	1.71311233	AZRLN	70.9954458	GMT	18.90000(	
VDR	9.60888679	RB1	27.3100000	DVDR	-30.7704327	VCAL	294.440230	BANK	-.199348141	OMXB	0.0000E+00	DOMXB	0.0000E+(	
ELR	17.5518111	BETA	5.67135394	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-176.460420	RGR	54731.5088			
TC1	19.2000000	H	16602.1660	MACH	0.360148790	Q	101.668752	RANG	1.50719431	VAMI	378.462092	ALFA	0.2132397]	
MAYB	32042.4936	GAMA	0.055311233	LATV	40.6582131	LONV	-72.6387955	ELRLH	0.288636118	AZRLN	71.0014818	GMT	19.20000(	

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VDR   0.365353296 RB1    27.3100000 DVDR -30.8576261 VCAL   294.677688 BANK  -.199572267 OMXB   0.0000E+00 DOMXB  0.0000E+(
ELR    17.5679399 BETA   5.67010288 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR   -176.581710 RGR    54688.6050

TC1    19.2118392 H      16602.1732 MACH  0.360164934 Q      101.677837 RANG   1.50796975 VAMI   378.479047 ALFA  0.2123893(
MAYB   31997.4715 GAMA   0.3452E-14 LATV   40.6582173 LONV  -72.6387795 ELRLH 0.232202927 AZRLN  71.0017210 GMT    19.21183(
VDR    0.3420E-13 RB1    27.3100000 DVDR -30.8616248 VCAL   294.691048 BANK  -.199583635 OMXB   0.0000E+00 DOMXB  0.0000E+(
ELR    17.5685189 BETA   5.66984864 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR   -176.586504 RGR    54686.8982

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   EVENT ESN   20                                                    DATE / TIME   15-03-04  13:36:12
   TIME =      19.212          TYPE = PRIMARY-ORDERED          CASE = 1.     CP =  0.125   CYCLES =   194.
         EVENT CAUSED BY
+                              VDR    =  0.00000000E+00                  TG MODEL - G7
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   TC1    19.2118392 H      16602.1732 MACH  0.360164934 Q      101.677837 RANG   1.50796975 VAMI   378.479047 ALFA  0.2123893(
   MAYB   31997.4715 GAMA   0.3452E-14 LATV   40.6582173 LONV  -72.6387795 ELRLH 0.232202926 AZRLN  71.0017210 GMT    19.21183(
   VDR    0.3420E-13 RB1    27.3100000 DVDR -30.8616248 VCAL   294.691048 BANK  -.199583635 OMXB   0.0000E+00 DOMXB  0.0000E+(
   ELR    17.5685189 BETA   5.66984864 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR   -176.586504 RGR    54686.8982

   TC1    19.5000000 H      16601.0141 MACH  0.360660535 Q      101.962668 RANG   1.52685404 VAMI   379.001551 ALFA  0.1873138(
   MAYB   30522.6294 GAMA  -1.34686041 LATV   40.6583196 LONV  -72.6383882 ELRLH -1.14633358 AZRLN  71.0075690 GMT    19.50000(
   VDR   -8.90842532 RB1    27.3100000 DVDR -30.9721517 VCAL   295.109335 BANK  -.199920451 OMXB   0.0000E+00 DOMXB  0.0000E+(
   ELR    17.5812608 BETA   5.65887716 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR   -176.703351 RGR    54645.0370

   TC1    19.8000000 H      16597.0746 MACH  0.361385201 Q      102.389247 RANG   1.54653574 VAMI   379.768865 ALFA  0.1522838(
   MAYB   28164.5720 GAMA  -2.75001313 LATV   40.6584261 LONV  -72.6379804 ELRLH -2.59132238 AZRLN  71.0137121 GMT    19.80000(
   VDR   -18.2206864 RB1    27.3100000 DVDR -31.1141249 VCAL   295.734314 BANK  -.200396074 OMXB   0.0000E+00 DOMXB  0.0000E+(
   ELR    17.5917570 BETA   5.63773663 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR   -176.825344 RGR    54600.8008

   TC1    20.1000000 H      16590.3348 MACH  0.362321419 Q      102.948693 RANG   1.56623950 VAMI   380.762650 ALFA  0.1083983(
   MAYB   24928.2870 GAMA  -4.15371225 LATV   40.6585328 LONV  -72.6375721 ELRLH -4.04558198 AZRLN  71.0199154 GMT    20.10000(
   VDR   -27.5795789 RB1    27.3100000 DVDR -31.2828430 VCAL   296.551748 BANK  -.201002733 OMXB   0.0000E+00 DOMXB  0.0000E+(
   ELR    17.5994088 BETA   5.60677682 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR   -176.947690 RGR    54555.8922

   TC1    20.4000000 H      16580.7794 MACH  0.363467690 Q      103.641436 RANG   1.58596521 VAMI   381.981401 ALFA  0.0561822(
   MAYB   20793.0617 GAMA  -5.55751018 LATV   40.6586395 LONV  -72.6371634 ELRLH -5.50807713 AZRLN  71.0261824 GMT    20.40000(
   VDR   -36.9929220 RB1    27.3100000 DVDR -31.4768140 VCAL   297.560739 BANK  -.201744140 OMXB   0.0000E+00 DOMXB  0.0000E+(
   ELR    17.6041938 BETA   5.56612801 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR   -177.070388 RGR    54510.3071

   TC1    20.7000000 H      16568.3910 MACH  0.364822387 Q      104.468131 RANG   1.60571255 VAMI   383.423500 ALFA  -.0035842(
   MAYB   15757.4554 GAMA  -6.96091833 LATV   40.6587463 LONV  -72.6367542 ELRLH -6.97747897 AZRLN  71.0325158 GMT    20.70000(
   VDR   -46.4679741 RB1    27.3100000 DVDR -31.6938684 VCAL   298.760369 BANK  -.202624012 OMXB   0.0000E+00 DOMXB  0.0000E+(
   ELR    17.6060868 BETA   5.51595405 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR   -177.193437 RGR    54464.0416

   TC1    21.0000000 H      16553.1501 MACH  0.366384753 Q      105.430222 RANG   1.62548094 VAMI   385.088256 ALFA  -.0698760(
   MAYB   9826.84258 GAMA  -8.36339387 LATV   40.6588532 LONV  -72.6363445 ELRLH -8.45216332 AZRLN  71.0389176 GMT    21.00000(
   VDR   -56.0114547 RB1    27.3100000 DVDR -31.9324546 VCAL   300.150523 BANK  -.203645952 OMXB   0.0000E+00 DOMXB  0.0000E+(
   ELR    17.6050598 BETA   5.45643620 MAZB   0.0000E+00 MAXB   0.0000E+00 AZR   -177.316832 RGR    54417.0922

   TC1    21.3000000 H      16535.0353 MACH  0.368153828 Q      106.529338 RANG   1.64526961 VAMI   386.974786 ALFA  -.1414712(
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MAYB	3059.71360	GAMA	-9.76429508	LATV	40.6589602	LONV	-72.6359345	ELRLH	-9.93021403	AZRLN	71.0453888	GMT	21.30000(
VDR	-65.6291402	RB1	27.3100000	DVDR	-32.1879216	VCAL	301.731007	BANK	-.204813322	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.6010829	BETA	5.38778876	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-177.440570	RGR	54369.4555		
TC1	21.6000000	H	16514.0235	MACH	0.370127718	Q	107.766856	RANG	1.66507751	VAMI	389.081239	ALFA	-.2169924(
MAYB	-4479.49642	GAMA	-11.1628548	LATV	40.6590672	LONV	-72.6355239	ELRLH	-11.4094388	AZRLN	71.0519295	GMT	21.60000(
VDR	-75.3254861	RB1	27.3100000	DVDR	-32.4561192	VCAL	303.500924	BANK	-.206129107	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.5941239	BETA	5.31026857	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-177.564644	RGR	54321.1286		
TC1	21.9000000	H	16490.0907	MACH	0.372304338	Q	109.144324	RANG	1.68490332	VAMI	391.405581	ALFA	-.2949327:
MAYB	-12704.2373	GAMA	-12.5581756	LATV	40.6591743	LONV	-72.6351131	ELRLH	-12.8873907	AZRLN	71.0585391	GMT	21.90000(
VDR	-85.1036245	RB1	27.3100000	DVDR	-32.7323913	VCAL	305.459304	BANK	-.207595787	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.5841487	BETA	5.22416214	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-177.689045	RGR	54272.1094		
TC1	22.2000000	H	16463.2120	MACH	0.374681411	Q	110.663447	RANG	1.70474537	VAMI	393.945593	ALFA	-.3738115(
MAYB	-17259.7815	GAMA	-13.9492194	LATV	40.6592815	LONV	-72.6347018	ELRLH	-14.3615145	AZRLN	71.0652163	GMT	22.20000(
VDR	-94.9652487	RB1	27.3100000	DVDR	-33.0120547	VCAL	307.605088	BANK	-.209215312	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.5711223	BETA	5.12978428	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-177.813763	RGR	54222.3966		
TC1	22.5000000	H	16433.3622	MACH	0.377256452	Q	112.326073	RANG	1.72460172	VAMI	396.698849	ALFA	-.4532396(
MAYB	-17387.5455	GAMA	-15.3348817	LATV	40.6593887	LONV	-72.6342903	ELRLH	-15.8302864	AZRLN	71.0719635	GMT	22.50000(
VDR	-104.911066	RB1	27.3100000	DVDR	-33.2938969	VCAL	309.937115	BANK	-.210990192	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.5550087	BETA	5.02747651	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-177.938786	RGR	54171.9898		
TC1	22.8000000	H	16400.5160	MACH	0.380026753	Q	114.134169	RANG	1.74447014	VAMI	399.662704	ALFA	-.5341219(
MAYB	-13534.3107	GAMA	-16.7141923	LATV	40.6594959	LONV	-72.6338784	ELRLH	-17.2936182	AZRLN	71.0787887	GMT	22.80000(
VDR	-114.942101	RB1	27.3100000	DVDR	-33.5809646	VCAL	312.454109	BANK	-.212924494	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.5357710	BETA	4.91760482	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-178.064099	RGR	54120.8895		
TC1	23.1000000	H	16364.6475	MACH	0.382989382	Q	116.089820	RANG	1.76434803	VAMI	402.834293	ALFA	-.6183537:
MAYB	-5404.07267	GAMA	-18.0864858	LATV	40.6596032	LONV	-72.6334664	ELRLH	-18.7527260	AZRLN	71.0857053	GMT	23.10000(
VDR	-125.060803	RB1	27.3100000	DVDR	-33.8797024	VCAL	315.154677	BANK	-.215024484	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.5133712	BETA	4.80055637	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-178.189686	RGR	54069.0973		
TC1	23.4000000	H	16325.7296	MACH	0.386141190	Q	118.195219	RANG	1.78423242	VAMI	406.210536	ALFA	-.7087638:
MAYB	7550.69631	GAMA	-19.4515552	LATV	40.6597104	LONV	-72.6330542	ELRLH	-20.2102260	AZRLN	71.0927333	GMT	23.40000(
VDR	-135.272056	RB1	27.3100000	DVDR	-34.1998861	VCAL	318.037317	BANK	-.217299588	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.4877698	BETA	4.67673538	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-178.315527	RGR	54016.6155		
TC1	23.7000000	H	16283.7335	MACH	0.389478816	Q	120.452665	RANG	1.80411990	VAMI	409.788148	ALFA	-.8091360:
MAYB	26277.9878	GAMA	-20.8098073	LATV	40.6598176	LONV	-72.6326420	ELRLH	-21.6703120	AZRLN	71.0999003	GMT	23.70000(
VDR	-145.584194	RB1	27.3100000	DVDR	-34.5548118	VCAL	321.100427	BANK	-.219763656	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.4589246	BETA	4.54655872	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-178.441602	RGR	53963.4473		
TC1	24.0000000	H	16238.6269	MACH	0.392998681	Q	122.864559	RANG	1.82400644	VAMI	413.563634	ALFA	-.9240086(
MAYB	37772.0687	GAMA	-22.1624271	LATV	40.6599248	LONV	-72.6322297	ELRLH	-23.1387194	AZRLN	71.1072430	GMT	24.00000(
VDR	-156.010076	RB1	27.3100000	DVDR	-34.9607088	VCAL	324.342305	BANK	-.222436179	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.4267892	BETA	4.41045120	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-178.567882	RGR	53909.5965		
TC1	24.3000000	H	16190.3734	MACH	0.396697023	Q	125.433414	RANG	1.84388726	VAMI	417.533321	ALFA	-1.055330:
MAYB	44479.3528	GAMA	-23.5112925	LATV	40.6600319	LONV	-72.6318175	ELRLH	-24.6192939	AZRLN	71.1147930	GMT	24.30000(
VDR	-166.566487	RB1	27.3100000	DVDR	-35.4252387	VCAL	327.761184	BANK	-.225337602	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.3913120	BETA	4.26884050	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-178.694338	RGR	53855.0675		

TC1	24.6000000	H	16138.9311	MACH	0.400569967	Q	128.161900	RANG	1.86375668	VAMI	421.693443	ALFA	-1.203147(
MAYB	52076.8252	GAMA	-24.8585351	LATV	40.6601389	LONV	-72.6314056	ELRLH	-26.1142381	AZRLN	71.1225779	GMT	24.60000(
VDR	-177.271185	RB1	27.3100000	DVDR	-35.9494772	VCAL	331.355298	BANK	-.228488994	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.3524351	BETA	4.12215361	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-178.820932	RGR	53799.8652		
TC1	24.9000000	H	16084.2527	MACH	0.404613492	Q	131.052814	RANG	1.88360799	VAMI	426.040101	ALFA	-1.367594(
MAYB	60586.4761	GAMA	-26.2064528	LATV	40.6602458	LONV	-72.6309940	ELRLH	-27.6260120	AZRLN	71.1306295	GMT	24.90000(
VDR	-188.142249	RB1	27.3100000	DVDR	-36.5345426	VCAL	335.122856	BANK	-.231915331	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.3100938	BETA	3.97081609	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-178.947621	RGR	53743.9956		
TC1	25.2000000	H	16026.2854	MACH	0.408823357	Q	134.109025	RANG	1.90343329	VAMI	430.569185	ALFA	-1.548914(
MAYB	70036.4920	GAMA	-27.5575292	LATV	40.6603525	LONV	-72.6305829	ELRLH	-29.1573737	AZRLN	71.1389848	GMT	25.20000(
VDR	-199.198099	RB1	27.3100000	DVDR	-37.1815684	VCAL	339.061974	BANK	-.235646358	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.2642169	BETA	3.81525212	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-179.074352	RGR	53687.4656		
TC1	25.5000000	H	15964.9712	MACH	0.413159250	Q	137.309631	RANG	1.92322338	VAMI	435.238608	ALFA	-1.743272(
MAYB	80233.2021	GAMA	-28.9169964	LATV	40.6604590	LONV	-72.6301726	ELRLH	-30.7113849	AZRLN	71.1476869	GMT	25.50000(
VDR	-210.456174	RB1	27.3100000	DVDR	-37.8760033	VCAL	343.140356	BANK	-.239717581	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.2147262	BETA	3.70734985	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-179.201066	RGR	53630.2834		
TC1	25.8000000	H	15900.2474	MACH	0.417610779	Q	140.652790	RANG	1.94296772	VAMI	440.037794	ALFA	-1.951424(
MAYB	91220.8891	GAMA	-30.2875894	LATV	40.6605651	LONV	-72.6297632	ELRLH	-32.2913623	AZRLN	71.1567860	GMT	25.80000(
VDR	-221.928923	RB1	27.3100000	DVDR	-38.6189324	VCAL	347.350930	BANK	-.244171372	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.1615377	BETA	3.63735508	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-179.327692	RGR	53572.4591		
TC1	26.1000000	H	15832.0469	MACH	0.422195076	Q	144.155349	RANG	1.96265421	VAMI	444.985184	ALFA	-2.176702(
MAYB	103219.967	GAMA	-31.6707389	LATV	40.6606709	LONV	-72.6293549	ELRLH	-33.9008765	AZRLN	71.1663409	GMT	26.10000(
VDR	-233.633718	RB1	27.3100000	DVDR	-39.4233560	VCAL	351.710017	BANK	-.249058460	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.1045616	BETA	3.56620047	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-179.454152	RGR	53514.0048		
TC1	26.4000000	H	15760.2975	MACH	0.426904815	Q	147.818153	RANG	1.98226897	VAMI	450.073478	ALFA	-2.419418)
MAYB	116234.951	GAMA	-33.0700158	LATV	40.6607763	LONV	-72.6289481	ELRLH	-35.5438220	AZRLN	71.1764211	GMT	26.40000(
VDR	-245.588664	RB1	27.3100000	DVDR	-40.2856837	VCAL	356.213361	BANK	-.254440055	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	17.0437007	BETA	3.49403027	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-179.580353	RGR	53454.9348		
TC1	26.7000000	H	15684.9212	MACH	0.431731793	Q	151.641464	RANG	2.00179606	VAMI	455.294471	ALFA	-2.680056(
MAYB	130287.639	GAMA	-34.4891484	LATV	40.6608812	LONV	-72.6285432	ELRLH	-37.2244266	AZRLN	71.1871097	GMT	26.70000(
VDR	-257.810559	RB1	27.3100000	DVDR	-41.2024635	VCAL	360.856022	BANK	-.260390422	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	16.9788508	BETA	3.42098517	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-179.706191	RGR	53395.2662		
TC1	27.0000000	H	15605.8357	MACH	0.436666928	Q	155.624906	RANG	2.02121726	VAMI	460.639042	ALFA	-2.959184(
MAYB	145409.117	GAMA	-35.9321228	LATV	40.6609854	LONV	-72.6281404	ELRLH	-38.9472562	AZRLN	71.1985066	GMT	27.00000(
VDR	-270.315156	RB1	27.3100000	DVDR	-42.1695587	VCAL	365.632363	BANK	-.267000240	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	16.9099010	BETA	3.34720152	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-179.831544	RGR	53335.0193		
TC1	27.3000000	H	15522.9536	MACH	0.441700074	Q	159.767266	RANG	2.04051180	VAMI	466.096959	ALFA	-3.257439)
MAYB	161629.624	GAMA	-37.4031987	LATV	40.6610890	LONV	-72.6277402	ELRLH	-40.7172250	AZRLN	71.2107328	GMT	27.30000(
VDR	-283.116703	RB1	27.3100000	DVDR	-43.1809611	VCAL	370.535880	BANK	-.274381059	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	16.8367336	BETA	3.27281188	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	-179.956274	RGR	53274.2185		
TC1	27.6000000	H	15436.1840	MACH	0.446819805	Q	164.066262	RANG	2.05965607	VAMI	471.656652	ALFA	-3.575530(
MAYB	178977.179	GAMA	-38.9069225	LATV	40.6611916	LONV	-72.6273430	ELRLH	-42.5396051	AZRLN	71.2239366	GMT	27.60000(
VDR	-296.227300	RB1	27.3100000	DVDR	-44.2282879	VCAL	375.559001	BANK	-.282671298	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	16.7592244	BETA	3.19794590	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	179.919776	RGR	53212.8926		

TC1	27.9000000	H	15345.4324	MACH	0.452013160	Q	168.518259	RANG	2.07862326	VAMI	477.304930	ALFA	-3.914237
MAYB	197475.992	GAMA	-40.4481379	LATV	40.6612933	LONV	-72.6269496	ELRLH	-44.4200356	AZRLN	71.2383017	GMT	27.90000
VDR	-309.656102	RB1	27.3100000	DVDR	-45.3001868	VCAL	380.692837	BANK	-.292044433	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.6772441	BETA	3.12273115	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	179.796785	RGR	53151.0756		
TC1	28.2000000	H	15250.6019	MACH	0.457272767	Q	173.123548	RANG	2.09738313	VAMI	483.034509	ALFA	-4.273315
MAYB	198004.243	GAMA	-42.0321445	LATV	40.6613938	LONV	-72.6265604	ELRLH	-46.3635904	AZRLN	71.2540518	GMT	28.20000
VDR	-323.414512	RB1	27.3100000	DVDR	-46.4359160	VCAL	385.933304	BANK	-.302715166	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.5906578	BETA	3.04724448	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	179.674953	RGR	53088.8078		
TC1	28.5000000	H	15151.5906	MACH	0.462601229	Q	177.890042	RANG	2.11590210	VAMI	488.848659	ALFA	-4.648409
MAYB	194265.971	GAMA	-43.6642741	LATV	40.6614929	LONV	-72.6261762	ELRLH	-48.3712603	AZRLN	71.2714338	GMT	28.50000
VDR	-337.516504	RB1	27.3100000	DVDR	-47.5713157	VCAL	391.284981	BANK	-.314930705	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.4993238	BETA	2.97149036	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	179.554507	RGR	53026.1343		
TC1	28.8000000	H	15048.2964	MACH	0.467984582	Q	182.813108	RANG	2.13414291	VAMI	494.733152	ALFA	-5.034181
MAYB	185760.457	GAMA	-45.3486329	LATV	40.6615905	LONV	-72.6257977	ELRLH	-50.4418331	AZRLN	71.2907410	GMT	28.80000
VDR	-351.951315	RB1	27.3100000	DVDR	-48.6474704	VCAL	396.738187	BANK	-.328988762	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.4030975	BETA	2.89557927	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	179.435696	RGR	52963.1074		
TC1	29.1000000	H	14940.6227	MACH	0.473389847	Q	187.872565	RANG	2.15206445	VAMI	500.653633	ALFA	-5.422685
MAYB	171600.866	GAMA	-47.0904954	LATV	40.6616862	LONV	-72.6254258	ELRLH	-52.5725520	AZRLN	71.3123332	GMT	29.10000
VDR	-366.693724	RB1	27.3100000	DVDR	-49.6103135	VCAL	402.266619	BANK	-.345256102	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.3018377	BETA	2.81738580	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	179.318795	RGR	52899.7880		
TC1	29.4000000	H	14828.4827	MACH	0.478806046	Q	193.064485	RANG	2.16962205	VAMI	506.598957	ALFA	-5.808209
MAYB	151125.407	GAMA	-48.8909656	LATV	40.6617800	LONV	-72.6250614	ELRLH	-54.7588315	AZRLN	71.3366546	GMT	29.40000
VDR	-381.701913	RB1	27.3100000	DVDR	-50.4155744	VCAL	407.862807	BANK	-.364187179	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.1954117	BETA	2.73735169	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	179.204106	RGR	52836.2469		
TC1	29.7000000	H	14711.8041	MACH	0.484232864	Q	198.393203	RANG	2.18676783	VAMI	512.569229	ALFA	-6.185250
MAYB	123799.287	GAMA	-50.7488078	LATV	40.6618715	LONV	-72.6247056	ELRLH	-56.9940300	AZRLN	71.3642585	GMT	29.70000
VDR	-396.923093	RB1	27.3100000	DVDR	-51.0222208	VCAL	413.528426	BANK	-.386349077	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	16.0837000	BETA	2.65742195	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	179.091950	RGR	52772.5646		
TC1	30.0000000	H	14590.5323	MACH	0.489656098	Q	203.851516	RANG	2.20345112	VAMI	518.549812	ALFA	-6.545771
MAYB	89174.6294	GAMA	-52.6631730	LATV	40.6619604	LONV	-72.6243593	ELRLH	-59.2692768	AZRLN	71.3958411	GMT	30.00000
VDR	-412.290563	RB1	27.3100000	DVDR	-51.3833957	VCAL	419.252861	BANK	-.412455044	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	15.9666007	BETA	2.57768841	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.982670	RGR	52708.8320		
TC1	30.3000000	H	14464.6347	MACH	0.495063659	Q	209.433244	RANG	2.21961917	VAMI	524.528246	ALFA	-6.881120
MAYB	47028.3288	GAMA	-54.6314489	LATV	40.6620465	LONV	-72.6240236	ELRLH	-61.5733242	AZRLN	71.4322858	GMT	30.30000
VDR	-427.724268	RB1	27.3100000	DVDR	-51.4574751	VCAL	425.027060	BANK	-.443409424	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	15.8440345	BETA	2.49823073	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.876624	RGR	52645.1499		
TC1	30.6000000	H	14334.1046	MACH	0.500446648	Q	215.134207	RANG	2.23521823	VAMI	530.495374	ALFA	-7.182140
MAYB	-2581.67682	GAMA	-56.6490743	LATV	40.6621294	LONV	-72.6236997	ELRLH	-63.8924721	AZRLN	71.4747243	GMT	30.60000
VDR	-443.132891	RB1	27.3100000	DVDR	-51.2116462	VCAL	430.844451	BANK	-.480368589	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	15.7159496	BETA	2.41911498	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.774176	RGR	52581.6280		
TC1	30.9000000	H	14198.9638	MACH	0.505800429	Q	220.953309	RANG	2.25019471	VAMI	536.446478	ALFA	-7.439345
MAYB	-59262.0671	GAMA	-58.7093811	LATV	40.6622089	LONV	-72.6233887	ELRLH	-66.2105811	AZRLN	71.5246196	GMT	30.90000
VDR	-458.417055	RB1	27.3100000	DVDR	-50.6255449	VCAL	436.701888	BANK	-.524824033	OMXB	0.0000E+00	DOMXB	0.0000E+

ELR	15.5823256	BETA	2.34039280	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.675692	RGR	52518.3835		
TC1	31.2000000	H	14059.2649	MACH	0.511125595	Q	226.893630	RANG	2.26449665	VAMI	542.382313	ALFA	-7.643153
MAYB	-122236.702	GAMA	-60.8034775	LATV	40.6622848	LONV	-72.6230917	ELRLH	-68.5091964	AZRLN	71.5838802	GMT	31.20000
VDR	-473.473554	RB1	27.3100000	DVDR	-49.6945027	VCAL	442.600539	BANK	-.578716097	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	15.4431766	BETA	2.26210162	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.581526	RGR	52455.5391		
TC1	31.5000000	H	13915.0916	MACH	0.516292734	Q	232.840754	RANG	2.27807555	VAMI	548.165531	ALFA	-7.756843
MAYB	-189524.510	GAMA	-62.9480532	LATV	40.6623566	LONV	-72.6228096	ELRLH	-70.7678038	AZRLN	71.6550160	GMT	31.50000
VDR	-488.193235	RB1	27.3100000	DVDR	-48.3532002	VCAL	448.425568	BANK	-.644589861	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	15.2985536	BETA	2.17553674	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.492013	RGR	52393.2196		
TC1	31.8000000	H	13766.5635	MACH	0.521388123	Q	238.870132	RANG	2.29089062	VAMI	553.887519	ALFA	-7.787818
MAYB	-259267.847	GAMA	-65.1137425	LATV	40.6624243	LONV	-72.6225432	ELRLH	-72.9644331	AZRLN	71.7413602	GMT	31.80000
VDR	-502.456279	RB1	27.3100000	DVDR	-46.6950899	VCAL	454.252867	BANK	-.725816075	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	15.1485510	BETA	2.08217560	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.407435	RGR	52331.5458		
TC1	32.1000000	H	13613.8292	MACH	0.526532220	Q	245.093600	RANG	2.30290956	VAMI	559.676123	ALFA	-7.748817
MAYB	-330023.209	GAMA	-67.2646978	LATV	40.6624876	LONV	-72.6222934	ELRLH	-75.0762833	AZRLN	71.8473731	GMT	32.10000
VDR	-516.189368	RB1	27.3100000	DVDR	-44.8282642	VCAL	460.189635	BANK	-.826893589	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	14.9933006	BETA	1.98800739	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.328019	RGR	52270.6314		
TC1	32.4000000	H	13457.0560	MACH	0.531744249	Q	251.534113	RANG	2.31410781	VAMI	565.551762	ALFA	-7.632606
MAYB	-399531.046	GAMA	-69.3850074	LATV	40.6625464	LONV	-72.6220606	ELRLH	-77.0801954	AZRLN	71.9790331	GMT	32.40000
VDR	-529.338033	RB1	27.3100000	DVDR	-42.8092772	VCAL	466.253287	BANK	-.953840159	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	14.8329604	BETA	1.89313994	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.253941	RGR	52210.5812		
TC1	32.7000000	H	13296.4251	MACH	0.537046379	Q	258.218572	RANG	2.32447010	VAMI	571.538000	ALFA	-7.434147
MAYB	-465186.443	GAMA	-71.4569374	LATV	40.6626006	LONV	-72.6218450	ELRLH	-78.9533744	AZRLN	72.1443266	GMT	32.70000
VDR	-541.866551	RB1	27.3100000	DVDR	-40.7056267	VCAL	472.463969	BANK	-1.11468123	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	14.6677094	BETA	1.79770020	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.185316	RGR	52151.4876		
TC1	33.0000000	H	13132.1252	MACH	0.542461521	Q	265.176027	RANG	2.33399181	VAMI	577.659226	ALFA	-7.151000
MAYB	-524129.926	GAMA	-73.4613749	LATV	40.6626502	LONV	-72.6216469	ELRLH	-80.6742324	AZRLN	72.3537739	GMT	33.00000
VDR	-553.760338	RB1	27.3100000	DVDR	-38.5896464	VCAL	478.842669	BANK	-1.31997426	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	14.4977424	BETA	1.70183980	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.122187	RGR	52093.4265		
TC1	33.3000000	H	12964.3463	MACH	0.548042004	Q	272.466411	RANG	2.34267998	VAMI	583.971222	ALFA	-6.794004
MAYB	-574341.079	GAMA	-75.3659962	LATV	40.6626953	LONV	-72.6214660	ELRLH	-82.2233169	AZRLN	72.6207640	GMT	33.30000
VDR	-565.026846	RB1	27.3100000	DVDR	-36.5468438	VCAL	485.437354	BANK	-1.58314217	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	14.3232627	BETA	1.62859676	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.064519	RGR	52036.4541		
TC1	33.6000000	H	12793.2715	MACH	0.553864434	Q	280.178089	RANG	2.35055233	VAMI	590.555810	ALFA	-6.386760
MAYB	-615321.922	GAMA	-77.1235321	LATV	40.6627360	LONV	-72.6213020	ELRLH	-83.5839231	AZRLN	72.9609715	GMT	33.60000
VDR	-575.704987	RB1	27.3100000	DVDR	-34.6588045	VCAL	492.318858	BANK	-1.91988911	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	14.1444735	BETA	1.64061634	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	178.012204	RGR	51980.6067		
TC1	33.9000000	H	12619.0711	MACH	0.559810932	Q	288.205195	RANG	2.35763613	VAMI	597.287547	ALFA	-5.893775
MAYB	-640440.003	GAMA	-78.7625930	LATV	40.6627723	LONV	-72.6211543	ELRLH	-84.7425142	AZRLN	73.3891414	GMT	33.90000
VDR	-585.836432	RB1	27.3100000	DVDR	-32.9102031	VCAL	499.381110	BANK	-2.34498404	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	13.9615695	BETA	1.65215005	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.965073	RGR	51925.9011		
TC1	34.2000000	H	12441.9024	MACH	0.565889249	Q	296.565615	RANG	2.36397211	VAMI	604.174815	ALFA	-5.327420
MAYB	-647118.191	GAMA	-80.2617760	LATV	40.6628045	LONV	-72.6210221	ELRLH	-85.6905354	AZRLN	73.9109035	GMT	34.20000

VDR	-595.469166	RB1	27.3100000	DVDR	-31.3381368	VCAL	506.631976	BANK	-2.86407257	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	13.7747390	BETA	1.66312801	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.922863	RGR	51872.3283		
TC1	34.5000000	H	12261.9073	MACH	0.572093905	Q	305.264149	RANG	2.36961429	VAMI	611.211910	ALFA	-4.703424:
MAYB	-633507.680	GAMA	-81.6023242	LATV	40.6628330	LONV	-72.6209042	ELRLH	-86.4254613	AZRLN	74.5066707	GMT	34.50000(
VDR	-604.658654	RB1	27.3100000	DVDR	-29.9552915	VCAL	514.067339	BANK	-3.45757225	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	13.5841600	BETA	1.67352487	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.885225	RGR	51819.8531		
TC1	34.8000000	H	12079.2106	MACH	0.578405635	Q	314.290692	RANG	2.37462862	VAMI	618.378410	ALFA	-4.040603(
MAYB	-588823.605	GAMA	-82.7692456	LATV	40.6628580	LONV	-72.6207994	ELRLH	-86.9515488	AZRLN	75.1113156	GMT	34.80000(
VDR	-613.460622	RB1	27.3100000	DVDR	-28.7512650	VCAL	521.670363	BANK	-4.06034797	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	13.3899979	BETA	1.68336043	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.851726	RGR	51768.4161		
TC1	35.1000000	H	11893.9173	MACH	0.584950542	Q	323.795065	RANG	2.37909017	VAMI	625.809400	ALFA	-3.463754(
MAYB	-530747.992	GAMA	-83.6510074	LATV	40.6628800	LONV	-72.6207060	ELRLH	-87.2830785	AZRLN	75.6154168	GMT	35.10000(
VDR	-621.971161	RB1	27.3100000	DVDR	-28.0412330	VCAL	529.559250	BANK	-4.56295224	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	13.1924000	BETA	1.70873647	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.821873	RGR	51717.9382		
TC1	35.4000000	H	11706.0961	MACH	0.591644448	Q	333.701165	RANG	2.38306776	VAMI	633.415297	ALFA	-2.932064:
MAYB	-471195.493	GAMA	-84.3132677	LATV	40.6628994	LONV	-72.6206226	ELRLH	-87.4394925	AZRLN	75.9027627	GMT	35.40000(
VDR	-630.297970	RB1	27.3100000	DVDR	-27.4838564	VCAL	537.658108	BANK	-4.84913764	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	12.9914711	BETA	1.72681530	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.795216	RGR	51668.3429		
TC1	35.7000000	H	11515.7982	MACH	0.598364118	Q	343.881775	RANG	2.38662701	VAMI	641.064466	ALFA	-2.384474)
MAYB	-399510.319	GAMA	-84.8415761	LATV	40.6629165	LONV	-72.6205479	ELRLH	-87.4402640	AZRLN	75.9120946	GMT	35.70000(
VDR	-638.468093	RB1	27.3100000	DVDR	-26.9905155	VCAL	545.853393	BANK	-4.85760929	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	12.7872943	BETA	1.72108094	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.771320	RGR	51619.5556		
TC1	36.0000000	H	11323.0685	MACH	0.605088451	Q	354.319082	RANG	2.38983994	VAMI	648.734412	ALFA	-1.845419:
MAYB	-319315.156	GAMA	-85.2381410	LATV	40.6629316	LONV	-72.6204803	ELRLH	-87.3084806	AZRLN	75.6811529	GMT	36.00000(
VDR	-646.495203	RB1	27.3100000	DVDR	-26.5260804	VCAL	554.125858	BANK	-4.62606390	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	12.5799480	BETA	1.69269757	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.749711	RGR	51571.4899		
TC1	36.3000000	H	11127.9497	MACH	0.611791915	Q	364.988293	RANG	2.39278178	VAMI	656.397822	ALFA	-1.335739)
MAYB	-234568.963	GAMA	-85.5105568	LATV	40.6629453	LONV	-72.6204183	ELRLH	-87.0699940	AZRLN	75.3106970	GMT	36.30000(
VDR	-654.383845	RB1	27.3100000	DVDR	-26.0613538	VCAL	562.451753	BANK	-4.25521180	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	12.3695078	BETA	1.64312765	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.729892	RGR	51524.0536		
TC1	36.6000000	H	10930.4843	MACH	0.618429711	Q	375.839004	RANG	2.39552766	VAMI	664.006611	ALFA	-.8411444:
MAYB	-142278.776	GAMA	-85.6895890	LATV	40.6629579	LONV	-72.6203604	ELRLH	-86.7522857	AZRLN	74.8999142	GMT	36.60000(
VDR	-662.128464	RB1	27.3100000	DVDR	-25.5530327	VCAL	570.788642	BANK	-3.84418745	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	12.1560480	BETA	1.60523987	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.711365	RGR	51477.1549		
TC1	36.9000000	H	10730.7187	MACH	0.624975653	Q	386.839784	RANG	2.39815480	VAMI	671.532535	ALFA	-.3764561:
MAYB	-45706.2990	GAMA	-85.7776927	LATV	40.6629698	LONV	-72.6203049	ELRLH	-86.3851950	AZRLN	74.5145713	GMT	36.90000(
VDR	-669.709920	RB1	27.3100000	DVDR	-24.9861978	VCAL	579.111055	BANK	-3.45870026	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	11.9396463	BETA	1.61612780	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.693619	RGR	51430.6995		
TC1	37.2000000	H	10528.7041	MACH	0.631439726	Q	398.002299	RANG	2.40073900	VAMI	678.986139	ALFA	-.0181445:
MAYB	36579.9539	GAMA	-85.7497741	LATV	40.6629815	LONV	-72.6202503	ELRLH	-86.0001116	AZRLN	74.1862928	GMT	37.20000(
VDR	-677.118854	RB1	27.3100000	DVDR	-24.4062589	VCAL	587.427608	BANK	-3.13031441	OMXB	0.0000E+00	D0MXB	0.0000E+(
ELR	11.7203837	BETA	1.62272558	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.676152	RGR	51384.5962		
TC1	37.5000000	H	10324.4917	MACH	0.637815177	Q	409.317556	RANG	2.40334233	VAMI	686.359980	ALFA	0.2364256:

MAYB	101668.931	GAMA	-85.6341564	LATV	40.6629932	LONV	-72.6201953	ELRLH	-85.6243739	AZRLN	73.9219310	GMT	37.50000(
VDR	-684.368377	RB1	27.3100000	DVDR	-23.9281907	VCAL	595.730968	BANK	-2.86582911	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	11.4983342	BETA	1.62496805	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.658551	RGR	51338.7769		
TC1	37.8000000	H	10118.1261	MACH	0.644102496	Q	420.785416	RANG	2.40601136	VAMI	693.654400	ALFA	0.39491731
MAYB	148236.490	GAMA	-85.4580376	LATV	40.6630053	LONV	-72.6201390	ELRLH	-85.2798086	AZRLN	73.7169744	GMT	37.80000(
VDR	-691.476051	RB1	27.3100000	DVDR	-23.4586835	VCAL	604.020700	BANK	-2.66069055	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	11.2735576	BETA	1.62278461	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.640509	RGR	51293.1984		
TC1	38.1000000	H	9909.64971	MACH	0.650243356	Q	432.327527	RANG	2.40877742	VAMI	700.806349	ALFA	0.51722716
MAYB	189216.525	GAMA	-85.2944002	LATV	40.6630178	LONV	-72.6200806	ELRLH	-84.9823048	AZRLN	73.5633259	GMT	38.10000(
VDR	-698.444193	RB1	27.3100000	DVDR	-22.9855783	VCAL	612.239476	BANK	-2.50677043	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	11.0461047	BETA	1.61115336	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.621815	RGR	51247.8427		
TC1	38.4000000	H	9699.10525	MACH	0.656218304	Q	443.912601	RANG	2.41166620	VAMI	707.794501	ALFA	0.60630236
MAYB	224109.934	GAMA	-85.1583241	LATV	40.6630311	LONV	-72.6200196	ELRLH	-84.7452819	AZRLN	73.4542794	GMT	38.40000(
VDR	-705.268899	RB1	27.3100000	DVDR	-22.5219457	VCAL	620.366791	BANK	-2.39733613	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	10.8160241	BETA	1.59170846	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.602301	RGR	51202.7013		
TC1	38.7000000	H	9486.53425	MACH	0.662081627	Q	455.608900	RANG	2.41469749	VAMI	714.677055	ALFA	0.60666185
MAYB	235009.312	GAMA	-85.0055766	LATV	40.6630450	LONV	-72.6199557	ELRLH	-84.5803799	AZRLN	73.3853359	GMT	38.70000(
VDR	-711.963553	RB1	27.3100000	DVDR	-22.1198086	VCAL	628.453708	BANK	-2.32786547	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	10.5833610	BETA	1.57228682	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.581833	RGR	51157.7752		
TC1	39.0000000	H	9271.97293	MACH	0.667827400	Q	467.405441	RANG	2.41787483	VAMI	721.447352	ALFA	0.53953743
MAYB	224925.512	GAMA	-84.8606989	LATV	40.6630598	LONV	-72.6198888	ELRLH	-84.4918871	AZRLN	73.3519571	GMT	39.00000(
VDR	-718.547030	RB1	27.3100000	DVDR	-21.7796562	VCAL	636.493220	BANK	-2.29381119	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	10.3481487	BETA	1.55288018	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.560387	RGR	51113.0918		
TC1	39.3000000	H	9055.45192	MACH	0.673450582	Q	479.291931	RANG	2.42118782	VAMI	728.099674	ALFA	0.42674745
MAYB	198099.063	GAMA	-84.7423843	LATV	40.6630752	LONV	-72.6198190	ELRLH	-84.4771432	AZRLN	73.3499122	GMT	39.30000(
VDR	-725.036381	RB1	27.3100000	DVDR	-21.4894730	VCAL	644.479128	BANK	-2.29094720	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	10.1104102	BETA	1.53347858	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.538033	RGR	51068.7011		
TC1	39.6000000	H	8836.99760	MACH	0.678926647	Q	491.229371	RANG	2.42461650	VAMI	734.607203	ALFA	0.32467559
MAYB	171864.256	GAMA	-84.6780756	LATV	40.6630913	LONV	-72.6197468	ELRLH	-84.5281771	AZRLN	73.3754467	GMT	39.60000(
VDR	-731.440517	RB1	27.3100000	DVDR	-21.2014936	VCAL	652.385965	BANK	-2.31553397	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	9.87016135	BETA	1.59309124	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.514903	RGR	51024.6682		
TC1	39.9000000	H	8616.63562	MACH	0.684262498	Q	503.222564	RANG	2.42814058	VAMI	740.977071	ALFA	0.21837312
MAYB	141174.767	GAMA	-84.6579716	LATV	40.6631078	LONV	-72.6196727	ELRLH	-84.6360474	AZRLN	73.4262978	GMT	39.90000(
VDR	-737.758766	RB1	27.3100000	DVDR	-20.9218702	VCAL	660.218994	BANK	-2.36532576	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	9.62741823	BETA	1.67559137	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.491130	RGR	50981.0585		
TC1	40.2000000	H	8394.39111	MACH	0.689461979	Q	515.272281	RANG	2.43173872	VAMI	747.213105	ALFA	0.10829425
MAYB	104297.190	GAMA	-84.6795776	LATV	40.6631247	LONV	-72.6195970	ELRLH	-84.7909084	AZRLN	73.5010469	GMT	40.20000(
VDR	-743.993895	RB1	27.3100000	DVDR	-20.6447963	VCAL	667.980530	BANK	-2.43892296	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	9.38219725	BETA	1.75298942	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.466856	RGR	50937.9389		
TC1	40.5000000	H	8170.28895	MACH	0.694524153	Q	527.372287	RANG	2.43538771	VAMI	753.313957	ALFA	0.00594801
MAYB	67650.9903	GAMA	-84.7423405	LATV	40.6631419	LONV	-72.6195202	ELRLH	-84.9809282	AZRLN	73.5979837	GMT	40.50000(
VDR	-750.144529	RB1	27.3100000	DVDR	-20.3566947	VCAL	675.668157	BANK	-2.53463806	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	9.13451521	BETA	1.82485284	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.442235	RGR	50895.3793		

TC1	40.8000000	H	7944.35441	MACH	0.699467427	Q	539.545964	RANG	2.43906500	VAMI	759.299263	ALFA	-.09682012
MAYB	29198.9003	GAMA	-84.8320570	LATV	40.6631592	LONV	-72.6194429	ELRLH	-85.1941175	AZRLN	73.7152130	GMT	40.80000(
VDR	-756.212675	RB1	27.3100000	DVDR	-20.1095948	VCAL	683.298794	BANK	-2.65059928	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	8.88439088	BETA	1.87456077	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.417417	RGR	50853.4481		
TC1	41.1000000	H	7716.60988	MACH	0.704325001	Q	551.841594	RANG	2.44274606	VAMI	765.204799	ALFA	-.21732733
MAYB	-17621.7554	GAMA	-84.9309247	LATV	40.6631765	LONV	-72.6193654	ELRLH	-85.4177750	AZRLN	73.8495904	GMT	41.10000(
VDR	-762.212007	RB1	27.3100000	DVDR	-19.8759054	VCAL	690.904522	BANK	-2.78368712	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	8.63184063	BETA	1.87176825	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.392566	RGR	50812.2163		
TC1	41.4000000	H	7487.07678	MACH	0.709061223	Q	564.201037	RANG	2.44640294	VAMI	770.991591	ALFA	-.29727358
MAYB	-49964.2412	GAMA	-85.0640993	LATV	40.6631937	LONV	-72.6192885	ELRLH	-85.6371568	AZRLN	73.9947818	GMT	41.40000(
VDR	-768.132430	RB1	27.3100000	DVDR	-19.5845390	VCAL	698.448451	BANK	-2.92759627	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	8.37688020	BETA	1.86820273	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.367866	RGR	50771.7605		
TC1	41.7000000	H	7255.78112	MACH	0.713678010	Q	576.623177	RANG	2.45001535	VAMI	776.661401	ALFA	-.33989506
MAYB	-68231.1685	GAMA	-85.2179178	LATV	40.6632106	LONV	-72.6192124	ELRLH	-85.8412830	AZRLN	74.1439045	GMT	41.70000(
VDR	-773.957826	RB1	27.3100000	DVDR	-19.2442167	VCAL	705.931130	BANK	-3.07546595	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	8.11953415	BETA	1.86382172	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.343454	RGR	50732.1444		
TC1	42.0000000	H	7022.75336	MACH	0.718177846	Q	589.107794	RANG	2.45357168	VAMI	782.216598	ALFA	-.35157967
MAYB	-74267.0379	GAMA	-85.3801856	LATV	40.6632272	LONV	-72.6191376	ELRLH	-86.0237712	AZRLN	74.2906728	GMT	42.00000(
VDR	-779.675242	RB1	27.3100000	DVDR	-18.8667018	VCAL	713.353638	BANK	-3.22102311	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	7.85983574	BETA	1.85858142	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.319407	RGR	50693.4177		
TC1	42.3000000	H	6788.02752	MACH	0.722560818	Q	601.650713	RANG	2.45706837	VAMI	787.656930	ALFA	-.33048926
MAYB	-66626.6952	GAMA	-85.5419138	LATV	40.6632434	LONV	-72.6190639	ELRLH	-86.1824323	AZRLN	74.4303396	GMT	42.30000(
VDR	-785.273845	RB1	27.3100000	DVDR	-18.4535992	VCAL	720.714591	BANK	-3.35952517	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	7.59782536	BETA	1.87561641	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.295749	RGR	50655.6163		
TC1	42.6000000	H	6551.64054	MACH	0.726830643	Q	614.253689	RANG	2.46050966	VAMI	792.986090	ALFA	-.29734639
MAYB	-53516.6073	GAMA	-85.6926620	LATV	40.6632593	LONV	-72.6189914	ELRLH	-86.3191577	AZRLN	74.5610907	GMT	42.60000(
VDR	-790.746319	RB1	27.3100000	DVDR	-18.0284672	VCAL	728.016262	BANK	-3.48915435	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	7.33354951	BETA	1.89352281	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.272452	RGR	50618.7632		
TC1	42.9000000	H	6313.63070	MACH	0.730987697	Q	626.912948	RANG	2.46390381	VAMI	798.204128	ALFA	-.26053496
MAYB	-38335.0287	GAMA	-85.8295760	LATV	40.6632750	LONV	-72.6189198	ELRLH	-86.4380533	AZRLN	74.6836699	GMT	42.90000(
VDR	-796.090603	RB1	27.3100000	DVDR	-17.6000358	VCAL	735.257518	BANK	-3.61064644	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	7.06705773	BETA	1.90970998	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.249462	RGR	50582.8741		
TC1	43.2000000	H	6074.03657	MACH	0.735031498	Q	639.623107	RANG	2.46726048	VAMI	803.310150	ALFA	-.22548220
MAYB	-23413.2221	GAMA	-85.9524352	LATV	40.6632904	LONV	-72.6188490	ELRLH	-86.5439907	AZRLN	74.8006094	GMT	43.20000(
VDR	-801.306532	RB1	27.3100000	DVDR	-17.1734529	VCAL	742.436323	BANK	-3.72652413	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	6.79840066	BETA	1.92411998	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.226714	RGR	50547.9622		
TC1	43.5000000	H	5832.89652	MACH	0.738953413	Q	652.364194	RANG	2.47058902	VAMI	808.294339	ALFA	-.20428739
MAYB	-14246.0179	GAMA	-86.0725540	LATV	40.6633056	LONV	-72.6187788	ELRLH	-86.6417529	AZRLN	74.9155075	GMT	43.50000(
VDR	-806.396127	RB1	27.3100000	DVDR	-16.7606688	VCAL	749.542185	BANK	-3.84037633	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	6.52762902	BETA	1.89571168	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.204146	RGR	50514.0405		
TC1	43.8000000	H	5590.24781	MACH	0.742758218	Q	665.139255	RANG	2.47389563	VAMI	813.161520	ALFA	-.19121634
MAYB	-8490.28759	GAMA	-86.1890487	LATV	40.6633207	LONV	-72.6187091	ELRLH	-86.7346050	AZRLN	75.0312847	GMT	43.80000(
VDR	-811.363443	RB1	27.3100000	DVDR	-16.3553129	VCAL	756.578411	BANK	-3.95511696	OMXB	0.0000E+00	DOMXB	0.0000E+(
ELR	6.25479201	BETA	1.84790446	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.181717	RGR	50481.1267		

TC1	44.1000000	H	5346.12696	MACH	0.746449198	Q	677.948984	RANG	2.47718410	VAMI	817.914903	ALFA	-.1823032
MAYB	-4483.15822	GAMA	-86.2995503	LATV	40.6633357	LONV	-72.6186397	ELRLH	-86.8244873	AZRLN	75.1499782	GMT	44.10000
VDR	-816.209642	RB1	27.3100000	DVDR	-15.9532101	VCAL	763.546820	BANK	-4.07277956	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	5.97993796	BETA	1.79904460	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.159401	RGR	50449.2418		
TC1	44.4000000	H	5100.57018	MACH	0.750026067	Q	690.787680	RANG	2.48045709	VAMI	822.553787	ALFA	-.1772462
MAYB	-2169.32488	GAMA	-86.4055520	LATV	40.6633506	LONV	-72.6185706	ELRLH	-86.9127569	AZRLN	75.2733512	GMT	44.40000
VDR	-820.935666	RB1	27.3100000	DVDR	-15.5540636	VCAL	770.445536	BANK	-4.19512449	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	5.70311520	BETA	1.74914201	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.137183	RGR	50418.4084		
TC1	44.7000000	H	4853.61342	MACH	0.753469825	Q	703.614525	RANG	2.48371630	VAMI	827.056925	ALFA	-.1717028
MAYB	446.497924	GAMA	-86.5316436	LATV	40.6633654	LONV	-72.6185018	ELRLH	-87.0002491	AZRLN	75.4028272	GMT	44.70000
VDR	-825.542056	RB1	27.3100000	DVDR	-15.1549630	VCAL	777.253026	BANK	-4.32357359	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	5.42437219	BETA	1.65031790	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.115049	RGR	50388.6498		
TC1	45.0000000	H	4605.29255	MACH	0.756794319	Q	716.448785	RANG	2.48696324	VAMI	831.439077	ALFA	-.1735108
MAYB	-429.137071	GAMA	-86.6631726	LATV	40.6633802	LONV	-72.6184332	ELRLH	-87.0876861	AZRLN	75.5399637	GMT	45.00000
VDR	-830.029464	RB1	27.3100000	DVDR	-14.7624250	VCAL	783.982069	BANK	-4.45968303	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	5.14375785	BETA	1.51823508	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.092990	RGR	50359.9892		
TC1	45.3000000	H	4355.64291	MACH	0.760013821	Q	729.311825	RANG	2.49019751	VAMI	835.715523	ALFA	-.1829881
MAYB	-5092.11516	GAMA	-86.7848622	LATV	40.6633948	LONV	-72.6183649	ELRLH	-87.1749347	AZRLN	75.6852496	GMT	45.30000
VDR	-834.400091	RB1	27.3100000	DVDR	-14.3757143	VCAL	790.646092	BANK	-4.60394182	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	4.86132084	BETA	1.38661999	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.071009	RGR	50332.4523		
TC1	45.6000000	H	4104.69932	MACH	0.763127748	Q	742.197454	RANG	2.49341619	VAMI	839.885244	ALFA	-.1960015
MAYB	-11636.9604	GAMA	-86.8985852	LATV	40.6634093	LONV	-72.6182970	ELRLH	-87.2606060	AZRLN	75.8370192	GMT	45.60000
VDR	-838.655093	RB1	27.3100000	DVDR	-13.9910429	VCAL	797.242969	BANK	-4.75468716	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	4.57710947	BETA	1.25608962	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.049126	RGR	50306.0685		
TC1	45.9000000	H	3852.49641	MACH	0.766145349	Q	755.118668	RANG	2.49661512	VAMI	843.958048	ALFA	-.2070769
MAYB	-17366.6559	GAMA	-86.9909590	LATV	40.6634237	LONV	-72.6182294	ELRLH	-87.3426519	AZRLN	75.9918371	GMT	45.90000
VDR	-842.794452	RB1	27.3100000	DVDR	-13.6032186	VCAL	803.781027	BANK	-4.90848785	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	4.29117241	BETA	1.17938064	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.027368	RGR	50280.8682		
TC1	46.2000000	H	3599.06908	MACH	0.769056739	Q	768.051052	RANG	2.49979068	VAMI	847.922675	ALFA	-.2108297
MAYB	-19500.7038	GAMA	-87.0728461	LATV	40.6634380	LONV	-72.6181623	ELRLH	-87.4192313	AZRLN	76.1457217	GMT	46.20000
VDR	-846.816363	RB1	27.3100000	DVDR	-13.2086833	VCAL	810.248279	BANK	-5.06136592	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	4.00355955	BETA	1.14000986	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	177.005760	RGR	50256.8808		
TC1	46.5000000	H	3344.45282	MACH	0.771854075	Q	780.973134	RANG	2.50294144	VAMI	851.770077	ALFA	-.2093867
MAYB	-18995.1440	GAMA	-87.1536896	LATV	40.6634521	LONV	-72.6180957	ELRLH	-87.4895362	AZRLN	76.2959031	GMT	46.50000
VDR	-850.719272	RB1	27.3100000	DVDR	-12.8102374	VCAL	816.634771	BANK	-5.21055322	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	3.71432244	BETA	1.10042972	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	176.984312	RGR	50234.1309		
TC1	46.8000000	H	3088.68348	MACH	0.774538178	Q	793.880210	RANG	2.50606772	VAMI	855.500739	ALFA	-.2047784
MAYB	-16813.3013	GAMA	-87.2316116	LATV	40.6634661	LONV	-72.6180296	ELRLH	-87.5536472	AZRLN	76.4410865	GMT	46.80000
VDR	-854.502316	RB1	27.3100000	DVDR	-12.4098859	VCAL	822.939732	BANK	-5.35475471	OMXB	0.0000E+00	DOMXB	0.0000E+
ELR	3.42351392	BETA	1.06064035	MAZB	0.0000E+00	MAXB	0.0000E+00	AZR	176.963020	RGR	50212.6399		
TC1	47.1000000	H	2831.79686	MACH	0.777131939	Q	806.813347	RANG	2.50916985	VAMI	859.139545	ALFA	-.2390724
MAYB	-35210.9738	GAMA	-87.2754341	LATV	40.6634800	LONV	-72.6179640	ELRLH	-87.6118429	AZRLN	76.5803843	GMT	47.10000
VDR	-858.168361	RB1	27.3100000	DVDR	-12.0397630	VCAL	829.186207	BANK	-5.49308249	OMXB	0.0000E+00	DOMXB	0.0000E+

```
 ELR     3.13118739 BETA  0.989618900 MAZB    0.0000E+00 MAXB    0.0000E+00 AZR     176.941885 RGR     50192.4284

 TC1     47.4000000 H      2573.82655 MACH  0.779623214 Q      819.742273 RANG    2.51223697 VAMI    862.672705 ALFA   -.2704252
 MAYB   -52392.6955 GAMA  -87.3139602 LATV   40.6634936 LONV  -72.6178991 ELRLH  -87.6594993 AZRLN   76.7011500 GMT    47.40000
 VDR    -861.724907 RB1    27.3100000 DVDR  -11.6672075 VCAL   835.359675 BANK    -5.61289944 OMXB    0.0000E+00 D0MXB  0.0000E+
 ELR     2.83739318 BETA  0.904889369 MAZB    0.0000E+00 MAXB    0.0000E+00 AZR     176.920977 RGR     50173.5345

 TC1     47.7000000 H      2314.80599 MACH  0.782002241 Q      832.640365 RANG    2.51525714 VAMI    866.089018 ALFA   -.2785746
 MAYB   -57384.3088 GAMA  -87.3560202 LATV   40.6635069 LONV  -72.6178352 ELRLH  -87.6907462 AZRLN   76.7860049 GMT    47.70000
 VDR    -865.167027 RB1    27.3100000 DVDR  -11.2780477 VCAL   841.448025 BANK    -5.69683892 OMXB    0.0000E+00 D0MXB  0.0000E+
 ELR     2.54218233 BETA  0.823497214 MAZB    0.0000E+00 MAXB    0.0000E+00 AZR     176.900378 RGR     50155.9975

 TC1     48.0000000 H      2054.77014 MACH  0.784271447 Q      845.506054 RANG    2.51822645 VAMI    869.390746 ALFA   -.2709336
 MAYB   -53821.6234 GAMA  -87.3926589 LATV   40.6635200 LONV  -72.6177723 ELRLH  -87.7035760 AZRLN   76.8266266 GMT    48.00000
 VDR    -868.490708 RB1    27.3100000 DVDR  -10.8785730 VCAL   847.452259 BANK    -5.73658283 OMXB    0.0000E+00 D0MXB  0.0000E+
 ELR     2.24560925 BETA  0.745498658 MAZB    0.0000E+00 MAXB    0.0000E+00 AZR     176.880113 RGR     50139.8428

 TC1     48.3000000 H      1793.75514 MACH  0.786412687 Q      858.292940 RANG    2.52114803 VAMI    872.557330 ALFA   -.2280059
 MAYB   -30608.9782 GAMA  -87.4467679 LATV   40.6635328 LONV  -72.6177105 ELRLH  -87.6992874 AZRLN   76.8245591 GMT    48.30000
 VDR    -871.691111 RB1    27.3100000 DVDR  -10.4540561 VCAL   853.350913 BANK    -5.73367256 OMXB    0.0000E+00 D0MXB  0.0000E+
 ELR     1.94773088 BETA  0.657581646 MAZB    0.0000E+00 MAXB    0.0000E+00 AZR     176.860162 RGR     50125.0831

 TC1     48.6000000 H      1531.79894 MACH  0.788446280 Q      871.037466 RANG    2.52403573 VAMI    875.610847 ALFA   -.1923918
 MAYB   -11023.8883 GAMA  -87.4802914 LATV   40.6635454 LONV  -72.6176493 ELRLH  -87.6841700 AZRLN   76.7956086 GMT    48.60000
 VDR    -874.764270 RB1    27.3100000 DVDR  -10.0358567 VCAL   859.164403 BANK    -5.70390165 OMXB    0.0000E+00 D0MXB  0.0000E+
 ELR     1.64860723 BETA  0.569812143 MAZB    0.0000E+00 MAXB    0.0000E+00 AZR     176.840433 RGR     50111.7131

 TC1     48.9000000 H      1268.93927 MACH  0.790376736 Q      883.742746 RANG    2.52690295 VAMI    878.555878 ALFA   -.1718499
 MAYB    456.419868 GAMA  -87.4913396 LATV   40.6635579 LONV  -72.6175885 ELRLH  -87.6648050 AZRLN   76.7566870 GMT    48.90000
 VDR    -877.713885 RB1    27.3100000 DVDR  -9.63021718 VCAL   864.896045 BANK    -5.66416853 OMXB    0.0000E+00 D0MXB  0.0000E+
 ELR     1.34829797 BETA  0.486016011 MAZB    0.0000E+00 MAXB    0.0000E+00 AZR     176.820835 RGR     50099.7273

 TC1     49.0922864 H      1100.00000 MACH  0.791559384 Q      891.861502 RANG    2.52873376 VAMI    880.385765 ALFA   -.1651585
 MAYB    4249.07449 GAMA  -87.4900362 LATV   40.6635659 LONV  -72.6175497 ELRLH  -87.6520998 AZRLN   76.7313799 GMT    49.09228
 VDR    -879.541142 RB1    27.3100000 DVDR  -9.37606094 VCAL   868.525495 BANK    -5.63834205 OMXB    0.0000E+00 D0MXB  0.0000E+
 ELR     1.15521681 BETA  0.434510221 MAZB    0.0000E+00 MAXB    0.0000E+00 AZR     176.808318 RGR     50092.7739

-------------------------------------------------------------------------------------------------------------
    EVENT ESN   30                                                    DATE / TIME   15-03-04  13:36:12
    TIME =      49.092          TYPE = PRIMARY-ORDERED          CASE = 1.      CP =  0.281   CYCLES =   495.
          EVENT CAUSED BY
+                                    H      =  1.10000000E+03                  TG MODEL - G1
-------------------------------------------------------------------------------------------------------------

 TC1     49.0922864 H      1100.00000 MACH  0.791559384 Q      891.861502 RANG    2.52873376 VAMI    880.385765 ALFA   0.1590E-1
 MAYB   -376900.517 GAMA  -87.4900362 LATV   40.6635659 LONV  -72.6175497 ELRLH  -87.4900362 AZRLN   66.4316943 GMT    49.09228
 VDR    -879.541142 RB1    27.3100000 DVDR  -15.6833891 VCAL   868.525495 BANK    0.4665E-12 OMXB    0.0000E+00 D0MXB  0.0000E+
 ELR     1.15521681 BETA  -0.1590E-13 MAZB    0.0000E+00 MAXB    0.0000E+00 AZR     176.808318 RGR     50092.7739

 TC1     49.0922864 H      1100.00000 MACH  0.791559384 Q      891.861502 RANG    2.52873376 VAMI    880.385765 ALFA   0.1590E-1
 MAYB    0.0000E+00 GAMA  -87.4900362 LATV   40.6635659 LONV  -72.6175497 ELRLH  -87.4900362 AZRLN   66.4316943 GMT    49.09228
```

```
VDR   -879.541142 RB1    27.3100000 DVDR  -15.6833996 VCAL   868.525495 BANK   0.4665E-12 OMXB   0.0000E+00 DOMXB  0.0000E+(
ELR    1.15521681 BETA  -0.1590E-13 MAZB    0.0000E+00 MAXB   0.0000E+00 AZR    176.808318 RGR    50092.7739
```

EVENT ESN 40
TIME = 49.092 TYPE = PRIMARY-ORDERED DATE / TIME 15-03-04 13:36:12
CASE = 1. CP = 0.281 CYCLES = 495.
EVENT CAUSED BY
TDURP = 0.00000000E+00 TG MODEL - G1

```
TC1    49.0922864 H      1100.00000 MACH  0.791559384 Q      891.861502 RANG   2.52873376 VAMI   880.385765 ALFA   0.1590E-1
MAYB    0.0000E+00 GAMA  -87.4900362 LATV   40.6635659 LONV  -72.6175497 ELRLH -87.4900362 AZRLN  66.4316943 GMT    49.09228(
VDR   -879.541142 RB1    27.3100000 DVDR  -15.6833996 VCAL   868.525495 BANK   0.4665E-12 OMXB   0.0000E+00 DOMXB  0.0000E+(
ELR    1.15521681 BETA  -0.1590E-13 MAZB    0.0000E+00 MAXB   0.0000E+00 AZR    176.808318 RGR    50092.7739

TC1    49.2000000 H      1005.17611 MACH  0.792813010 Q      897.781896 RANG   2.52975749 VAMI   882.069631 ALFA  -0.1217E-(
MAYB    0.0000E+00 GAMA  -87.4893670 LATV   40.6635703 LONV  -72.6175280 ELRLH -87.4893670 AZRLN  67.1055861 GMT    49.20000(
VDR   -881.222941 RB1    27.3100000 DVDR  -15.5438684 VCAL   871.216603 BANK   0.2332E-12 OMXB   0.0000E+00 DOMXB  0.0000E+(
ELR    1.04681931 BETA  -0.3222E-07 MAZB    0.0000E+00 MAXB   0.0000E+00 AZR    176.801318 RGR    50089.1285

TC1    49.5000000 H       740.130469 MACH  0.796210185 Q      914.258969 RANG   2.53260207 VAMI   886.661604 ALFA   0.4612E-1
MAYB    0.0000E+00 GAMA  -87.5150366 LATV   40.6635826 LONV  -72.6174677 ELRLH -87.5150366 AZRLN  67.2040982 GMT    49.50000(
VDR   -885.827818 RB1    27.3100000 DVDR  -15.1551833 VCAL   878.640337 BANK   0.0000E+00 OMXB   0.0000E+00 DOMXB  0.0000E+(
ELR    0.743753746 BETA  -0.1495E-12 MAZB    0.0000E+00 MAXB   0.0000E+00 AZR    176.781859 RGR    50079.9294

TC1    49.8000000 H       473.720748 MACH  0.799493119 Q      930.768390 RANG   2.53543671 VAMI   891.136641 ALFA   0.3976E-1
MAYB    0.0000E+00 GAMA  -87.5408615 LATV   40.6635949 LONV  -72.6174076 ELRLH -87.5408615 AZRLN  67.2678904 GMT    49.80000(
VDR   -890.315972 RB1    27.3100000 DVDR  -14.7657205 VCAL   885.984800 BANK  -0.2381E-12 OMXB   0.0000E+00 DOMXB  0.0000E+(
ELR    0.439024130 BETA  -0.8906E-13 MAZB    0.0000E+00 MAXB   0.0000E+00 AZR    176.762457 RGR    50072.1523

TC1    50.1000000 H       205.981997 MACH  0.802662353 Q      947.304568 RANG   2.53826128 VAMI   895.494918 ALFA   0.4930E-1
MAYB    0.0000E+00 GAMA  -87.5662713 LATV   40.6636070 LONV  -72.6173476 ELRLH -87.5662713 AZRLN  67.3320841 GMT    50.10000(
VDR   -894.687187 RB1    27.3100000 DVDR  -14.3756193 VCAL   893.248932 BANK   0.1203E-12 OMXB   0.0000E+00 DOMXB  0.0000E+(
ELR    0.132687350 BETA  -0.1050E-12 MAZB    0.0000E+00 MAXB   0.0000E+00 AZR    176.743115 RGR    50065.8200

TC1    50.2629619 H       60.0000000 MACH  0.804336324 Q      956.296050 RANG   2.53979134 VAMI   897.813360 ALFA  -0.1590E-1
MAYB    0.0000E+00 GAMA  -87.5799043 LATV   40.6636135 LONV  -72.6173152 ELRLH -87.5799043 AZRLN  67.3671249 GMT    50.26296(
VDR   -897.012584 RB1    27.3100000 DVDR  -14.1635004 VCAL   897.160684 BANK   0.6048E-12 OMXB   0.0000E+00 DOMXB  0.0000E+(
ELR    -.034369977 BETA  -0.2544E-13 MAZB    0.0000E+00 MAXB   0.0000E+00 AZR    176.732632 RGR    50062.9937
```

EVENT ESN 50
TIME = 50.263 TYPE = PRIMARY-ORDERED DATE / TIME 15-03-04 13:36:12
CASE = 1. CP = 0.281 CYCLES = 510.
EVENT CAUSED BY
H = 6.00000000E+01 TG MODEL - G7

```
TC1    50.2629619 H       60.0000000 MACH  0.804336324 Q      956.296050 RANG   2.53979134 VAMI   897.813360 ALFA  -0.1590E-1
```

```
   MAYB    0.0000E+00 GAMA   -87.5799043 LATV    40.6636135 LONV   -72.6173152 ELRLH -87.5799043 AZRLN   67.3671249 GMT     50.262961
   VDR    -897.012584 RB1     27.3100000 DVDR  -14.1635004 VCAL    897.160684 BANK    0.6048E-12 OMXB    0.0000E+00 DOMXB   0.0000E+(
   ELR    -.034369977 BETA   -0.2544E-13 MAZB    0.0000E+00 MAXB    0.0000E+00 AZR     176.732632 RGR     50062.9937
0NO.  1  TAPE75 ENDS AT TD=    50.263


     EVENT SUMMARY


          VEHICLE NUMBER 1

                          0.000     2
                          0.000     3
                          0.000    10
                          0.000    11
                          0.000    12
                          0.000    13
                         19.212    20
                         49.092    30
                         49.092    40
                         50.263    50


      MAXIMUM NUMBER OF INTEGRATIONS WAS  35 , STORAGE WOULD HAVE ALLOWED(NIV)  50 .
0    BUCKET SIZE FOR THIS CASE       2660

 CONTROL CARD    1.0
 ------------------------------------------- CONTROL CARD  1.00 -------------------------------------
0 BUCKET SIZE REQUESTED IS163841
0 CPU TIME AT CALL TO INP1M =    0.0000
0 CPU TIME AT RETURN FROM INP1M =    0.1094
  CPU TIME USED BY INP1M MODULE =    0.1094
0 CPU TIME AT CALL TO INP2M     =    0.1094
  CPU TIME AT RETURN FROM INP2M =    0.1719
  CPU TIME USED BY INP2M MODULE =    0.0625
 ---- CASE 1. ----
  ESN  2 CASE=  1. AT TD=      0.0
  ESN  2 CASE=  1. AT TD=      0.0
  ESN  3 CASE=  1. AT TD=      0.0
  ESN  3 CASE=  1. AT TD=      0.0
  ESN 10 CASE=  1. AT TD=      0.0
  ESN 10 CASE=  1. AT TD=      0.0
  ESN 11 CASE=  1. AT TD=      0.0
  ESN 11 CASE=  1. AT TD=      0.0
  ESN 12 CASE=  1. AT TD=      0.0
  ESN 12 CASE=  1. AT TD=      0.0
  ESN 13 CASE=  1. AT TD=      0.0
  ESN 13 CASE=  1. AT TD=      0.0
  ESN 20 CASE=  1. AT TD=     19.2
  ESN 20 CASE=  1. AT TD=     19.2
  ESN 30 CASE=  1. AT TD=     49.1
  ESN 30 CASE=  1. AT TD=     49.1
  ESN 40 CASE=  1. AT TD=     49.1
```

```
 ESN 40 CASE=  1. AT TD=     49.1
 ESN 50 CASE=  1. AT TD=     50.3
 ESN 50 CASE=  1. AT TD=     50.3
0 BUCKET SIZE REQUESTED IS163841
0 CPU TIME AT CALL TO INP1M =    0.5469
0 CPU TIME AT RETURN FROM INP1M =    0.5469
  CPU TIME USED BY INP1M MODULE =    0.0000
0 CPU TIME AT CALL TO INP2M     =    0.5469
```

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(b) (3)

NOTE FOR: [redacted]

FROM: [redacted] (b) (6)

DATE: 04-16-97 11:03:16 PM (b) (7) (c)

SUBJECT: Location of Eyewitness [redacted]

(b) (6)
(b) (7) (c)

Interesting development...I used the mapping software to locate the house from which [redacted] observed TWA Flight 800. According to the mapping software, she was in one of the houses over which [redacted] observed the event. So her perspective was almost identical to his, but she saw the "orange ball" fall all the way to the water, followed one to two seconds later by the first boom. Depending on which "first explosion point" we use (831:11.313 PM or 831:07.496 PM), sound would take 54.30 seconds or 55.43 seconds (respectievely) to reach her...corrected for "winds aloft." So the total duration from the first explosion to water impact based on her observations would be between 52.30 seconds and 54.43 seconds. These are the types of numbers we were trying to to obtain for [redacted] but couldn't get because he didn't actually see the aircraft hit the water. (By the way, kinda makes me favor the earlier time for the first explosion...but that's not too important here.)

(b) (6)
(b) (7) (c)

(b) (6)
(b) (7) (c)

Since [redacted] was seated at a known location in the house and first saw the "bright white light" through a specified window, it should be possible to ascertain the approximate azimuth at which her observations began. More importantly, she estimated that her total observation lasted at most about 30 seconds, including five to ten seconds of "bright white light." So there's no time for a missile here unless her time estimate is off by about 100%.

See you when you return from your trip, and we can discuss this in detail. (...unless, of course, Chris Holmes and John Gannon and George Tenet think it's so important that I need to brief it to Kallstrom and Freeh and Clinton before you return.)

[redacted] (b) (3)

(b) (6)
(b) (7) (c)

Interesting footnote: [redacted] was interviewed two days after the disaster, and the report was transcribed a day after that interview.

CC:

APPROVED FOR RELEASE
DATE: JUN 2005

~~FOR OFFICIAL USE ONLY~~

3 MARCH 97

(b) (4)
(b) (6)

[redacted]
Boeing Aircraft Co. (b) (4)
(b) (6)
[redacted]

(b) (4)
(b) (6) [redacted]

This message hopefully fills your request for a problem statement and a definition of the information we would like to obtain. Any further ideas or thoughts you have on the subject would be welcome.

Problem Statement
Define probable motion of the aircraft from the point at which the aircraft lost its nose section. Include as many of the flight relative variables as is practical.

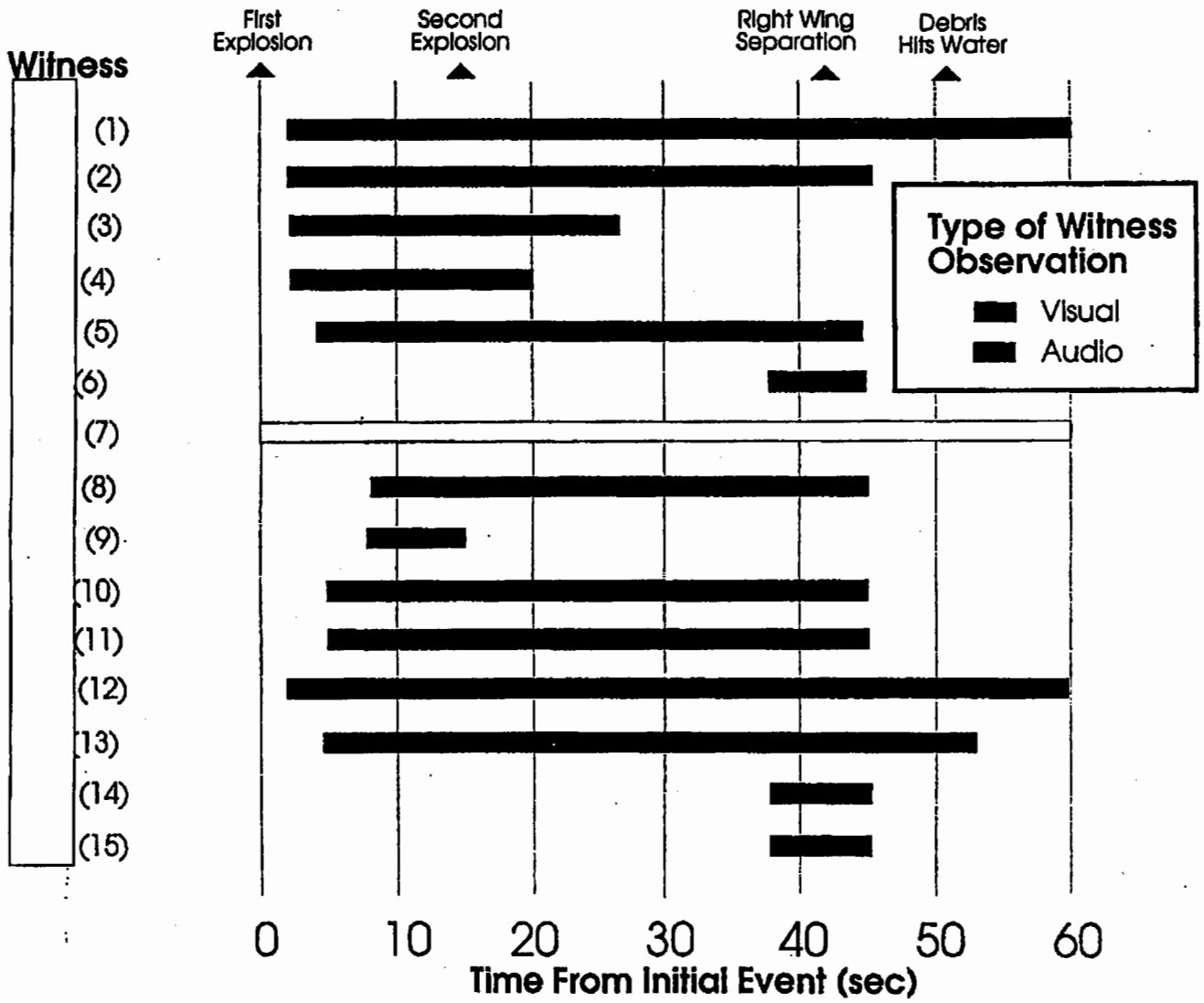
Required ~~Required~~ Input Variables
1) Aerodynamics of the complete aircraft (lift and drag). Any thoughts about the change in the aerodynamics (lift and drag) as a result of loosing the nose would be welcome. (My thought is simply to assume that the lift component is unaffected and the axial component is indexed by a constant amount -- about 0.2 to 0.4 based on fuselage cross-section)
2) Weight, MOI and center of gravity of the aircraft with and without the nose section.
3) Initial conditions (altitude, velocity, position and direction).
4) Accuracy ranges associated with all of the above.

Thanks for your help,

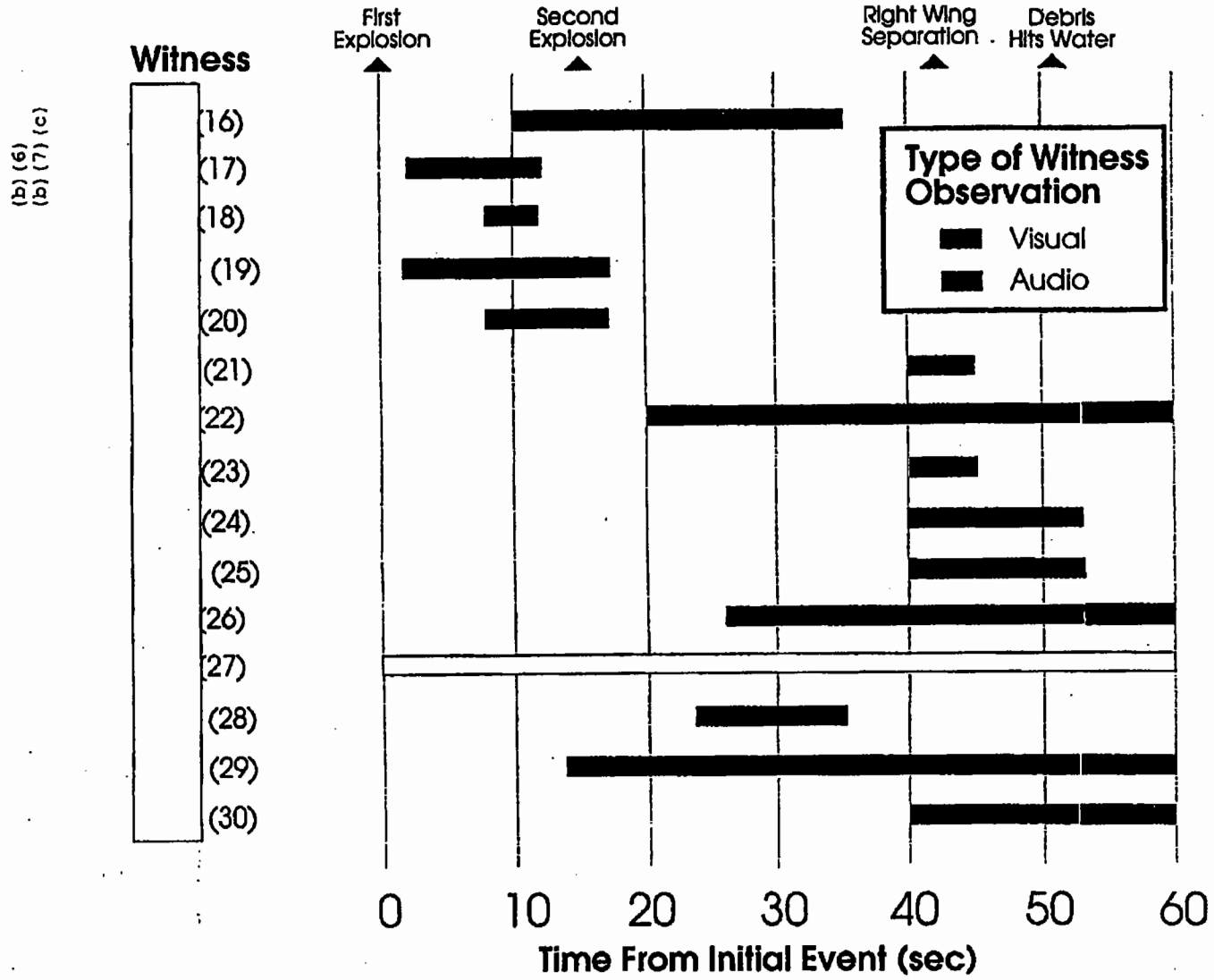
[redacted] (b) (3)

(b)(6)
(b)(7)(c)

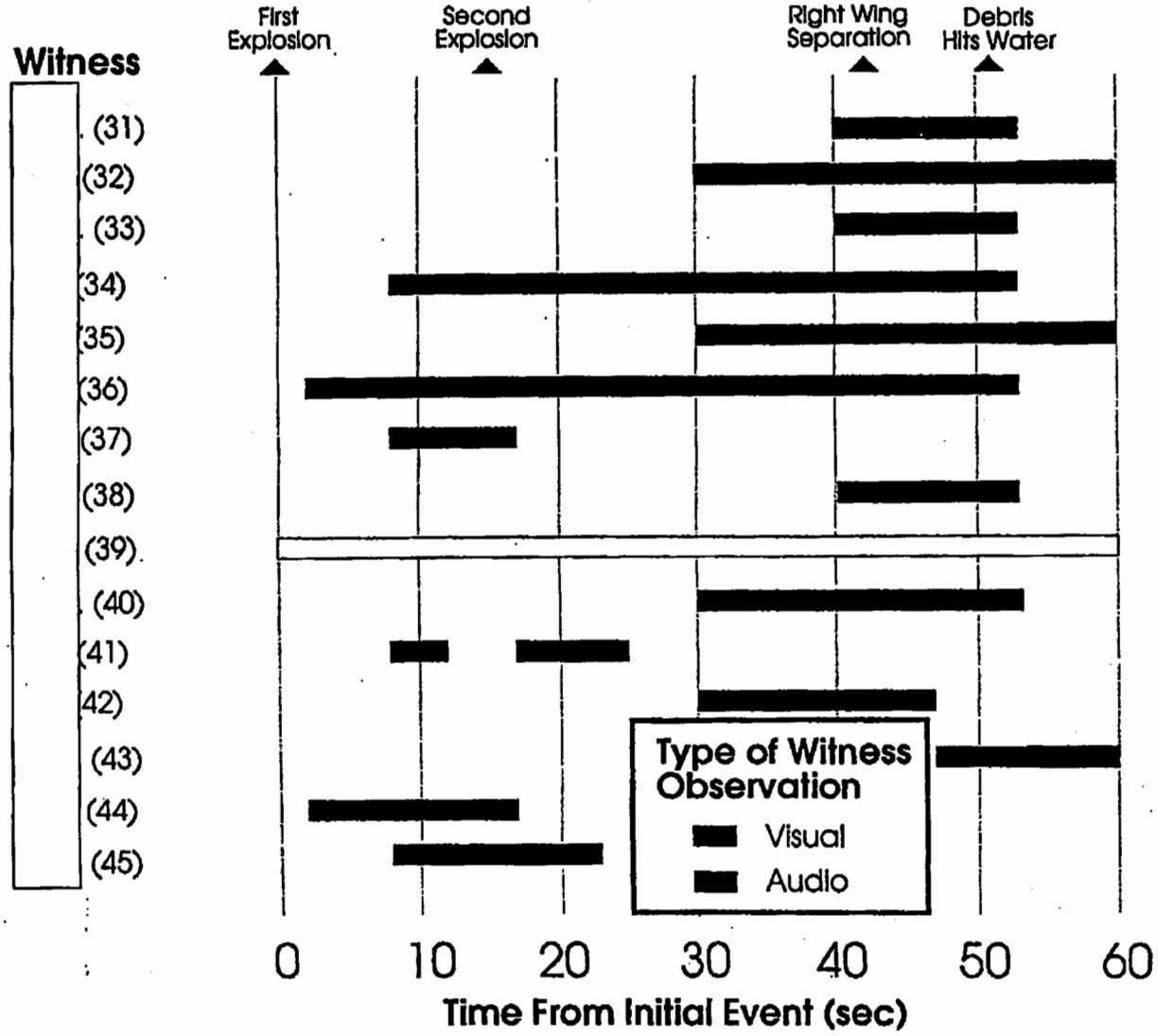
Timeline Of Witness Observations



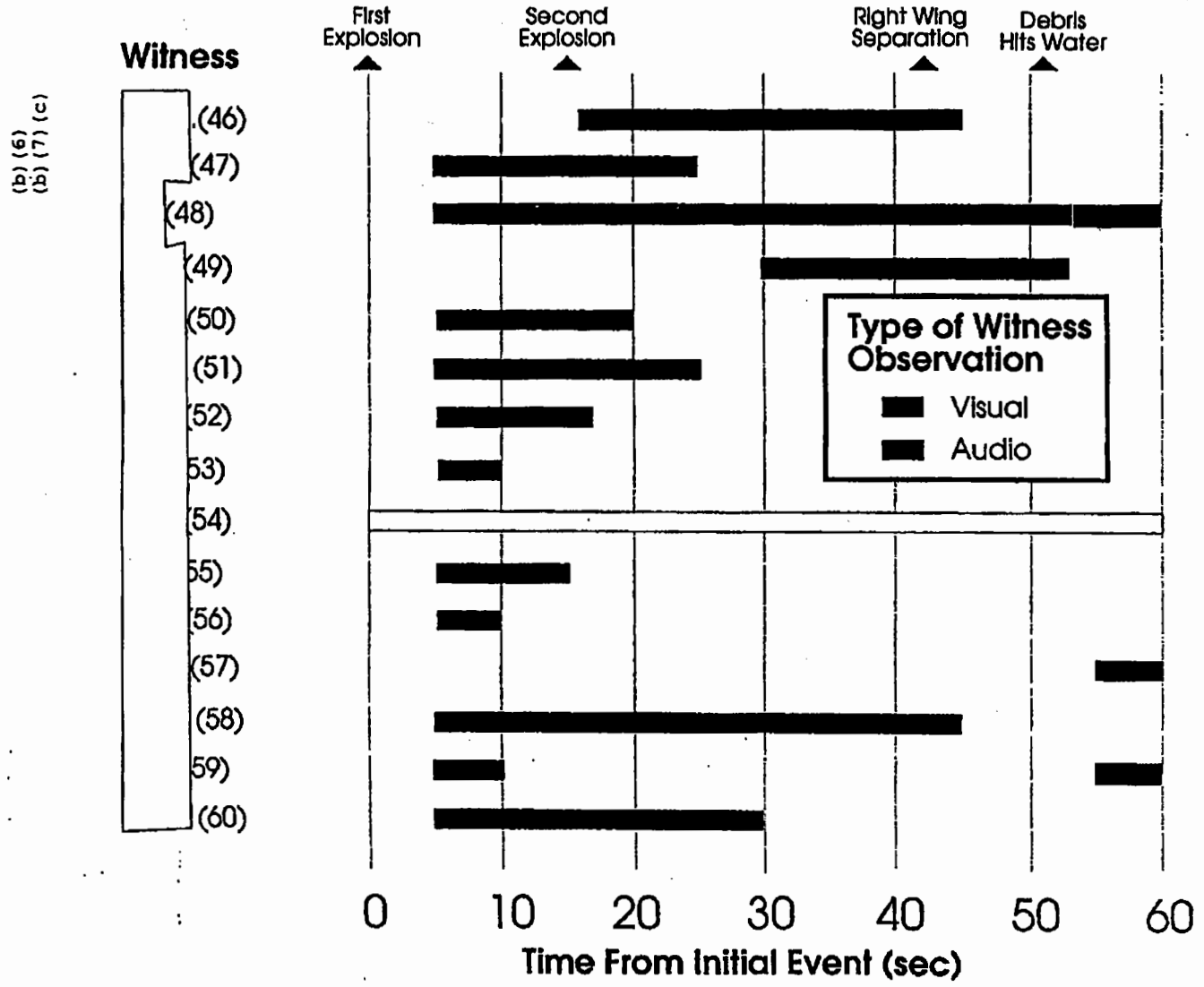
Timeline Of Witness Observations



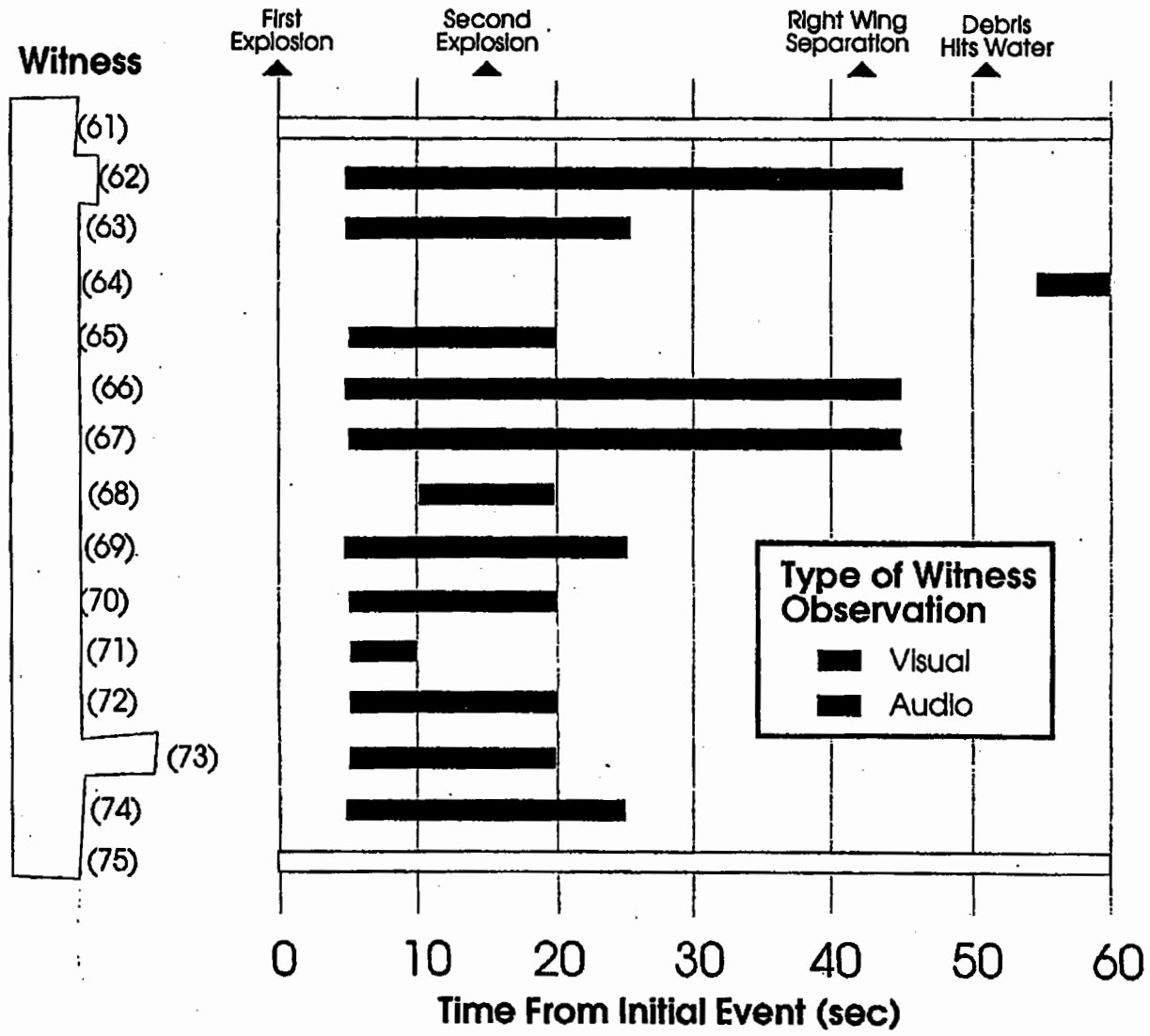
Timeline Of Witness Observations



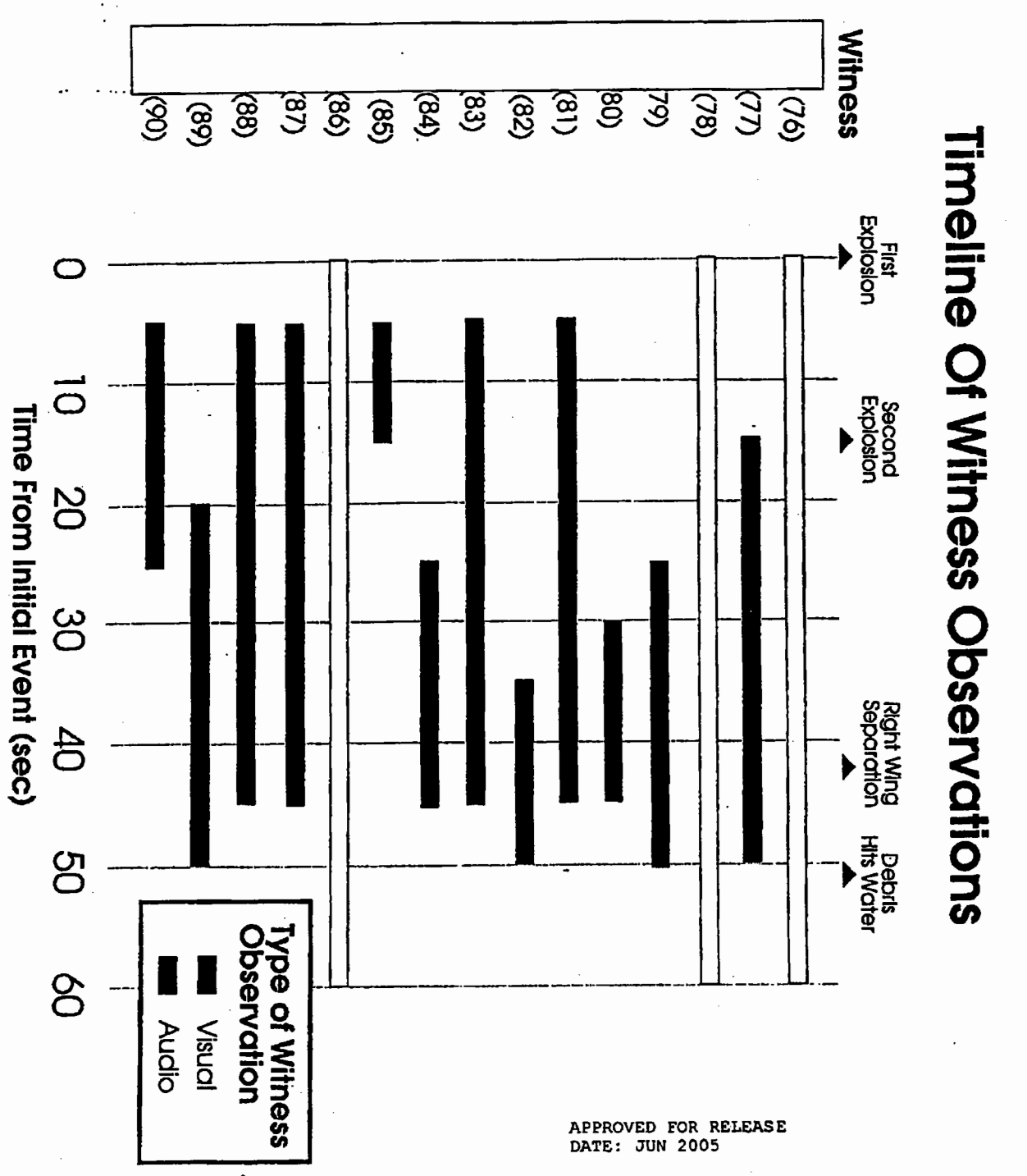
Timeline Of Witness Observations



Timeline Of Witness Observations



(b) (6)
(b) (7) (c)

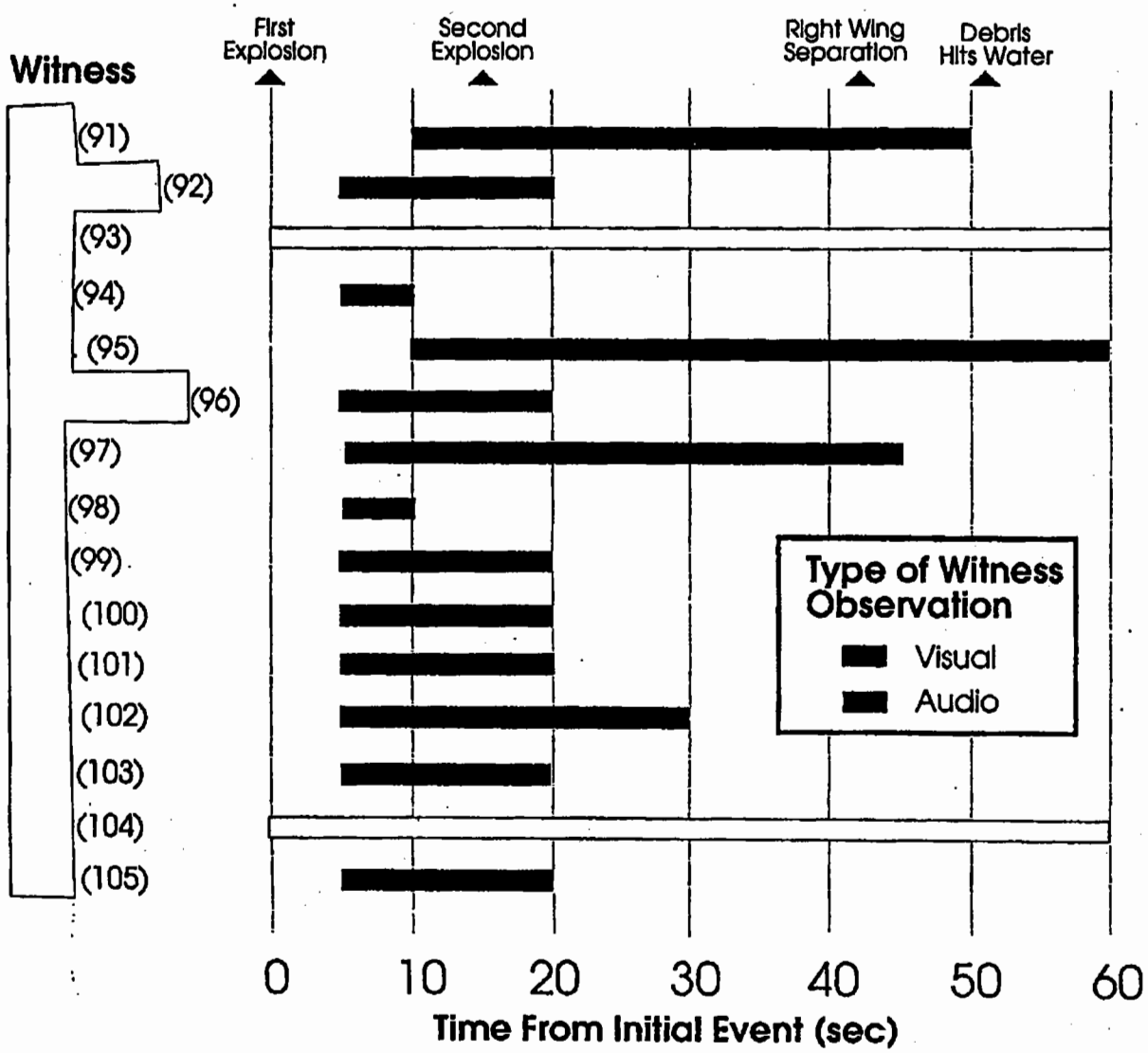


	Possible A/C	water, land, air	Comments	Observers location	Where seen
#107	[redacted] ?	—	Speed of the first	Hampton Bay, HS, corner of Argonne & Wakemann Rd	SW to W
65	No	~~Land~~		Westhampton HS	Area S
78	?		object above treeline in sky ascending at very high rate of speed bright light w/ yellowish orange tail	?	?
108	No	—	large bright light. expl. from a/c about 20 sec. before	Watching Flight of HS in Shirley, Long Island	?
68	[redacted] ?	land	rotating & low in flying up & took 4-5 sec. before hitting the airplane (obj. took off from Dare Rd or left side of it)		
109	No		noticed expl. in sky, then heard 2 or 3 expl. & sound of thunder, noticed vapor line from ocean up to the sky after initial blast	With [redacted] #14	(b) (6) (b) (7) (c)
52	?		ascend almost vertically at moderate speed		
110	No	water	heard sonic like rolling thunder & felt slight vibrations in the ground	water hole of Old County Rd, Vic Suffolk County Police Dept. fixtures range in water	

(b) (6)
(b) (7) (c)

Name	#	Age	Obs. pos	Time	Color	Substantial Color	Trajectory	Path Constant?	Descrip	Flgt. time (S)	Audio	Delay
	107	39	land	835	white	yes/grey	SW to W diagonal across	No	roman candle/ flare	–	–	–
	65	52	land	830-840	bright white		W to E and usually vertically >45°	yes	fireworks	3-5	–	yes
	78						ascend. L to R	No	fireworks	5	–	yes
	108	–	land	–	–	–	–	–	–	–	–	–
	68		(b) (6) (b) (7) (c)				at an angle		Roman candles	45		
	109			830	–	–	–	–	–	–	–	–
	52	43		815-825	red or pink w/ white	yes/white	moving slightly in SW direction almost vertically	No	jet/flare/meteor into sky/ disappear	6-7		
	10	–	boat	830	white	–	straight up	–	flare	5	–	–
	111	20	land	830	reddish orange	yes/white	ascending – the sky turned lime w/ slight angle R to L	yes	flare	–	–	–

Timeline Of Witness Observations



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NOTE FOR: [redacted] (b) (3)

FROM: [redacted]
DATE: 04-15-97 10:19:02 PM
SUBJECT: TWA Flight 800: Revision of Time and Lat/Long for First Explosion

(b) (6)
(b) (7) (c) [redacted]at the FBI believes that the accuracy of the clock aboard TWA Flight 800 is suspect. He would like us to use 831:11.313 PM as the time of the first explosion (last transponded point), rather than 831:07.496 PM as we had been using. I have recalculated the "first explosion" position for TWA Flight 800 using this revised time, assuming the aircraft maintains its heading of 70.93 degrees, ground speed of 641 ft/sec, and altitude of 13,820 feet for the additional 3.817 seconds. The revised coordinates are:

N40 deg/38 min/52.2 sec
W72 deg/40 min/50.5 sec.

All the JFK Airport radar coordinates (sampled every 12 seconds) remain valid and unchanged. The revision simply moves the explosion 3.817 seconds into the future, and therefore places it about 2,450 feet east-northeast of where we had it.

(b) (3) [redacted] After our meeting with the FBI and Sandia Labs tomorrow, I'll adjust our VGs accordingly if the change seems warranted. My preliminary calculations indicate that it would strenghten our case a little that the eyewitnesses saw only the crippled aircraft, and not a missile. In particular, I think it would strenghten the case that the observer on US Air Flight 217 saw the aircraft explode, rather than a missile. Also, it would make the time between when the aircraft first exploded and when it hit the water match the "sound propagation analysis" a little better (it was already within about a second or so). And it would decrease by several seconds our estimate of the time between when the left wing separated and when the aircraft and wing hit the water — strengthening our case that the many eyewitnesses whose observations were within about 10 seconds of this event could not have seen the initial explosion.

(b) (3) [redacted] this revision clearly would require that the aircraft pitch up and ascend much more abruptly after the first explosion than we had previously thought. Because the aircraft would maintain its 641 ft/sec horizontal speed for an additional 3.817 seconds, its horizontal speed would need to slow down much more than before after the first explosion to match our calculated average horizontal speed of 457 ft/sec between the JFK radar hit at 831:10 PM and the next one at 831:22 PM. This would imply a much higher vertical speed. [The total horizontal distance between these two points is about 5,485 feet.]

Anyway, it's late and I'm outta here. (b) (3)

[redacted]

CC: [redacted] (b) (3)

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(b) (3)

TO: [redacted]
FROM:
DATE: 05-12-97 11:41:55 AM
SUBJECT: Re: Description of TWA Flight 800 for Video

Max flight path angle?

Requested info.

1) Time of nose section impact = 38.9 +/- about 2 seconds.

2) Pitch-up takes about 10 seconds (Boeing [redacted] (b) (4) – it is not "abrupt". (b) (4)

3) Maximum pitch angle is about 40 degrees (Boeing [redacted] I think the aircraft may possibly have gone all the way over (pitch angle > [redacted] degrees). Maximum altitude = 17400 feet (Boeing [redacted] (b) (4) (b) (4) [redacted]

4) Boeing and I agree about the unlikelihood of the wing tips breaking off due to "aerodynamic overload" at a point in the flight where the dynamic pressure is almost nil. To have this occur symmetrically in a low load condition is VERY unlikely. I get an indicated airspeed of about 150 knots – Boeing [redacted] (b) (4) [redacted]- at peak altitude. Based on trajectory simulation, I do not believe that loss of the wing tips would have any discernible effect on the trajectory provided their loss occurred symmetrically and at T0+10 or later.

5) Bullet #7 – altitude unknown.

6) It is my understanding that wing fuel is burnt first and is not "reserve" fuel. No specific fuel tank is the "reserve" tank.

7) Under the heading of pure speculation come,
   a) Wing tip loss is symmetric and causes specific motion (other than at final breakup).
   b) Engines stall just as the wing tips come off.
   c) Nose breaks downward (although this is what I would show).
   d) Stalling engines ignite fuel.
   e) Left wing spirals leading edge first.

I think stalling engines is the source of the sound people heard. It is not the only possible source of ignition for fuel in the air. Wing tanks could easily have been ruptured by the initial explosion and this fuel ignited by burning debris. I do not think it is a good idea to present speculation as fact. Some speculation is OK and surely expected.

CC: [redacted] (b) (3)

~~UNCLASSIFIED~~

~~UNCLASSIFIED~~

(b) (3) 14 November 1997

MEMORANDUM FOR: [redacted]

FROM: [redacted] (b) (3)

OFFICE: OWTP

SUBJECT: Final Reports to FBI

REFERENCE:

[redacted] - FBIPB3_A.DOC [redacted] - FBIPB4_A.DOC [redacted] - TWAFINPT.DOC [redacted] - TWAQ&A.DOC [redacted] - TWAKEY_A.DOC

CC: [redacted] (b) (3)

Sent on 14 November 1997 at 06:34:05 PM

~~UNCLASSIFIED~~

Key Points of Analysis

- No explosion or loud sound occurred on the aircraft before the one noted on the cockpit voice recorder.
- A loud sound created by this explosion took more than 40 seconds to reach the nearest eyewitnesses, who reported hearing sounds associated with the disaster.
- After the aircraft exploded, it took about 50 seconds for the burning aircraft to hit the water.
- Most eyewitnesses reported seeing a large, conspicuous "fireball". CIA analysis indicated this occurred about 10 seconds before the aircraft hit the water, and was detected by an infrared sensor on a U.S. satellite.
- A majority of eyewitnesses describe only things which occurred within 20 seconds of when the aircraft hit the water. Since the aircraft exploded 50 seconds before it hit the water, these eyewitnesses could not have seen a missile.
- The few eyewitnesses whose observations lasted considerably longer, and reported seeing an object ascend and culminate in an explosion, probably saw the aircraft shortly after it exploded.

TWA Flight 800 Questions and Answers

Why did the FBI request CIA's technical and analytical assistance in this "criminal investigation", and under what authority did the CIA respond?

The possibility existed that the crash of TWA Flight 800 was *foreign* terrorism, potentially one of the most lethal acts of terrorism ever perpetrated against the U.S. In full accordance with its charter, the CIA responded to the FBI's request for assistance by applying the technical and analytical expertise normally used to monitor and assess foreign weapons threats to U.S. national security.

Why did the CIA attention focus on the eyewitness accounts?

Many people who saw something ascend and culminate in an explosion thought they had seen a missile destroy the aircraft. So the first step in CIA's analytical process focused on determining what the eyewitnesses had seen. This led to CIA's use of "sound propagation analysis" [explained in the video], and the subsequent conclusion that the eyewitnesses saw only events that took place after the aircraft exploded.

What did the eyewitnesses see ascend that night?

Some eyewitnesses saw the burning aircraft ascend, just *after* the aircraft exploded. This ascent was caused by the sudden loss of the front third of the aircraft, including the cockpit, just after the aircraft exploded. This may also have looked like a "flare or firework" ascending skyward. Most eyewitnesses saw only the most spectacular event, a large fireball which erupted shortly before the aircraft hit the water.

Are there any eyewitness statements that disagree with the CIA analysis?

Of the 244 eyewitness statements examined in detail, the vast majority are consistent with the analysis presented here. As with any event of this nature, there remain a few reports that cannot be fully explained.

What did the "sound propagation analysis" entail?

The explosion of Flight 800 produced a very loud sound which shook houses ten miles away. This sound took more than 40 seconds to reach the closest eyewitness. By correlating what eyewitnesses reporting seeing at about the time they reported hearing this sound, CIA analysts were able to determine that almost all eyewitnesses saw only the burning aircraft near the end of its crippled flight.

TWA Flight 800 Questions and Answers

What information was used in the analysis?

CIA analysts primarily used the visual and audio observations of eyewitnesses, as reported by the FBI, to determine the timing and direction of key events. The National Transportation Safety Board provided the aircraft's location and flight conditions when it exploded, the air traffic control radar data, the location of the aircraft wreckage on the ocean floor, and the information from the Cockpit Voice Recorder and Flight Data Recorder. Infrared data collected by a U.S. satellite also was used.

TWA Flight 800: What Did the Eyewitnesses See?

Missile analysts at the Central Intelligence Agency have been working closely with special agents at the Federal Bureau of Investigation during the past 16 months to examine the hypothesis that a missile caused the TWA Flight 800 disaster on 17 July 1996.

Of particular concern to FBI investigators and CIA analysts are accounts from dozens of eyewitnesses who reported seeing an object—usually described as a "flare" or "firework"—ascend and culminate in an explosion. These eyewitness reports are the primary reason for speculation that a missile may have been used to shoot down TWA Flight 800.

CIA analysis demonstrates that the eyewitness sightings of greatest concern—the ones originally interpreted to be of a possible missile attack—took place <u>after</u> the aircraft exploded.

- Most eyewitnesses can be shown to have seen only events occurring 10 to 20 seconds before the crippled aircraft hit the water, ruling out the possibility that these people saw a missile initiate the destruction of the aircraft.

- CIA analysts believe that the ascending object seen by a few eyewitnesses was the burning aircraft itself, rising several thousand feet after the aircraft exploded.

- The aircraft climbed rapidly because the front third of the aircraft, including the cockpit, separated within four seconds after the aircraft exploded. This significant, sudden loss of mass from the front of the aircraft created an imbalance that caused the rapid pitch upward and ascent.

The CIA's analysis was based on:

— 244 eyewitness reports provided by the FBI
— radar data
— satellite infrared data
— information provided by the National Transportation Safety Board (NTSB) from Flight 800's "cockpit voice recorder" and "flight data recorder"
— sound propagation analysis

Eyewitnesses With Extensive Past or Possible Future Media Coverage

The eyewitnesses who have, or may in the future, talk with the media about their observations are: [redacted] (b) (6) (b) (7) (c)

(b) (6) (b) (7) (c) [redacted]

- (b) (6) (b) (7) (c) [redacted] reported seeing "a succession of multiple explosions which bled into a fiery monolith", which struck the water in about eight seconds. This is consistent with the aircraft's break-up during the latter part of its flight.

(b) (6) (b) (7) (c) [redacted]

- (b) (6) (b) (7) (c) [redacted] reported seeing an object which took 5 seconds to ascend followed by an "explosion" which grew and split into 2 pieces. The explosion and 2 fireballs are consistent with the aircraft's break-up during the latter part of its flight.
- (b) (6) (b) (7) (c) In her second interview, [redacted] reported seeing a "missile" ascend from a location on Long Island. In the time specified, this is not plausible as the nearest point of land is about 10 miles from the aircraft explosion location.

(b) (6) (b) (7) (c) [redacted]

- (b) (6) (b) (7) (c) [redacted] reported seeing an object which took about 5 seconds to ascend, followed by a very bright flame. The very bright flame is consistent with the aircraft's break-up during the latter part of its flight.

(b) (6) (b) (7) (c) [redacted]

(b) (6) (b) (7) (c)

- [redacted] reported seeing a streak moving from a higher elevation to a lower elevation, not an ascending object such as a missile.
- He observed this streak for only a few seconds before seeing a large explosion. This large explosion is consistent with the aircraft's break-up during the latter part of its flight.

(b) (6) (b) (7) (c) [redacted]

- (b) (6) (b) (7) (c) [redacted] reported seeing "an orange-colored arc ascend ... ending in a large explosion". The large explosion is consistent with the aircraft's break-up during the latter part of its flight.

Eyewitnesses With Extensive Past or Possible Future Media Coverage

(b) (6)
(b) (7) (c) [redacted]

- (b) (6) (b) (7) (c) [redacted] reported seeing an object which ascended for 10 seconds, followed by an explosion. He then reported that it descended for 2 minutes. This agrees with the CIA assessment of what happened to Flight 800 except for the extended time.
- (b) (6) (b) (7) (c) [redacted] was more that 40 miles away from where the aircraft exploded, and may have confused activity occurring after the aircraft hit the water with the object descending.

(b) (6)
(b) (7) (c) [redacted]

- (b) (6) (b) (7) (c) [redacted] reported seeing an object which ascended for 5 seconds followed by "a large explosion or fireball" which broke into 2 pieces. The fireball and 2 pieces are consistent with the aircraft's break-up during the latter part of its flight.

TWA Flight 800: Eyewitnesses Whose Descriptions Conflict With CIA's Analysis

The three eyewitnesses are: [redacted] (b) (6) (b) (7) (c)

(b) (6) (b) (7) (c) [redacted] reported seeing two discrete objects airborne followed by an explosion. However, CIA believes his observations were limited to the final moments of the aircraft's trajectory because:

- (b) (6) (b) (7) (c) [redacted] reported his total observation time as 20 seconds, much shorter than the 50 seconds it took the aircraft to hit the ocean after it exploded.
- (b) (6) (b) (7) (c) [redacted] reported seeing "large rectangular balls of flame" which CIA believes was the fuel fire just before Flight 800 hit the water.

(b) (6) (b) (7) (c) [redacted] gave a highly detailed description, with details such as "fissures developed all over the plane".

- (b) (6) (b) (7) (c) From over 17.5 miles away, we believe such detailed descriptions are not possible.
- [redacted] also reported hearing a "boom" just as the aircraft broke up. CIA analysis indicates that the first sound would have arrived at her location more than 30 seconds after the aircraft hit the water.

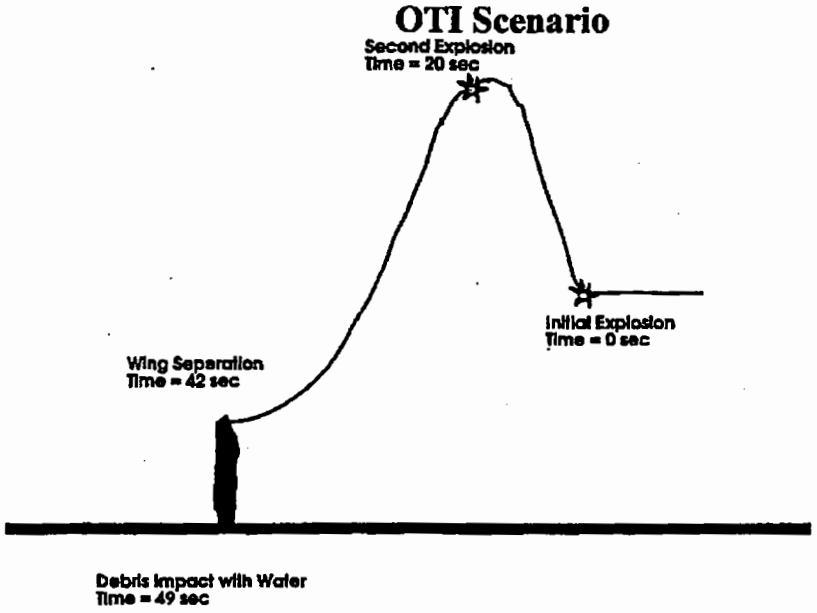
Review of FBI Special Agent [redacted] Critique of CIA's TWA Flight 800 Analysis

(b) (6)
(b) (7) (c)

To comment on Special Agent [redacted] critique, a review of the CIA's findings is necessary. OTI determined that TWA Flight 800 suffered a central tank explosion (based on NTSB/FBI findings) which caused the destruction of the Boeing 747. What initiated this explosion is still unknown. The aircraft fuselage section forward of the wing separated, and the back end of the aircraft started to pitch up. [This pitchup maneuver forms the basis of [redacted] first objection to OTI's analysis.] After about 15 seconds, the aircraft began to pitch downward, with a second explosion occurring approximately 20 seconds after the initial explosion. The aircraft was now descending, and continued to descend until, approximately 42 seconds after the initial explosion, the aircraft's left wing separated, releasing the fuel in the port wing tanks. This fuel subsequently ignited, resulting in a huge and very visible fireball in the sky. [Note: The time of some events may be adjusted due to the small change in time of the initial explosion provided by the FBI, but this change has not impacted the findings.]

(b) (6)
(b) (7) (c)

(b) (6)
(b) (7) (c)



We believe the evidence points to the majority of the eyewitnesses only observing events near the final fireball, nearly 40 seconds after the initial explosion. We base this on a number of items: 1) a reported short time of observations, usually less than 15 seconds and observing debris/flame hit the water, 2) observe two fireballs descending, which we know are the fuselage and left wing debris, 3) observations of "sheets of flame" or "wall of flame". In a majority of these cases, the eyewitnesses observed an ascending flare/firework/fire just prior to the large fireball.

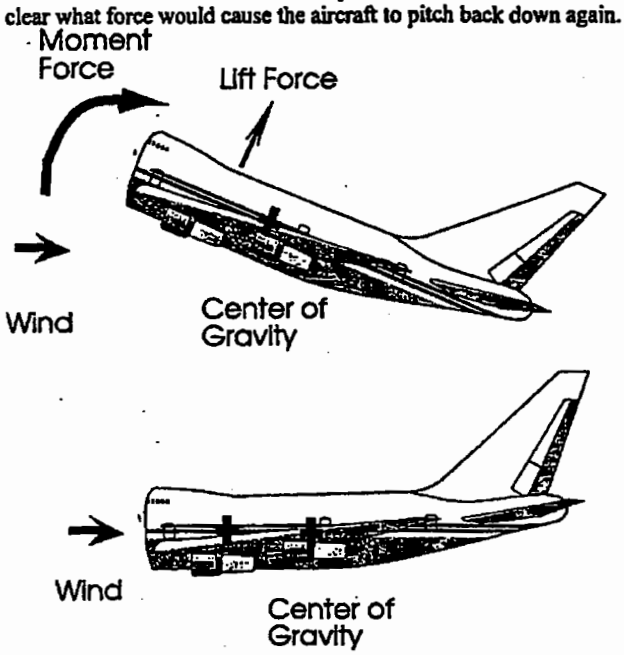
This ascending "flare" has not been explained properly (however we have several possibilities) and forms the basis of the second of [redacted] objection with OTI's analysis. *Nonetheless, eyewitness observations limited to the final fireball event alone, could not include a missile striking the aircraft and causing the initial explosion.*

(b) (6)
(b) (7) (c)

The first of [redacted] objections are on the initial pitchup of TWA Flight 800 after the center fuel

(b) (6)
(b) (7) (c)

tanks explode. The aircraft is in a longitudinal (pitch plane) unstable configuration with the front third of the fuselage removed. This is caused by the large shift in the remaining aircraft's center of gravity and the small shift in the aircraft's center of pressure. If a moment were to cause the aircraft to pitch up, it is not clear what force would cause the aircraft to pitch back down again.



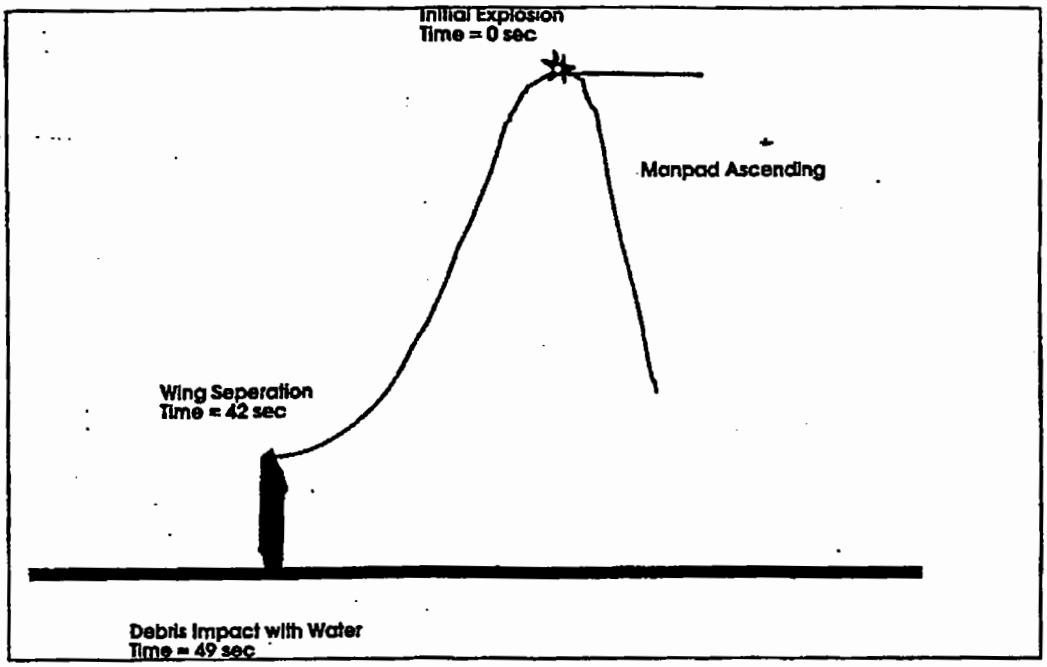
Center of pressure is where the lift vector is directed on the aircraft. Once an angle of attack is created, a lift force is created. This lift causes an upward pitch moment, which increases the angle of attack, Which creates a large lift force.....

Now if the aircraft were to start tumbling, as the above suggests, then the aircraft could not be expected to have directional stability, as the relatively straight radar plot suggests. The large rudder on the back of the aircraft would give the fuselage directional stability as long as the airflow was coming straight across it. Therefore, it is unlikely the aircraft ever tumbles end over end. We acknowledge the longitudinal stability problem exists, and [redacted] is working with Boeing to fix this problem. [It is important to note that the aircraft pitch-up theory was postulated from *eyewitness accounts* and *radar trajectory analysis*. The aircraft instability was theorized as the force mechanism to achieve the pitchup.] (b) (3)

Unfortunately, this problem persists no matter which way the aircraft trajectory goes after the initial explosion. If the aircraft goes straight or down, the instability would still exist. This in turn would suggest that the aircraft would tumble, and eliminate the directional stability of the aircraft.

The second objection that [redacted] put forward involves the eyewitness accounting of time. (b) (6) (b) (7) (c)
According to OTI's time line, the aircraft descended for over 20 seconds from the trajectory's apex before the left wing detached and about 25 seconds before the debris hits the water. Most eyewitness that OTI categorizes as only observing events near the end fireball, report about 10-15 seconds total observation time from their initial observation of an ascending object to the debris/fireball hitting the water. If the eyewitness time accounting is accepted, there is little doubt that they could not have seen the initial explosion. However, [redacted] believes the eyewitnesses time accounting can not be trusted. He suggests that the initial ascending object reported by the eyewitnesses could be a manpad ascending to hit the aircraft at an earlier time (see diagram). This creates the falling fireball reported by the eyewitnesses. Therefore, the eyewitnesses either do not report the intervening time from the initial explosion to the debris hitting the water or misjudge the total time between the events. (b) (6) (b) (7) (c)

Alternate Scenario



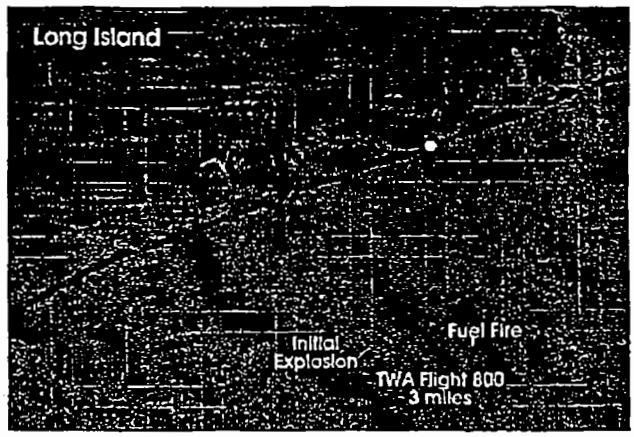
OTI disagrees with this argument for several reasons. One, the eyewitnesses are fairly uniform in their observations and it is unlikely they would all make the same mistake. Second, there are about ten eyewitness who describe the descent phase (as theorized by OTI) followed by the events surrounding the end fireball, including the separation of the left wing from the fuselage. Third, almost none of the eyewitnesses were in a stressful situation and thought they were observing a benign event such as a firework or flare. Therefore, there is no reason to believe that any time stretching/compressing would exist in these cases.

(b) (6)
(b) (7) (c)

Witness:
[redacted][1]

Witness Location: 40.8008 N
072.6276 W
Distance From (ft):
Initial Explosion 58772
Second Explosion 55099
Fuel Fire 49118
Azimuth to (deg):
Initial Explosion 196.23
Fuel Fire 181.26
Time for Initial Sound to Reach Witness (sec): 55.44

Group Assigned: 2



Observations:

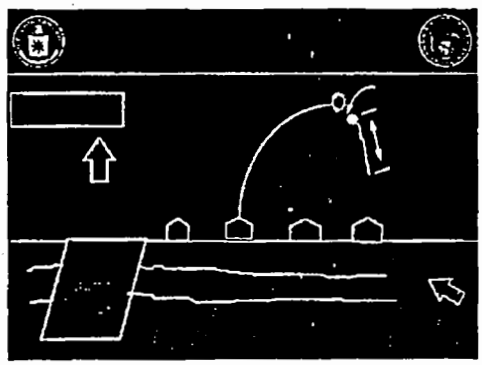
Eyewitness was working on Beach Lane Bridge. Eyewitness first saw a white light that was traveling skyward from the ground at approximately a 40 degree angle. Eyewitness described the white light as a light that sparkled and thought it was some type of fireworks. The white light zigzagged as it traveled upward and at the apex of its travel, the white light arched over and disappeared from his view. The white light was in his view for about 15 seconds and its speed was consistent with a fireworks. The white light first came into view just above the roof top if the fourth house west of the public parking area on Dune road. Two to three seconds after the white light disappeared, he saw an orange light that appeared to be a fireball in the sky approximately one-half mile away. He was not able to estimate the height or elevation of this fireball due to its distance from him. The fireball descended at approximately a 30 degree angle and left a fire trail burning behind it. The fireball disappeared behind the second house to the West of the public parking area located at Beach Lane and Dune Road.

After the fireball disappeared behind the house, he heard the first of 4 explosions. The first explosion was loudest and the concussion shook the bridge. About 8 to 9 seconds after the first explosion, he heard a second and third explosion, closely spaced. About 1 second later, he heard the final explosion.

Conclusion:

Eyewitness account is consistent with the aircraft pitching up after the initial explosion. The azimuth from the first house to the second house (see below) match TWA 800's position at the initial explosion and the end event, respectively. Eyewitness view of the final fireball event (not described by [redacted]) was blocked by buildings. The eyewitness' account of hearing the first sound after the aircraft disappeared behind the house is consistent with a sound propagation time of 55.44 seconds. The time between the first and fourth sounds (about 10 seconds) does not exactly match the 17 to 18 second observation time of rising white object. The 10 second gap between eyewitness hearing sounds would have to be generated about 15 seconds apart on the aircraft.

(b) (6)
(b) (7) (c)



(b) (6)
(b) (7) (c)

Witness:
[redacted] [2]

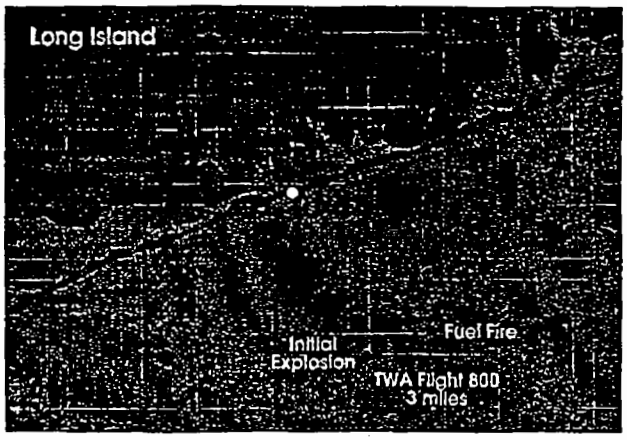
Witness Location: 40.7669 N
072.7539 W

Distance From (ft):
- Initial Explosion 58772
- Second Explosion 55099
- Fuel Fire 49118

Azimuth to (deg):
- Initial Explosion 196.23
- Fuel Fire 181.26

Time for Initial Sound to Reach Witness (sec): 55.44

Group Assigned: 2



Observations:

Eyewitness was fishing with a buddy in Moriches Inlet. He saw what appeared to be a flare rising into the sky to the South, Southeast of his position. Commented to his fishing partner the inadvisability of firing flares for no reason; however, inasmuch as the flare was not red, which would indicate a distress signal, but rather a whitish/yellowish in color, it seemed less serious at the time. He said that it appeared to him that the flare was launched from a position off-shore and not from any beach area. He watched the flare move upward in the sky to a point where the flare seemed to lose energy and arc and began to descend, he observed a fireball somewhat above where he last saw the flare.

Conclusion:

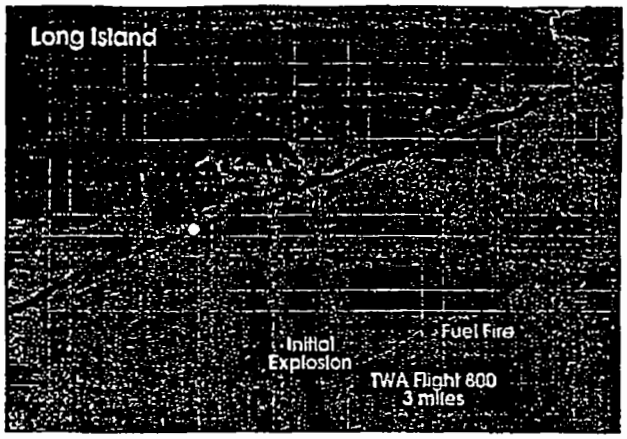
Eyewitness account is consistent with the aircraft pitching up after the initial explosion. However, depending on the *total* time of eyewitness' observation was short or if the total azimuth change of the flare was small, he could be just viewing the end event. Witness did not report hearing any sound or another object.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [3]

Witness Location: 40.7400 N
072.8500 W
Distance From (ft):
Initial Explosion 56607
Second Explosion 60561
Fuel Fire 66125
Azimuth to (deg):
Initial Explosion 127.20
Fuel Fire 113.97
Time for Initial Sound to
Reach Witness (sec): 53.51

Group Assigned: 1



Observations:

"Around dusk, eyewitness was camping at Smith Point Park and witnessed what appeared to be a 'flare' rise above the horizon over the water. This flare was 'red-orange' in color and had initiated from the East in an upward diagonal trajectory. The flare disappeared and seconds later a 'wide area' of the sky was filled with 'something' descending on fire resembling a 'white bright star'."

Conclusion:

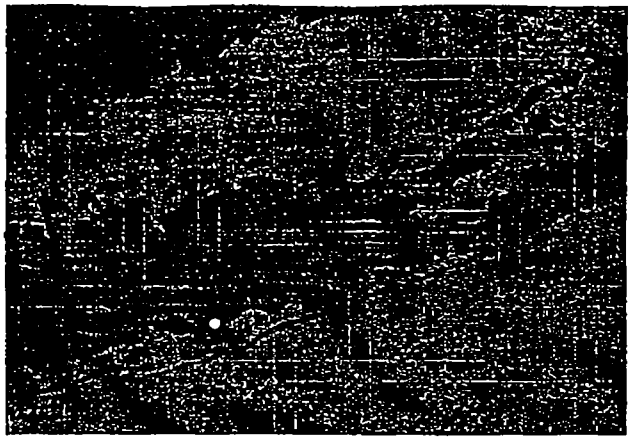
Eyewitness is most likely observing events only near the final moments of TWA Flight 800. The flare color and the description of a 'wide area' of the sky being filled fits the fuel fire at the end. The *relative* lack of motion eyewitness reported (only upward diagonal) would not fit the overall azimuth change the witness should expect to see of over 13 degrees.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [4]

Witness Location: 40.7198 N
073.0940 W
Distance From (ft):
Initial Explosion 115690
Second Explosion 121398
Fuel Fire 129332
Azimuth to (deg):
Initial Explosion 103.31
Fuel Fire 98.56
Time for Initial Sound to
Reach Witness (sec): 107.0

Group Assigned: 1



Observations:

Eyewitness was riding his bike on the West Sayville. Long Island Dock. While looking East and Southeast over the water, he observed a small reddish-orange round dot rise from the water, reaching its apex, making a small arch, falling a short distance, then disappearing. He observed no explosion, no noise, or trail of smoke. He believes the object appeared to be a flare.

Two (2) seconds later, he observed two (2) red streaks just to the right of the initial source falling off at the horizon. He observed no airplanes, objects, or explosions in the area at this time.

Conclusion:

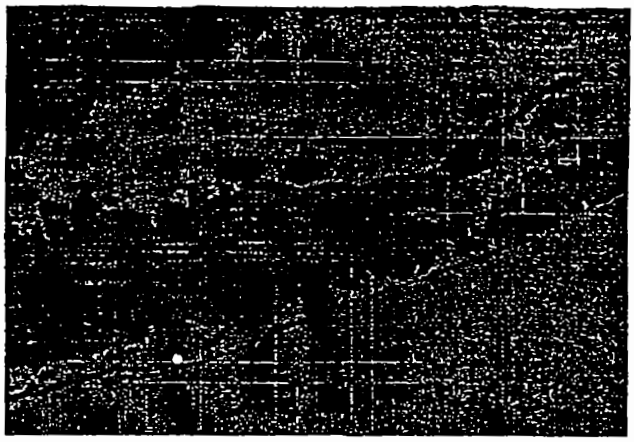
Flare color and the observation of two streaks is consistent with other reported events during the final moments of TWA Flight 800. Further, eyewitness did not observe an extended descent phase which should be present for about 25 seconds after the apex of Flight 800's flight path.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [5]

Witness Location: 40.6532 N
073.1575 W
Distance From (ft):
Initial Explosion 130164
Second Explosion 136493
Fuel Fire 145543
Azimuth to (deg):
Initial Explosion 91.00
Fuel Fire 87.98
Time for Initial Sound to
Reach Witness (sec): 120.2

Group Assigned: 2



Observations:

Eyewitness was out on boat, fishing with his wife, when he saw what he thought to be a flare fly into the air to his Southeast side over the ocean. When the 'flare' reached its highest point a bright orange fireball erupted. The fireball then fell, fluttering back and forth, into the ocean. When he made these observations, he was located approximately three (3) miles East of the Fire Island Inlet on the Bay side of Fire Island in the vicinity of Ocean Beach.

He described the 'flare' as glowing red and stated that it rose 'straight up' from the ocean and was in flight for approximately ten (10) seconds. It took the fireball approximately 30 seconds to fall into the ocean. He saw no smoke trail from the 'flare' and saw nothing fall away from it as it rose. He did not see an airplane, nor did he hear any sound associated with the eruption of the fireball.

Conclusion:

It is unclear whether the witness observed the entire event or just the end event. The small azimuth change the witness would have observed makes any observations a 'straight up' one. The length of the flares rise and the total descent time matches the timing and shape of the aircraft starting near the initial explosion. However, the red color of the flare more closely matched the color of the end fireball event.

Currently, this witness is being placed in Group 2, witnessing the entire event. The observations in this case would be consistent with the aircraft pitching up after the initial event and then descending to destruction.

Witness did not observe any secondary objects that would indicate a missile was fired.

(b) (6)
(b) (7) (c)

Witness:
[6]

Witness Location: 41.0171 N
072.2448 W

Distance From (ft):	
Initial Explosion	182156
Second Explosion	176255
Fuel Fire	165578
Azimuth to (deg):	
Initial Explosion	222.18
Fuel Fire	219.94
Time for Initial Sound to Reach Witness (sec):	167.75

Group Assigned: 1

Observations:

Eyewitness was parked in her Ford Aerostar automobile on Mile Hill Road, at the shore of the Northwest Bay, East Hampton, New York.

Eyewitness observed a fine, pencil thin white light. This white light extended upward in the sky and was viewed as a fine white line. This white line had a more definitive head a less definitive smokey line. This white line extended upward in an arc shape at approximately 70 degrees from approximately 2-5 vertical degrees over the horizon. The line emanated wispy effects trailing off the East side. This fine white line traveled in a N, NW direction and was in the sky for about 3 sec.

The next observations are more clear in the eyewitnesses mind. The fine thin line at 20 degrees off the horizon became a brilliant, bright white light which quickly traveled into a star-shaped light radiating rays of white light. This transformation occurred in a split-second at which time it became a bright red/orange ball of fire. This red/orange light began to cascade in an arc-shape downward toward the horizon. The cascade of red/orange light arched slightly upward before flowing straight down toward the horizon. The cascade of red/orange light was of considerable size and width, described as a puffy, thick, fireball. A second red/orange cascade of light emanating from that same 20 deg point arched in a similar manner to the N, NE.

Eyewitness did not hear any sounds.

Conclusion:

Eyewitness is viewing events at the final stages of TWA 800s flight. Besides the observation of a fine, thin white line, this eyewitness reports sightings that closely match other eyewitnesses viewing the final moments of Flight 800. These observations include the bright red/orange fireball which initially rises, followed by a 'cascade' of flames, as well as observing two separate fireballs.

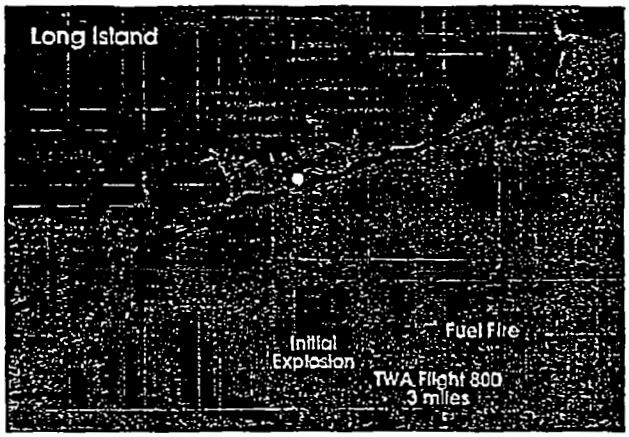
Since the eyewitness was reporting events close to the end fuel fire and her total observation time was approximately 2 to 5 seconds, she could not have observed the initial explosion on TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [7]

Witness Location: 40.7670 N
072.7539 W
Distance From (ft):
Initial Explosion 47830
Second Explosion 48670
Fuel Fire 49969
Azimuth to (deg):
Initial Explosion 157.24
Fuel Fire 137.36
Time for Initial Sound to
Reach Witness (sec): 45.72

Group Assigned: 1



Observations:

Eyewitness was fishing in the bay about one mile due South of the U.S. Coast Guard Station at East Moriches, N.Y. Sometime later, he saw a plane coming from West to East and then what looked like a "smaller" plane coming from the NE on a dead course heading toward the nose of the larger plane. There was no smoke trail on the "smaller plane". [redacted] saw the smaller plane for about 3 to 4 seconds before hearing a crackling sound and saw what looked like aerial bomb fireworks. The larger plane blew up and became a big fireball which then broke into four pieces. He heard a sound like paper crackling when the "two planes" crunched up, then a noise like "poof", then a whooshing sound. The sun was to the West of the Coast Guard station. Eyewitness did see a green light, but this might have been one of the lights from the big plane.

(b) (6)
(b) (7) (c)

Conclusion:

It is difficult to place this eyewitness' observations into the any one part of TWA Flight 800's flight path. No explanation for the "two planes" observations can be given. The sounds that the eyewitness heard could have been the initial explosion (the propagation time of 45.7 seconds matches when the he would have seen the end fireball), but it does lack the 'concussion' effect other eyewitnesses report.

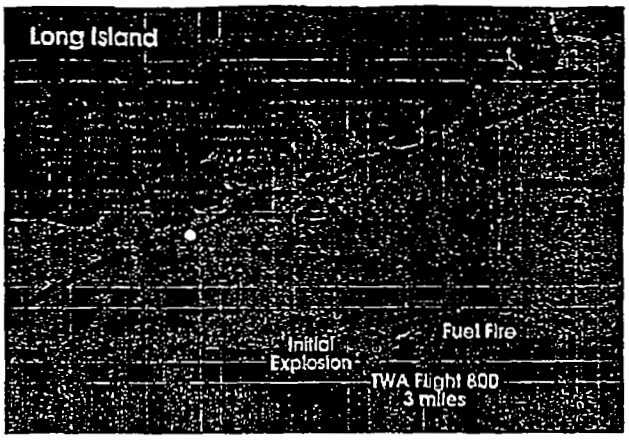
The only clear observation made by the eyewitness was of the fuel fireball at the end. Given the implied short observation time of the eyewitness this places his observations only at the final moments of TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [8]

Witness Location: 40.7358 N
072.8542 W
Distance From (ft):
Initial Explosion 56638
Second Explosion 60768
Fuel Fire 66589
Azimuth to (deg):
Initial Explosion 125.26
Fuel Fire 120.04
Time for Initial Sound to
Reach Witness (sec): 53.53

Group Assigned: 1



Observations:

Eyewitness was at the beach near the campgrounds at Smith Ponit Park on Fire Island, N.Y.

Eyewitness had walked to the waters edge in front of camp site number 29. At about 8:40 PM, she noticed something like fireworks or a flare going up from the water. It first appeared to be a fiery orange color. She also noticed white smoke. She then observed a bright orange explosion in the sky about half way up in the sky. She then observed this fireball fall into the sea beyond the horizon. This all occurred to the South and East of her location. It was almost directly South of Moriches Inlet. She recalls thinking to herself "how stupid it is to shoot fireworks from a boat".

Conclusion:

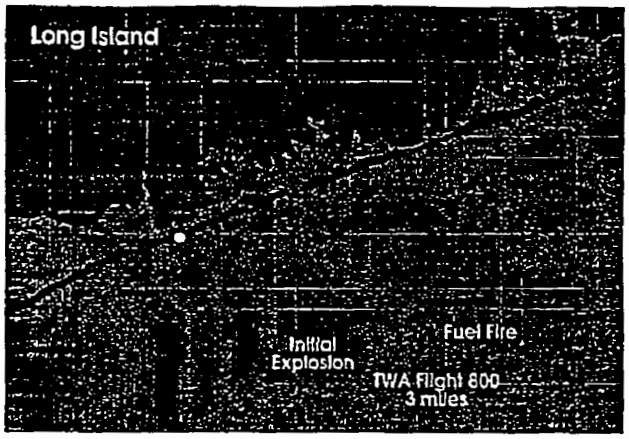
The reported fiery orange explosion and subsequent fireball falling from it, or obviously the final moments of TWA Flight 800. No total time of the eyewitness observations was provided, however, it is unlikely the total time was more than 10 seconds and the orange firework rising in the sky is similar to observations of other witnesses only viewing the end fireball.

(b) (6)
(b) (7) (c)

Witness: [redacted] [9]

Witness Location: 40.7333 N
072.8667 W
Distance From (ft):
Initial Explosion 58995
Second Explosion 63352
Fuel Fire 69469
Azimuth to (deg):
Initial Explosion 122.59
Fuel Fire 110.57
Time for Initial Sound to Reach Witness (sec): 55.64

Group Assigned: 1



Observations:

Eyewitness was sitting in a car in the parking lot to Smith Point Park facing South.

While looking out the front windshield, the eyewitness saw a "flare" rise up directly in front of her and due South of her position, far out over the Atlantic Ocean. The "flare" went straight up into the sky and then curved before they lost sight of it. The "flare" looked like a red stream that got thinner as it rose through the sky. Eyewitness did not observe an explosion or a plane crash.

Conclusion:

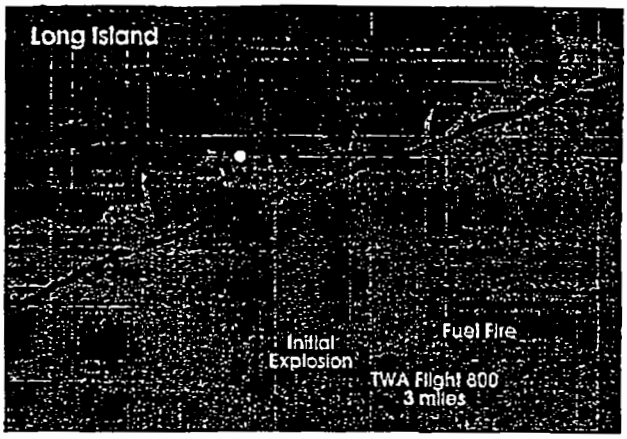
The eyewitness is observing only events near the end of Flight 800. The eyewitness does not report any significant azimuth change ("flare" went straight up) and the color of the flare is consistent with the end fuel fire. Also, the final fuel fire would have been the most visible part of the aircraft after the initial explosion, yet the eyewitness did not report any "explosions". Therefore, the eyewitness did not observe any explosions because she observed only the final fuel fire, which did not change shape sufficiently to look like an 'explosion'.

(b) (6)
(b) (7) (c)

Witness:
[redacted][10]

Witness Location: 40.7940 N
072.8070 W
Distance From (ft):
Initial Explosion 63328
Second Explosion 65064
Fuel Fire 67266
Azimuth to (deg):
Initial Explosion 148.39
Fuel Fire 133.82
Time for Initial Sound to
Reach Witness (sec): 55.44

Group Assigned: 1



Observations:

The eyewitness was on a boat with his wife [11], docked at the Senix Marina.

The eyewitnesses stated that while looking South towards the Atlantic Ocean, they observed a ball or orange fire trailing a white tail arcing upward. The abject looked like a "roman candle" firework. Approximately ten seconds later, they saw a large reddish-orange fireball where the firework-type object disappeared. The fireball fell at a sixty degree angle down angle and appeared to knife edge shortly before losing sight of it near the horizon.

Conclusion:

The eyewitness is most likely viewing events just prior to the final fuel fireball. Due to the color of the object (orange)and the close timing of the initial observation to the start of the fireball (10 seconds) the eyewitness could not have observed the initial explosion causing the destruction of TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [11]

Witness Location: 40.7940 N
072.8070 W

Distance From (ft):

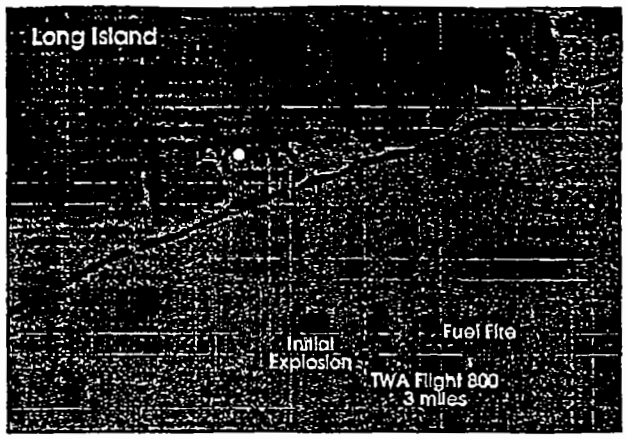
Initial Explosion	63328
Second Explosion	65064
Fuel Fire	67266

Azimuth to (deg):

Initial Explosion	148.39
Fuel Fire	133.82

Time for Initial Sound to Reach Witness (sec): 59.52

Group Assigned: 1



Observations:

Eyewitness was on boat with her husband [10], docked at Senix Marina.

She stated that while looking to the South towards the Atlantic Ocean, she was what looked like a flare with a white trail going in a curve, and then she saw red flames falling. She further stated that the falling flames grew larger, into a "wall or waterfall" of flames, before she lost sight of it near the horizon. She thought the flare-type object came from a boat in the ocean.

Conclusion:

The eyewitness is most likely viewing events just prior to the final fuel fireball. The main description of events is of falling flames which grew larger into a "wall or waterfall" of flames. This is obviously the end fuel fire. Due to the short observations time along with no real lateral motion observed (should have seen over 14 degrees) the eyewitness could not have observed the initial explosion causing the destruction of TWA Flight 800

(b) (6)
(b) (7) (c)

Witness:

[redacted] [12]

Witness Location: 40.7988 N
072.6400 W

Distance From (ft):

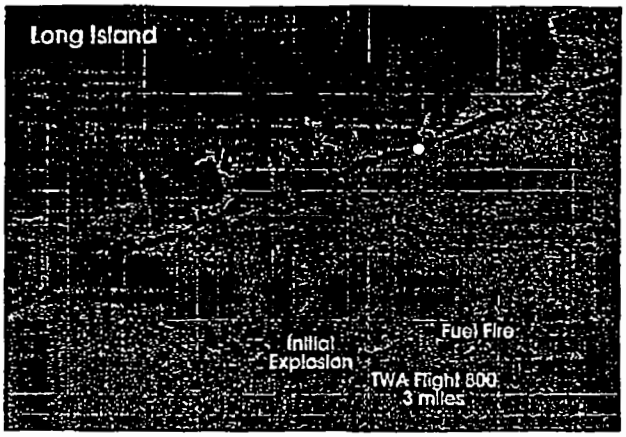
Initial Explosion	57198
Second Explosion	53854
Fuel Fire	48434

Azimuth to (deg):

Initial Explosion	193.14
Fuel Fire	187.08

Time for Initial Sound to Reach Witness (sec): 54.04

Group Assigned: 2



Observations:

Eyewitness was on boat in Moneybogue Bay.

Eyewitness observed what appeared top be a boat flare shoot straight up into the sky from the horizon beyond Dune Road. The flare was yellow-orange in color and shaped like a round ball. There was no tail of smoke on the flare. The flare ascended at the normal speed of a flare and did not arc or curve.

The flare ascended for about 15 seconds. It then burst into a yellow flash, slightly larger than the flare itself. The yellow flash remained illuminated and descended. It then burst into a huge fireball, yellow-orange in color. The second fireball was about twenty times the size of the yellow flash.

He did not hear any sounds as the flare ascended, or when the yellow flash and the huge fireball appeared. The fireball descended and eventually he lost visual contact as it descended South of Dune Road. He then heard three explosions after he lost visual contact. He estimates that the entire event took about thirty seconds.

Conclusion:

Eyewitness observed events throughout TWA Flight 800's flight. The initial ascent, followed by the second explosion were both observed. The timing of the explosions is also consistent as the aircraft would have been in the water by the time the sound had arrived at his location (which would take about 54 seconds). The eyewitness also describes a separate fireball event, distinct from his other observations. The estimate of the total event time of thirty seconds is somewhat short (should be closer to 45 seconds).

However, there is nothing in the eyewitness observations that indicates a missile was used to shoot down TWA 800. The initial ascent is the aircraft, as well as the descent phase. And, the eyewitness did not observe any secondary objects which could have been a missile in flight.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [13]

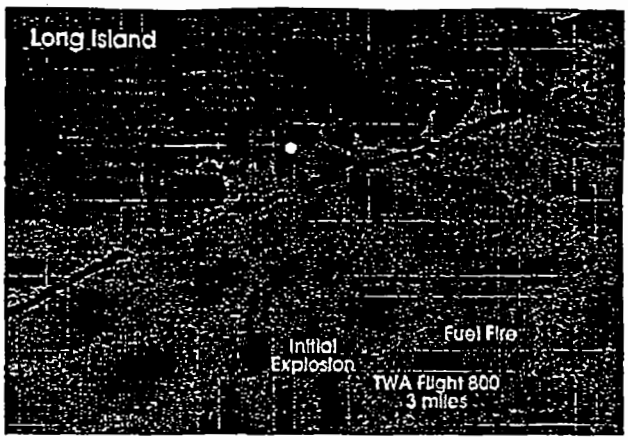
Witness Location: 40.8009 N
072.7565 W

Distance From (ft):
- Initial Explosion 59646
- Second Explosion 59932
- Fuel Fire 60061

Azimuth to (deg):
- Initial Explosion 161.20
- Fuel Fire 144.86

Time for Initial Sound to Reach Witness (sec): 56.22

Group Assigned: 1



Observations:

Eyewitness was cleaning his boat that was docked at Abbots Harts Cove Marina.

Eyewitness was standing on the dock next to his boat and looking South of the Moriches Inlet when he saw a "flare" rising in the sky. He immediately thought someone in Moriches Bay was having trouble. The "flare" traveled straight up into the sky on a Southerly course, and then hooked Southwest. Then, he saw a large red/orange explosion at the end of the flare's course of travel.

He saw what appeared to be "wreckage" from a plane falling from the site of the fireball. The "wreckage" took approximately ten seconds to come down to Earth, and fell in one large fireball, and many other smaller fireballs.

The eyewitness did not see a plane prior to him seeing the explosion. However, he believes that the explosion was caused by the "flare" hitting a plane.

Conclusion:

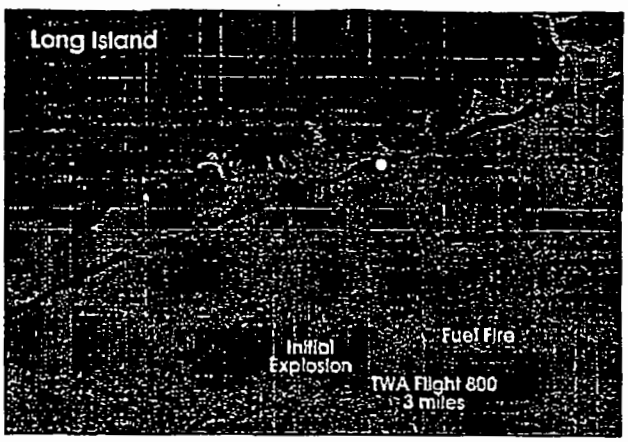
The eyewitness is observing events near the end of TWA Flight 800's flight. The red/orange explosion at the end of the "flares" course, with the wreckage and smaller fireballs fits the fuel fireball produced when the left wings detaches. Further, the "flare" traveled straight up in the sky and only a small hook to the SW. The eyewitness should have observed over 15 degrees of lateral motion from his position.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [14]

Witness Location: 40.7897 N
072.6695 W
Distance From (ft):
Initial Explosion 52610
Second Explosion 50150
Fuel Fire 46266
Azimuth to (deg):
Initial Explosion 185.28
Fuel Fire 166.87
Time for Initial Sound to
Reach Witness (sec): 49.95

Group Assigned: 1



Observations:

Eyewitness was standing on Point Road in Westhampton Beach.

Eyewitness observed a smoke trail originate at approximately 185 degrees magnetic North (which is about 171 degrees true North). He measured the distance of the smoke trail between his thumb and index finger to be four or five inches in length from where he was standing.

The smoke trail was described to be a well formed line of white smoke that looked as if it started from land.

He saw three explosions. The first one being a large round red fireball with white smoke billowing around it, the approximately three to four seconds later, a yellow flame a little smaller, then a third explosion appeared to be more like a fire with pieces of the plane falling from it.

Conclusion:

The eyewitness gives a very detailed description of the end fireball toward the end of his observations. Given the relatively short time frame his observations were made in, he could not have seen the initial explosion on TWA Flight 800. In addition, his initial observation was made at an azimuth (171 deg true North) that more closely matches the end fuel fire azimuth (166.87 deg) than the initial explosion azimuth (185.28 deg)

(b) (6)
(b) (7) (c)

Witness: [redacted] [15]

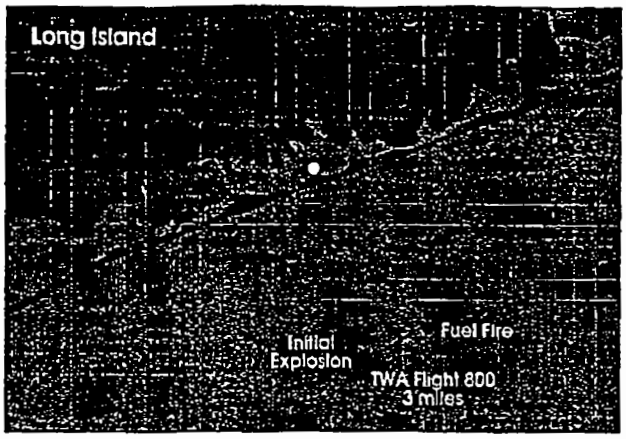
Witness Location: 40.7841 N
072.7358 W

Distance From (ft):
- Initial Explosion 52120
- Second Explosion 52017
- Fuel Fire 51778

Azimuth to (deg):
- Initial Explosion 164.99
- Fuel Fire 146.15

Time for Initial Sound to Reach Witness (sec): 49.51

Group Assigned: 1



Observations:

Eyewitness was present on her father's boat, in Moriches Bay, when she observed a white smoke trail ascending through the sky culminating in a bright orange fireball. The fireball appeared to emanate from either the dunes or beyond the dunes in the ocean. She noted that the smoke trail seemed to start off slowly, but gained momentum and speed before evolving into a fireball.

Conclusion:

Eyewitness observed events near the end of TWA Flight 800's flight. The white smoke trial is most likely the smoke caused by the initial burning of the fuel released from the left wing. The eyewitness did describe observing the end fireball. The lack of any reported azimuth change during her observations is inconsistent with viewing the entire event, which should be over 18 degrees in azimuth change.

(b) (6)
(b) (7) (c)

Witness: [redacted] [16]

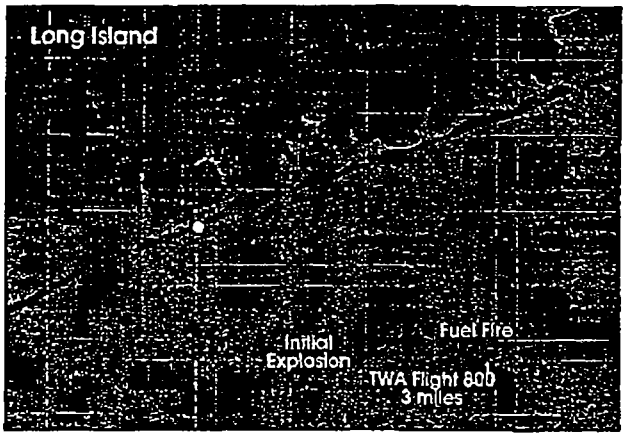
Witness Location: 40.7400 N
072.8500 W

Distance From (ft):
- Initial Explosion 56607
- Second Explosion 60561
- Fuel Fire 66125

Azimuth to (deg):
- Initial Explosion 127.20
- Fuel Fire 113.97

Time for Initial Sound to Reach Witness (sec): 53.51

Group Assigned: 1



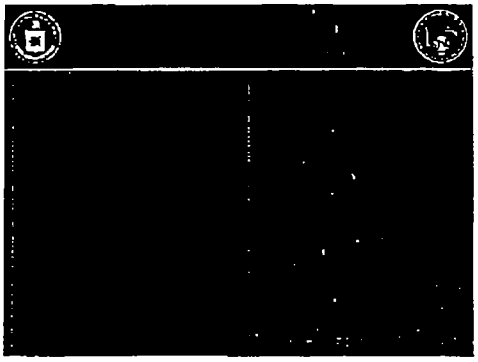
Observations:

Eyewitness was walking his dog at Smith Point Beach in Mastic, N.Y.

Eyewitness observed a light heading straight up in the sky just East of his location. The light was a small red ball that he caught halfway up in the sky. The red ball looked like a flare that had been fired from the beach. No smoke trail was observed emanating from the red ball. The red ball took approximately four seconds to impact from halfway up in the sky. Upon impact, he observed a large fireball which drifted or floated Westward while dripping fire and breaking up further. A smoke trail came from the explosion.

Conclusion:

Eyewitness observations are of TWA Flight 800 in the final moments of its flight. The eyewitness described the end fireball which was dripping fire and breaking up further. The eyewitness did not observe a descent phase prior to the fireball. Since the aircraft has a 25 second descent phase after its initial ascent, he could not have seen the initial ascent nor the initial explosion. Finally, the eyewitness does not mention a substantial lateral motion to account for the 13 degrees of azimuth change expected if the entire event was observed.



(b) (6)
(b) (7) (c)

Witness: [redacted] [17]

Witness Location: 40.7400 N
072.8500 W

Distance From (ft):

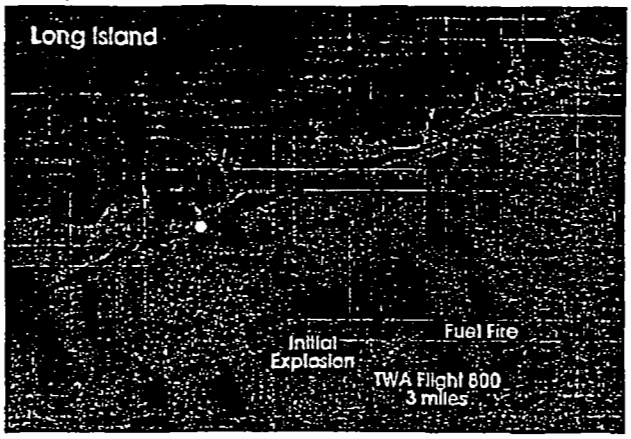
Initial Explosion	56607
Second Explosion	60561
Fuel Fire	66125

Azimuth to (deg):

Initial Explosion	127.20
Fuel Fire	113.97

Time for Initial Sound to Reach Witness (sec): 53.51

Group Assigned: 1



Observations:

Eyewitness was at Smith Point Campsite number 48, sitting inside her screen house tent. She saw a trail of fire going up in the sky. She indicated that at first she thought it was some kind of flare or fireworks. She stated that the flare broke off and continued into the sky. The flare was described as being bright orange and red, that went straight up in the sky. She was looking South into the sky and that the estimated distance between where she was located and the flare was about nine miles. She indicated that after the flare went up she did not observe where it went: nor did she observe anything come down to the ground.

Conclusion:

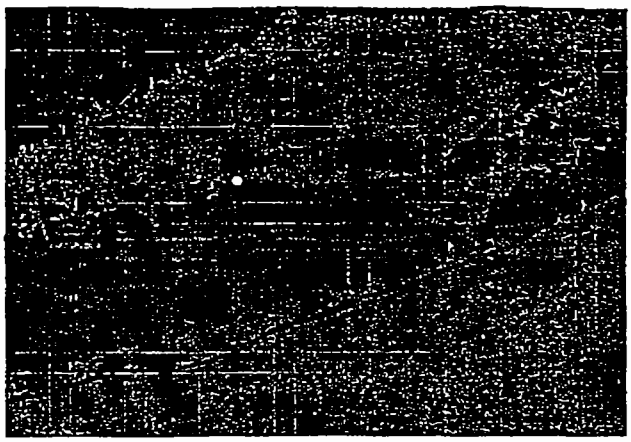
The eyewitness is observing events near the end of TWA Flight 800. The lack of any lateral movement (instead of the 13 degrees of azimuth expected), any descent, and the bright orange and red color of the flare, indicate she was observing only the fuel fire at the end.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [18]

Witness Location: 40.9783 N
073.0444 W
Distance From (ft):
Initial Explosion 156206
Second Explosion 158583
Fuel Fire 161026
Azimuth to (deg):
Initial Explosion 140.74
Fuel Fire 134.84
Time for Initial Sound to
Reach Witness (sec): 144.0

Group Assigned: 1



Observations:

Eyewitness was in a sailboat heading into the Mount Sinai Harbor roughly a mile and a half off the North Shore.

Eyewitness saw a very large orange glowing ball in the sky due South of where she was sailing. Seconds later, she saw a sharp, yellow, very distinct, streak rising about it. She stated that it was curved at the end like a hook. She noticed the streak started at the shoreline and traveled up in the sky and veered Westbound. She heard no sound and stated the whole event lasted no more than three to four seconds.

Conclusion:

Eyewitness was observing the fireball at the end of TWA Flight 800's flight. The large orange glowing ball in the sky description fits the fuel burning after release from the left wing. The description of the path as a hook also matches other descriptions such as a Cobra head or a Nike 'whoosh' sign.

(b) (6)
(b) (7) (c)

Witness:

[redacted] [19]

Witness Location: 41.2500 N
072.2000 W

Distance From (ft):

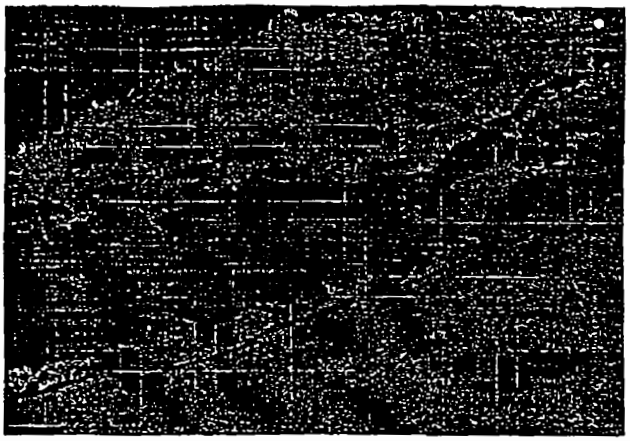
Initial Explosion	257812
Second Explosion	252620
Fuel Fire	243771

Azimuth to (deg):

Initial Explosion	211.50
Fuel Fire	209.31

Time for Initial Sound to Reach Witness (sec): 237.1

Group Assigned: 1



Observations:

Eyewitness was fishing on his boat in the Long Island Sound, approximately four miles due North of Plum Island and Nyanick Bay, when he saw what he thought was a "parachute flare" rising from the land into the sky above him.

He described the flare that looked like a comet, with a red fire ball and a red tail. Seconds later, he saw one huge explosion, occurring approximately 30 miles Northeast of him. He stated the time frame from the comet-like flare till the explosion lasted no more than 10 to 15 seconds and he heard no noise.

Conclusion:

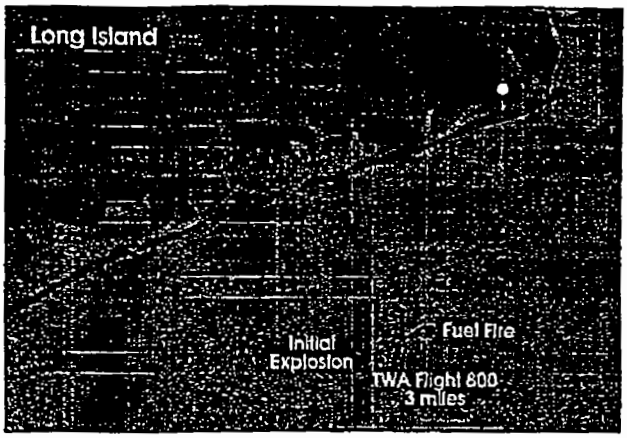
The short time frame of the eyewitnesses observations (10 to 15 seconds), and the observed "huge explosion", limits the observations to the end of TWA Flight 800's flight path.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [20]

Witness Location: 40.8418 N
072.5538 W
Distance From (ft):
Initial Explosion 80304
Second Explosion 75525
Fuel Fire 67552
Azimuth to (deg):
Initial Explosion 207.31
Fuel Fire 198.55
Time for Initial Sound to
Reach Witness (sec): 74.83

Group Assigned: 1



Observations:

The eyewitness observed an orange colored "arc" moving upward from behind trees South-Southwest of her home. The arc continued to travel upward and appeared to bend to the left a little at the end. Then the arc, which appeared to dissipate into a "little round glow" for 2-3 seconds, ended in a large explosion.

At first, she thought that what she saw was fireworks. However, when the arc ended in a large explosion, she no longer believed the arc to be fireworks. She is sure that what she saw was a missile based on what she has seen on television and the movies.

Conclusion:

The short time frame, the minor lateral movement, and the lack of a long descent phase before the end fireball event, all indicate the eyewitness only observed events at the end of TWA Flight 800's flight. The total time of the eyewitness' observations are most likely under ten seconds before the explosion. The total azimuth change expected would be eight degrees. Finally, if the eyewitness had observed the aircraft ascending, she should have observed a 25 seconds descent phase before the final fireball.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [21]

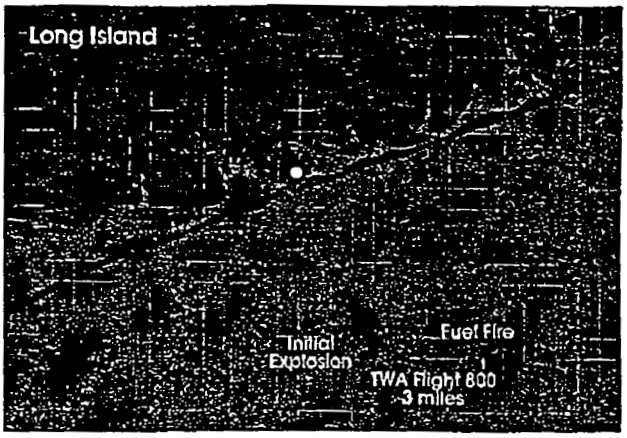
Witness Location: 40.7815 N
072.7515 W

Distance From (ft):
- Initial Explosion 52515
- Second Explosion 52977
- Fuel Fire 53564

Azimuth to (deg):
- Initial Explosion 160.14
- Fuel Fire 141.72

Time for Initial Sound to Reach Witness (sec): 49.86

Group Assigned: 1



Observations:

Witness was taking boat on test run and was in Moriches Bay, not far from the Coast Guard Station heading in the direction of Fire Island.

Witness noticed a bright light in the sky. He looked up and noticed a column of smoke went from the bright light down to the ground or water. He stopped his boat to watch, and a few seconds later, the bright light became more intense and broke into two fireballs as it fell. He told his son it looked as if a propane tank had blown up.

The eyewitness described the light he first saw as being white-orange in color. It then grew more intense in brightness and broke into two, red balls of fire.

He said the column of smoke resembled a trail left by something being shot up into the sky. He did not see anything moving from the ground upward, but when he saw the light and explosion, he concluded the smoke came from something being shot upward. He said the smoke on both sides of column were dark grey, almost blackish in color and seemed to spiral or twist upward on both sides. In the middle of the column was a lighter-colored, greyish smoke. Because of his experience as a fire fighter, he thought this might have been caused by a propane tank exploding.

The eyewitness did not hear any sounds associated with his sightings. He advised that his motor drowned out other noises.

Conclusion:

Column of smoke, intense bright light, and two fireballs are consistent with observations at the end of TWA Flight 800's flight. In addition, the eyewitness did not report any lateral motion (expected over 18 degrees) nor any descent phase. Therefore, this eyewitness' observations are limited to the final moments of TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [22]

Witness Location: 40.8383 N
072.8117 W

Distance From (ft):

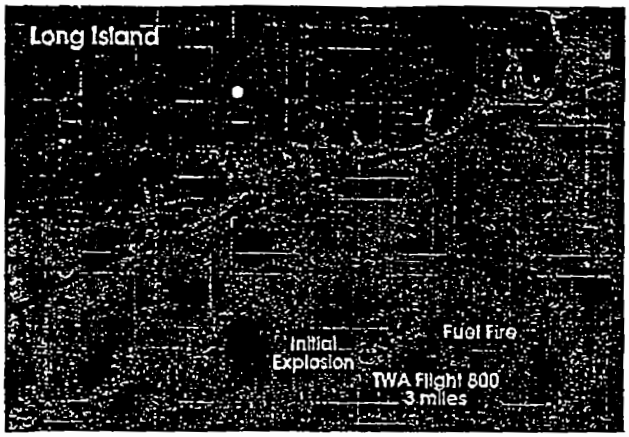
Initial Explosion	78109
Second Explosion	79165
Fuel Fire	80110

Azimuth to (deg):

Initial Explosion	153.79
Fuel Fire	141.54

Time for Initial Sound to Reach Witness (sec): 72.84

Group Assigned: 1



Observations:

The eyewitness was walking near the club house at the Pine Hills Golf Club, when he heard the sounds of an aircraft, and having some interest in airplanes, glanced toward the sky. He observed a large commercial airplane flying West to East and South of his location, probably over water. The aircraft had an unusual amount of black smoke spewing from the wing area (he thinks it is the left wing). A second later, he glanced again and saw what he described as a "red glow" or "red dot" on the aircraft.

The airplane started nosing at an angle towards the ground. He continued looking as the airplane disappeared behind trees in the horizon. He heard a blast and saw a red flash through the trees and extending upwards. He further states that the aircraft appeared to remain intact for the period of his observations.

Conclusion:

The sound that the eyewitness heard was not associated with this event. Since the eyewitness did not describe an ascent phase, his observations began after the second explosion at the apex of TWA Flight 800's flight path. This also correlates with his extended time viewing the aircraft traveling West to East (the total azimuth change would be around 12 degrees) and showing as a red glow or dot with black smoke. The eyewitness does not get a good view of the end fireball due to trees blocking his vision, though he does report seeing a red flash through the trees.

Therefore, this eyewitness observed a large part of TWA Flight 800's flight path, but not the initial explosion that caused the aircraft to crash.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [23]

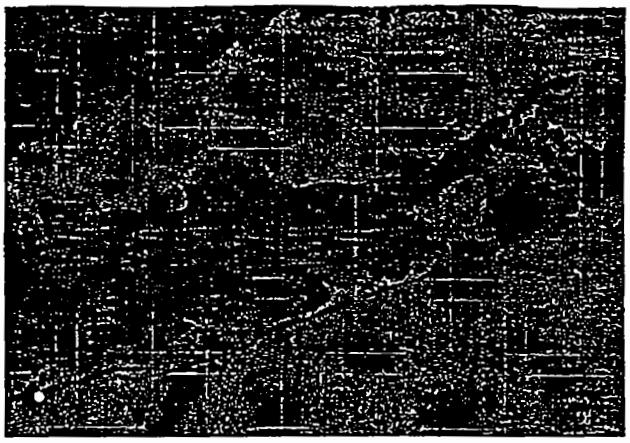
Witness Location: 40.5945 N
073.5029W

Distance From (ft):
- Initial Explosion 226551
- Second Explosion 233077
- Fuel Fire 242502

Azimuth to (deg):
- Initial Explosion 84.98
- Fuel Fire 83.54

Time for Initial Sound to Reach Witness (sec): 208.4

Group Assigned: 1



Observations:

Eyewitness was flying in a private Cessna at about 2000 ft above Jones Beach.

The eyewitness described observing a "bright stripe of light" which "looked like an S" a few seconds prior to witnessing a fireball. He was unable to tell whether the "bright stripe of light" was ascending or descending and that his initial impression was that it might be some phenomenon of sunlight. He stated that upon observing the fireball, his first thought was not of an airplane but that a ship or oil platform might have exploded.

Conclusion:

The "bright stripe of light" is the end fireball, but seen as a side view (as opposed to most view which are more perpendicular). The eyewitness does not describe a long observation time so he was not observing events close to the initial explosion.

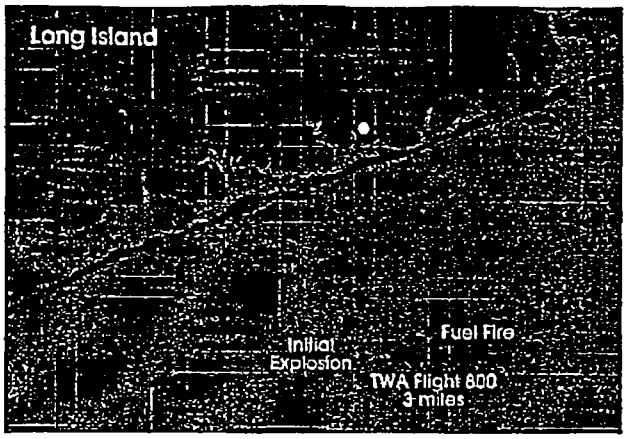
(b) (6)
(b) (7) (c)

Witness:
[redacted] [24]

Witness Location: 40.8125N
072.6876 W

Distance From (ft):	
Initial Explosion	60699
Second Explosion	58802
Fuel Fire	55576
Azimuth to (deg):	
Initial Explosion	179.84
Fuel Fire	163.79
Time for Initial Sound to Reach Witness (sec):	57.17

Group Assigned: 1



Observations:

Eyewitness was on his deck which faces the South shore. He was having dinner when his wife observed a white ball shooting across the sky and brought this to his attention. He advised that it looked like a shooting star. He advised that the white ball traveled in an arc from right to left (approximately West to East).The arc traveled on an decline from its initial sighting. The ball left a "skinny" white trail. From their position, looking South, at approximately a nine (9) o'clock position the ball exploded into a large whitish grey ball of smoke. Then a wide orange/reddish flame traveled upward to the smoke ball. Shortly after the wide area of flame disappeared, two strong earthquake type rumblings were felt and heard. He advised that the entire incident occurred in ten (10) seconds or less. He commented that the fireball and arc were East of the accident site. Additionally, he advised that it appeared to occur over the bay.

(b) (6)
(b) (7) (c) [redacted] his wife corroborated the above information.

Conclusion:

Eyewitness observed events at around ten seconds before the end fireball. He did not observe the initial explosion as he did not observe an ascending object, nor would events occurring ten seconds prior to the fireball be at the first part of TWA Flight 800's flight. The eyewitness did give an excellent description of the end fireball reported as a wide area of orange/reddish flame. The timing of the earthquake type rumblings is also consistent with a 57 second propagation time- well after the time for the aircraft to hit the water.

(b) (6)
(b) (7) (c)

Witness: [redacted] [25]

Witness Location: 40.7495 N
072.8193 W

Distance From (ft):

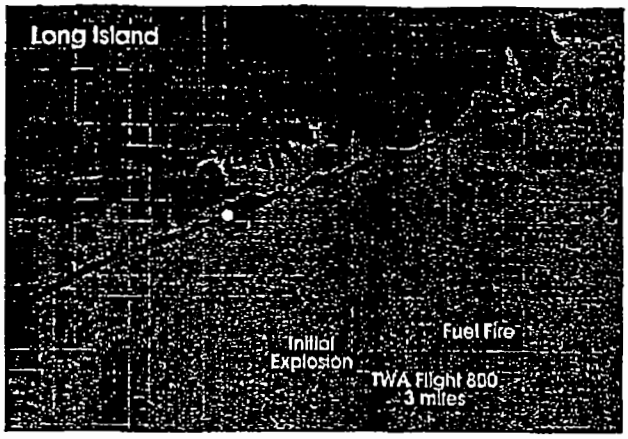
Initial Explosion	52544
Second Explosion	55683
Fuel Fire	60149

Azimuth to (deg):

Initial Explosion	135.86
Fuel Fire	120.30

Time for Initial Sound to Reach Witness (sec): 49.89

Group Assigned: 1



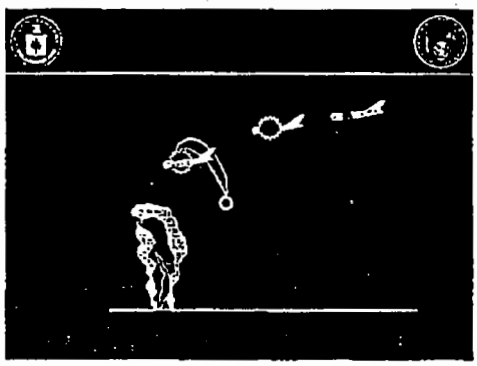
Observations:

Eyewitness is a former fireman who was fishing off the second cut on the beach at Smith Point, approximately three miles West of Moriches Inlet. He looked up into the sky and saw the red lights blinking on the side of a plane, and a star in the sky (see 1 below). He then saw an instant burst and flames start coming down in a mushroom shape (2). He did not see any rocket launched. Like the radio reported. He said he would have seen it if a missile went off. Approximately two seconds after the first explosion, a second burst of flames occurred and flames traveled back upward toward the first burst of flames (3). He believes this was a result of unburned fuel. Within a matter of seconds, the water was on fire and smoke was in a mushroom shape traveling up into the sky (4). The smoke was black nearer the water and a white cloud in the sky.

Conclusion:

Eyewitness gives a detailed description of the final moments of TWA Flight 800. Since his observations are of a short time period close to the final fireball and he see no ascent phase, he could not have seen the initial explosion.

Of particular interest is his comment of the flames traveling from the second burst to the first one. This description is similar to several other descriptions of a red object ascending for 2 to 3 seconds.



(b) (6)
(b) (7) (c)

Witness:
[redacted] [26]

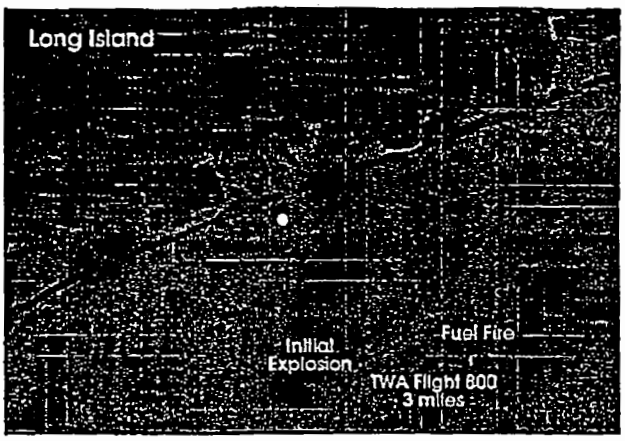
Witness Location: 40.7667 N
072.6833 W

Distance From (ft):
- Initial Explosion 44014
- Second Explosion 42081
- Fuel Fire 39369

Azimuth to (deg):
- Initial Explosion 181.33
- Fuel Fire 158.66

Time for Initial Sound to Reach Witness (sec): 42.36

Group Assigned: 1



Observations:

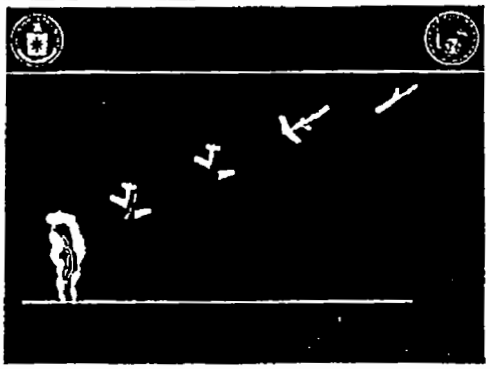
Eyewitness was on boat one mile off Great Gun Beach. He first sighted a yellow 'shooting star' moving in a downward 45 deg sloping arc toward the North, which grew progressively brighter and larger. At the instant he recognized it as a plane, he noted that it had rolled over onto its left side, and seemed to be hooking Northward and downward. Immediately, the entire right wing separated from the fuselage. At this instant, a large "fire trail" erupted and he felt a concussion on his chest. The separated wing disappeared into this fire trail. The plane then dropped sharply, separated into two parts, being the right wing and fuselage, dropped about one mile, and then hit the water. As the two pieces hit the water a large curtain of water arose and he saw black smoke coming from the impact area.

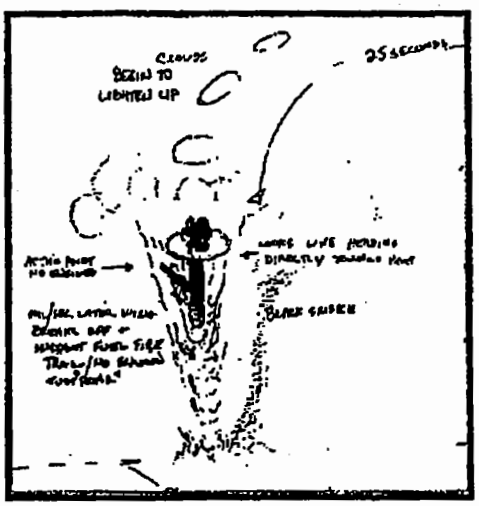
This eyewitness was the closest to the accident who was not on an airplane.

Conclusion:

Since the eyewitness did not observe the object ascend, and his observations are limited to about 25 seconds before the fireball, he could not have seen the initial explosion.

The eyewitness does give several interesting observations. The sound reaching the witness at the same time as the wing separates fixes the time after the initial explosion that this event occurs at about 42 seconds. He also saw a fire trial go to the left wing (the left wing separated from debris- the witness was viewing the top of the plane and not the bottom). Finally, he commented that the wing and fuselage produce two distinct fireballs that fell to the ocean.





(b) (6)
(b) (7) (c)

Witness:
[redacted] [27]

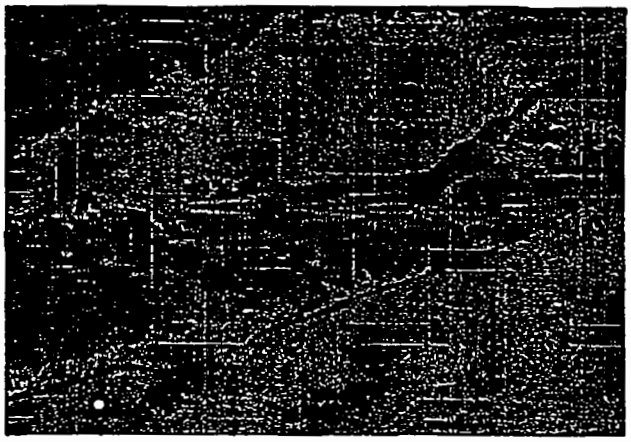
Witness Location: 40.5784 N
073.3654 W

Distance From (ft):
- Initial Explosion 189357
- Second Explosion 195958
- Fuel Fire 205577

Azimuth to (deg):
- Initial Explosion 82.30
- Fuel Fire 80.81

Time for Initial Sound to Reach Witness (sec): 174.3

Group Assigned: 1



Observations:

The eyewitness was fishing and about three to five miles from Fire Island Inlet and approximately three miles from shore (placing the boat somewhere between Fire Island Inlet and Jones Inlet). He observed an airplane traveling in an Easterly direction. The plane was located about 2 to 3 miles South of their boat. He noted that the plane was glowing red and orange to the rear of its nose and extended all the way to the tail section. He watched the plane continue to fly for about a half a minute to a minute. He lost view of the plane as it came across the post (port?) side of the captains pilot house and he did not attempt to observe it any longer.

Conclusion:

The eyewitness was most likely observing sun glint of an aircraft. When the plane was close to his position, the flight data recorders were still operating and showed no signs of unusual activity, nor would they for the flight up to the initial explosion.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [28]

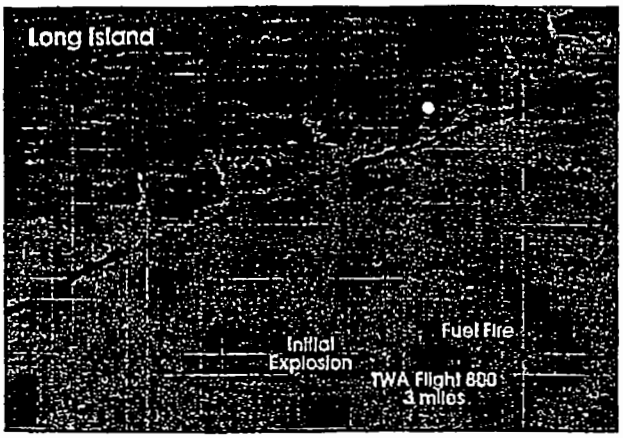
Witness Location: 40.8278 N
072.6268 W

Distance From (ft):
- Initial Explosion 68331
- Second Explosion 64836
- Fuel Fire 58964

Azimuth to (deg):
- Initial Explosion 194.10
- Fuel Fire 181.26

Time for Initial Sound to Reach Witness (sec): 64.02

Group Assigned: 1



Observations:

Eyewitness was driving Southwest on Suffolk County Road 51, South of Sunrise Highway and North of Montauk Highway, in East Moriches N.Y. He saw a bright yellow flame, thin at the top and wider at the bottom, moving downward slightly left to right and then out of his view over the horizon. He saw no objects or smoke trails in any direction before or after seeing the flames.

Conclusion:

Eyewitness most likely saw the end fireball which was described as a yellow flame. This is also consistent with only a slight lateral motion. However, since there are no points of reference for his observations (no sound or two objects) he could have been seeing the aircraft descending, which eventually leaves his point of view (the fireball would be at about a 6 degree elevation angle).

Given either possibility, the eyewitness did not observe the aircraft close to the initial explosion. He did not observe an ascending object and his observations are limited to just the time close to the end fireball.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [29]

Witness Location: 40.7367 N
072.8542 W

Distance From (ft):

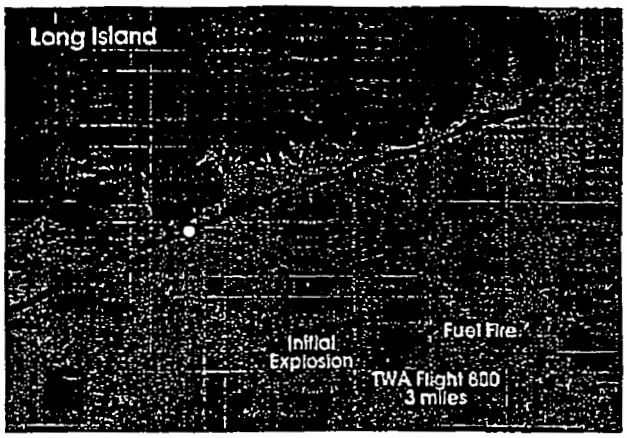
Initial Explosion	56828
Second Explosion	60933
Fuel Fire	66714

Azimuth to (deg):

Initial Explosion	125.53
Fuel Fire	112.62

Time for Initial Sound to Reach Witness (sec): 53.70

Group Assigned: 1



Observations:

Eyewitness was on beach at Smith Point just East of the boardwalk when she observed a huge "fireball" grow from a black/silvery dot in the sky. She watched as the red/orange fireball, which appeared to be momentarily suspended in one spot, began to fall toward the ocean. The fireball was outlined in black. About one-half of the distance from the horizon to the explosion spot in the sky, the fireball broke into two pieces; one pencil or telephone shaped, and one shaped like a circle. Both pieces continued to fall toward the ocean with the larger pencil-shaped piece falling slightly ahead of the smaller circular-shaped piece. The two pieces were both encircled in flames and close together.

Approximately 5-10 seconds after the pieces hit the water, she observed a white "flare" type of light rise from the right (West) side of where the two flaming pieces impacted the ocean. The "flare" was pink on the outside and white on the inside. The "flare" appeared to be followed by a black trail of smoke and arced to the East before fading out.

The eyewitness did not hear any sounds associated with these observations.

Conclusion:

The eyewitness is observing events only around the final fireball event. She gives a very detailed description of the moments, and development of the fireball. Since her observations did not include an ascent phase and they are limited to only the time close to the end fireball, she could not have seen the initial explosion on TWA Flight 800.

The eyewitness does make an interesting observation on events happening after the pieces hit the ocean. She describes seeing a "flare" which is pink on the outside and white on the inside. This "flare" rose and arced to the East. This could be what some of the witnesses at the end are observing (though it could not be confused with the fire trail some witnesses observe as that happens while the aircraft is still in the air).

(b) (6)
(b) (7) (c)

Witness: [redacted] [30]

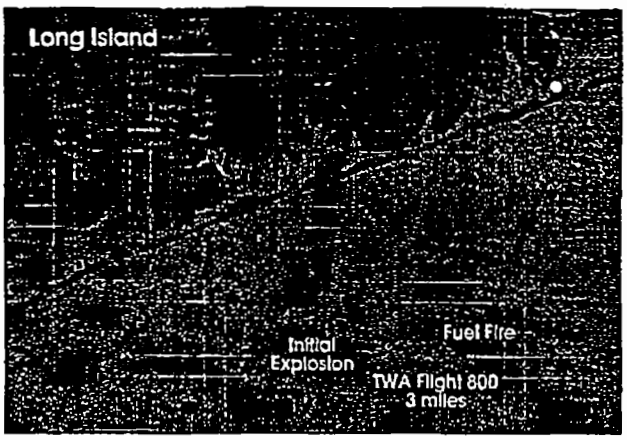
Witness Location: 40.8443 N
072.5035 W

Distance From (ft):
- Initial Explosion 88289
- Second Explosion 82882
- Fuel Fire 73959

Azimuth to (deg):
- Initial Explosion 215.09
- Fuel Fire 208.59

Time for Initial Sound to Reach Witness (sec): 82.06

Group Assigned: 1



Observations:

Eyewitness was in a boat immediately to the West side of the Ponquogue Bridge, looking South at the Barrier Island when he noticed something out of the corner of his eye. He saw a red glow in the Southwest, going straight up for approximately three seconds. Then he described a separation in this red glow as it reached its highest point; a red flame then went upward from the red glow.

After the red glow went out, what remained was black smoke with white smoke on top of the black smoke.

The eyewitness then heard two loud booms about twenty-five seconds later; one after the other.

The eyewitness related that this whole occurrence must have been far away, because the entire event was low on the horizon, approximately eye level.

The investigating officer took GPS readings and a magnetic compass reading from where the eyewitness was. These readings have not been provided to the CIA at this time.

Conclusion:

There are several factors which place the eyewitness' observations to the final fuel fireball. One, he observes no later motion (should get about 6.5 degrees). Second, the description of a red flame matches the fuel burning at the end. Finally, the sound from the initial event should take 82 seconds to reach the witness. His observations end 25 seconds earlier, or about at 57 seconds after the initial explosion. This is about the time the plane hit the water (actual time around 50 seconds).

(b) (6)
(b) (7) (c)

Witness:
[redacted] [31]

Witness Location: 40.7125 N
073.0758 W

Distance From (ft):

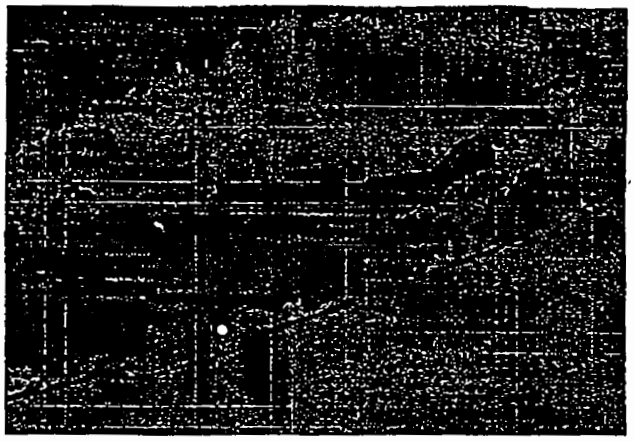
Initial Explosion	110192
Second Explosion	115949
Fuel Fire	123977

Azimuth to (deg):

Initial Explosion	102.58
Fuel Fire	97.70

Time for Initial Sound to Reach Witness (sec): 102.0

Group Assigned: I



Observations:

Eyewitness was on boat located in the Great South Bay at the end of the Connetquot River.

At exactly 8:23 PM, eyewitness looked in the sky and saw an explosion in the air. She did not hear any noise associated with the explosion. After the explosion, objects were seen falling from the sky. The falling objects were described as being bright red and orange in color. It took approximately 15-20 seconds for the objects to fall behind the horizon. She stated that the explosion resembled fireworks and the fallen objects resembled a distress flare.

Conclusion:

Eyewitness observed only the fireball near the end of TWA Flight 800's flight. She did not observe an ascending object or an extended descent phase (only falling objects after the explosion). And, the red and orange explosion matches other witnesses' description of the fuel burning in the air.

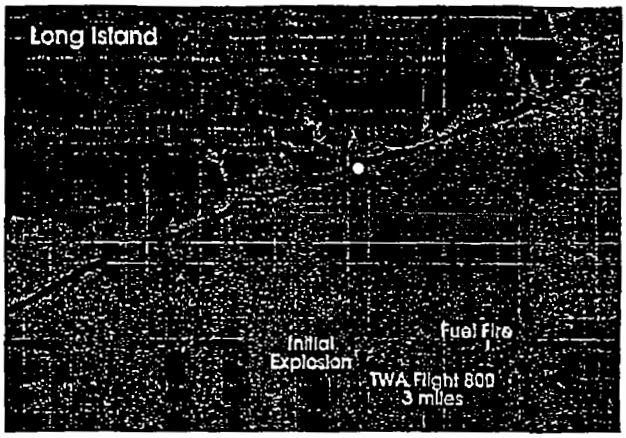
Since the eyewitness observations are limited to the end event, she did not see the initial explosion of TWA Flight 800, and therefore no missile attack on the aircraft.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [32]

Witness Location: 40.7833 N
072.6904 W
Distance From (ft):
Initial Explosion 50063
Second Explosion 48347
Fuel Fire 45720
Azimuth to (deg):
Initial Explosion 178.92
Fuel Fire 159.13
Time for Initial Sound to
Reach Witness (sec): 47.69

Group Assigned: 1



Observations:

Eyewitness was having dinner at John Scott's Restaurant on Dune Road in West Hampton, when he looked up and saw a reddish orange glowing ball. It appeared to be directly overhead. It looked like the ball from a Roman candle. He saw no falling debris at this point. He did not think it was a plane. He tracked it for 15-20 seconds. It then exploded and burst into flames. It broke into several pieces.

There was a haze over the ocean so he could not see the impact when the plane hit the water. He did hear two explosions and felt the concussion in his chest.

He did not see anything else in the sky. The glowing ball did not appear to be dropping when he saw it before the explosion. He saw nothing leave from the ground. He did not see any flames or smoke emitting from the glowing ball.

The glowing ball was traveling from his right to his left.

Conclusion:

Eyewitness observed TWA Flight 800 for no more than 20 seconds before the final fireball. He did not see any object ascending, and curiously did not see the object descend during the 20 seconds. It is possible that he did observe the object descend because he only saw the end fireball.

The sound propagation would put the initial explosion noise reaching his position in about 48 seconds, which is only a few seconds before the plane struck the water.

Since the eyewitness observations are only at the end of TWA Flight 800's flight, he could not have seen the initial explosion, and therefore no missile attack on the aircraft.

(b) (6)
(b) (7) (c)

Witness: [redacted] [33]

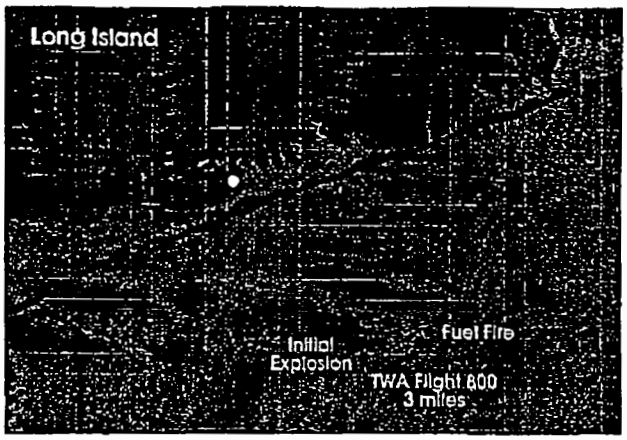
Witness Location: 40.7748 N
072.8151 W

Distance From (ft):
- Initial Explosion 58804
- Second Explosion 61164
- Fuel Fire 64372

Azimuth to (deg):
- Initial Explosion 142.95
- Fuel Fire 127.04

Time for Initial Sound to Reach Witness (sec): 55.47

Group Assigned: 1



Observations:

Eyewitness was in the parking lot of Paisley's Restaurant when she noticed what she thought were fireworks in the Southeast sky, out beyond Fire Island over the Atlantic Ocean. It appeared to start halfway up in the sky. She said to her children "Hey guys look at the fireworks!". A ball of flames burst above where she saw the rocket. A smaller ball of flames fell from the larger one and sparks and flames rained down toward the water. This all took about ten to twelve seconds. The ball of flames appeared to be suspended in the sky for a seconds of two then it fell. There was lots of blue smoke. She then said to her children, "Only one firework. Oh, no more. Let's go".

She measured the height of the fireball in the sky by placing the edge of her hand on the horizon. She then placed her fingers one on top of the other until she reached the apparent spot in the sky where the fireball was. It was six fingers high in the sky.

Conclusion:

Eyewitness observed TWA Flight 800 after the second explosion at the apex of the aircraft's flight. She did not see any object ascending (object started halfway up in the sky). The eyewitness describes seeing two different objects (the wing and fuselage) falling form the explosion site. Although from her description it is difficult to pinpoint exactly where her observations begin, it is most likely she saw events only near the end fireball.

Since the eyewitness observations are only at the end of TWA Flight 800's flight, he could not have seen the initial explosion, and therefore no missile attack on the aircraft.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [34]

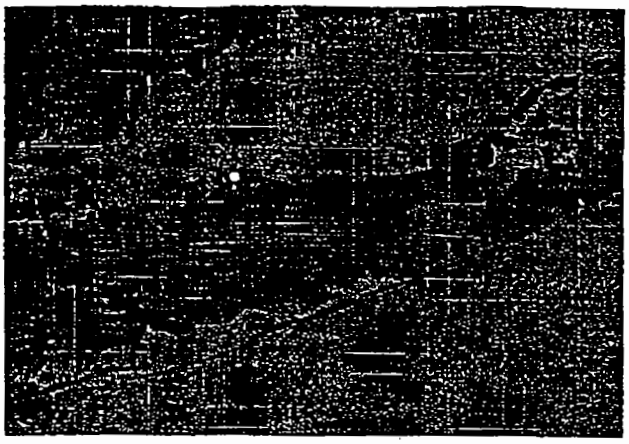
Witness Location: 40.9783 N
073.0449 W

Distance From (ft):
- Initial Explosion 156293
- Second Explosion 158674
- Fuel Fire 161124

Azimuth to (deg):
- Initial Explosion 140.70
- Fuel Fire 134.81

Time for Initial Sound to Reach Witness (sec): 144.1

Group Assigned: 1



Observations:

Eyewitness was on a boat, one mile North of Mt Sinai, when she saw what looked like a rocket rise from the Southeast. She explained that it appeared to be like a rocket used in fireworks, with a red-orange ball and tail. She did not observe any smoke and didn't hear anything because the boat's engines were running. She advised that the rocket followed an arched path and then she saw an explosion with the fireball to the left and black objects to the right. She explained that everything fell out of view and then she saw smoke rising. She thought that a house on land may have suffered a gas explosion until she heard news of the plane crash.

Conclusion:

Although it is difficult to pinpoint the exact start of the eyewitness' observations, she does give a good description of the end fireball, including seeing multiple objects (and this from about 30 miles away). Eyewitness describes a red-orange ball as traveling along an 'arched' path ending in the fireball. This is most likely limited to just the final fireball event. However, if the lateral component of this arch is large, and if the total time the eyewitness observed the arch was long, she could have seen more of the event. However, it is clear the eyewitness did not observe the initial explosion that brought down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [35]

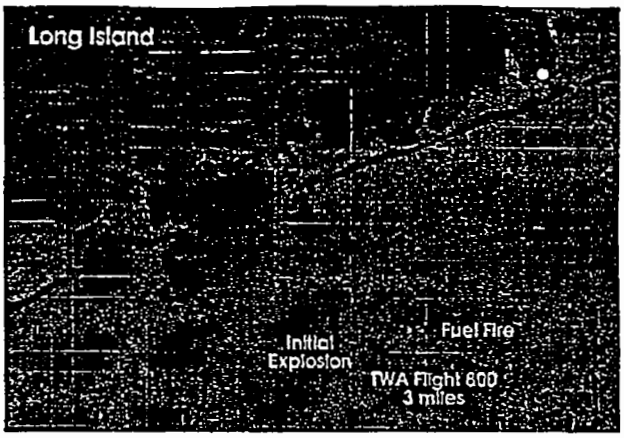
Witness Location: 40.8514 N
072.5150 W

Distance From (ft):
- Initial Explosion 88677
- Second Explosion 83468
- Fuel Fire 74822

Azimuth to (deg):
- Initial Explosion 212.45
- Fuel Fire 205.50

Time for Initial Sound to Reach Witness (sec): 82.41

Group Assigned: I



Observations:

Eyewitness was on a small beach in Southampton, two beaches West of Ponnequoge Beach, looking over the water.

The eyewitness saw a red navigator light from an airplane in the distance. He then saw an orange firework, with a tail, in the air Southwest of him. The firework traveled up, then arched down before he lost sight of it.

Seconds later he saw a second and third firework in the sky simultaneously. Both were orange with tails and they traveled in the same arching pattern of the first firework.

Approximately 30 seconds alter, he heard a rumble and saw a blue vertical line of smoke stretch down to the horizon. The blue clod remained for three to four minutes.

Conclusion:

Eyewitness is observing events just prior and during the final fireball. The second and third firework (which are most likely the wing and fuselage of the aircraft) traveling in the same "arch" pattern as the first indicates that the eyewitness was observing smaller 'arch' trajectories. The red navigator light on the aircraft was the fire on the aircraft prior to the end fireball, and has been described by other witnesses (though usually as orange or red-orange).

Since the eyewitness did not observe the initial explosion, he could not have witnessed any events relative to a missile shooting down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [36]

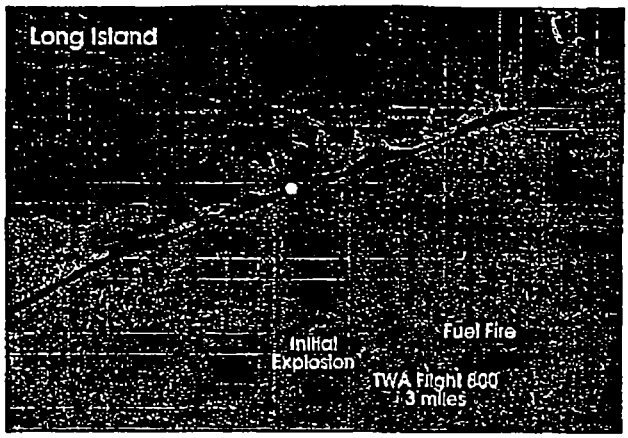
Witness Location: 40.7687 N
072.7527 W

Distance From (ft):
- Initial Explosion 48276
- Second Explosion 49037
- Fuel Fire 50205

Azimuth to (deg):
- Initial Explosion 157.89
- Fuel Fire 138.12

Time for Initial Sound to Reach Witness (sec): 46.11

Group Assigned: 2



Observations:

Eyewitness was fishing off a boat in the Northern section of Moriches Inlet when he observed a flare ascending four to six miles East from his position. He described the flare as an orange ball that traveled at a 10:00 angle (from perpendicular) from his position and increasing in brightness. Approximately one minute following his flare observation, he saw two large sections descending towards the oceans with one section in flames and the other leaving a small trail.

He estimated that the flare reached an altitude of 15,000 to 20,000 feet and was traveling slowly. He did not observe any smoke trail coming from the flare at its point of origin.

Conclusion:

Due to the extended time frame of the eyewitness' observations (one minute), he began observing TWA Flight 800 soon after the initial explosion. The steep rise (10:00 angle) is similar to the ascent reported by other eyewitnesses after the initial explosion. However, this eyewitness observed an orange object, not white as other eyewitnesses report.

There is a gap in the eyewitness' observations from the ascent to the final fireball. However, the eyewitness does describe the two objects falling from the fireball, similar to other eyewitness reports.

Although this eyewitness observe events close to the initial explosion of TWA Flight 800, he reports only one object until the end fireball, and his observations are consistent with the aircraft pitching up after initial explosion.

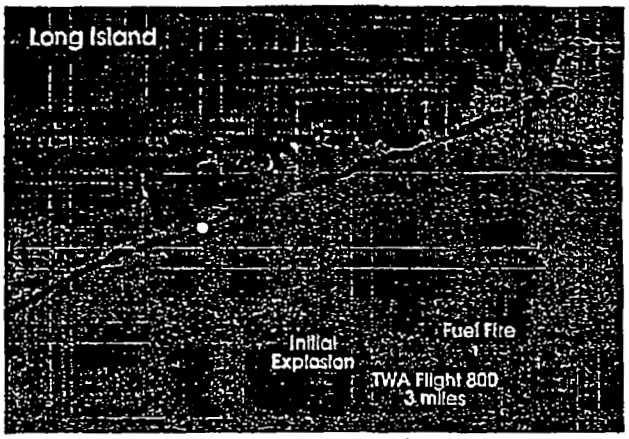
(b) (6)
(b) (7) (c)

Witness:
[redacted] [37]

Witness Location: 40.7400N
072.8500 W

Distance From (ft):	
Initial Explosion	56607
Second Explosion	60561
Fuel Fire	66125
Azimuth to (deg):	
Initial Explosion	127.20
Fuel Fire	113.97
Time for Initial Sound to Reach Witness (sec):	53.51

Group Assigned: 1



Observations:

Eyewitness was camping at Smith Point County Park . Around dusk, the eyewitness' husband said, 'Come here, look at this". She went to a large picture window in her trailer and her husband pointed to an object in the sky. The window was facing South, toward the ocean. The sky was clear, not very dark, and stars were beginning to be visible, as she looked South and a little toward the East. She saw a red object going up in the sky over the ocean which looked like a flare or bottle-rocket type of firework. As the object went up, she saw a whitish-colored piece of the object fall off the left side of it and travel downward in an "arch" shape. The flare-like object then traveled straight down. She then saw black smoke in the sky in a spiral shape where the object had been. The whole incident lasted a few seconds. She did not hear any loud noises or witness any explosions.

Conclusion:

The eyewitness is observing events only near the end fireball event. She did not observe any extended ascent or descent phase expected if the entire flight path of TWA Flight 800 has been observed. She also described seeing two objects fall to the ocean. Finally, the entire event described by the eyewitness was only a "few seconds".

Since the eyewitness did not observe the initial explosion, she could not have witnessed any events relative to a missile shooting down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [38]

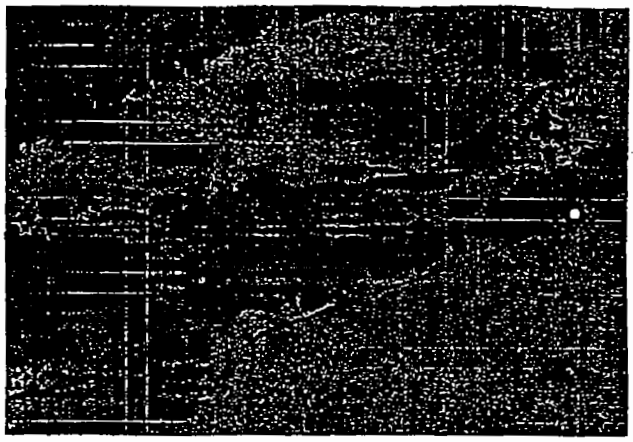
Witness Location: 40.9192 N
072.2576W

Distance From (ft):
- Initial Explosion 154821
- Second Explosion 148521
- Fuel Fire 138431

Azimuth to (deg):
- Initial Explosion 230.10
- Fuel Fire 228.32

Time for Initial Sound to Reach Witness (sec): 142.7

Group Assigned: I



Observations:

The eyewitness was on the beach in Bridgehampton directly overlooking the ocean. While looking Southwest, at a time just before dark, she saw the end part of something going up in the air. She explained that she did not actually see any defined object, but she saw a smoky orange streak. She could not see where the streak originated from, but it seemed to move from East to West.

The streak lasted only for about one or two seconds, when it burst into a very large bright orange-red round fire. The fire descended and became uneven in shape. It descended into the horizon, and was no longer visible. She did not hear anything at the time.

Conclusion:

The elapsed time (1 to 2 seconds) of the eyewitness' observations prior to witnessing the very large bright orange-red round fire (the end fireball), limits this eyewitness' observations to only the final moments of TWA Flight 800. Since the eyewitness did not observe the initial explosion, he could not have witnessed any events relative to a missile shooting down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [39]

Witness Location: 40.7698 N
072.7349 W

Distance From (ft):

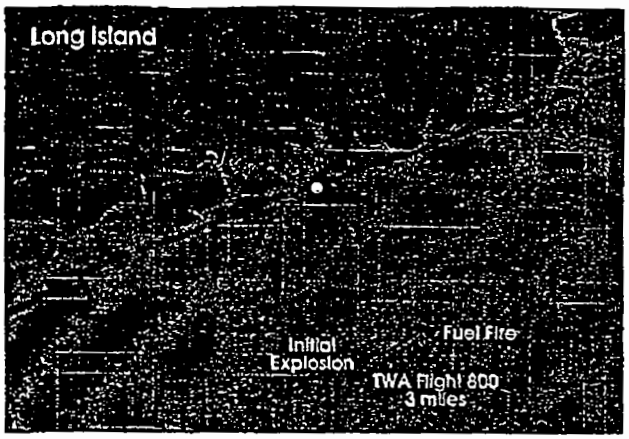
Initial Explosion	47034
Second Explosion	47137
Fuel Fire	47387

Azimuth to (deg):

Initial Explosion	163.64
Fuel Fire	142.89

Time for Initial Sound to Reach Witness (sec): 45.02

Group Assigned: 1



Observations:

The eyewitness was on Mobay (phonetic) section of Long Island Beach, N.Y., and had just looked at her watch and noted it was 8:37 PM, when she noticed an aircraft climbing in the sky traveling from her right to her left. She noticed that the aircraft appeared to level off. She thought the aircraft was too low of an altitude to be leveling off at the time. While keeping her eyes on the aircraft, she observed a "red streak" moving up from the ground toward the aircraft at an approximate 45 degree angle, The "red streak" was leaving a light gray colored smoke trail, The "red streak" went past the right side of the and above the aircraft before arcing back toward the aircraft's right wing. She described the arch's shape as resembling an upside down Nike "swoosh" logo. She advised that her perception of the length of the smoke trail was 15 feet. The smoke trail was narrow initially and widened as it approached the aircraft.

At the instant the smoke trail ended at the aircraft's right wing, she heard a loud sharp noise which sounded like a firecracker had just exploded at her feet. She then observed a fire at the aircraft followed by one or two secondary explosions which had a deeper sound.

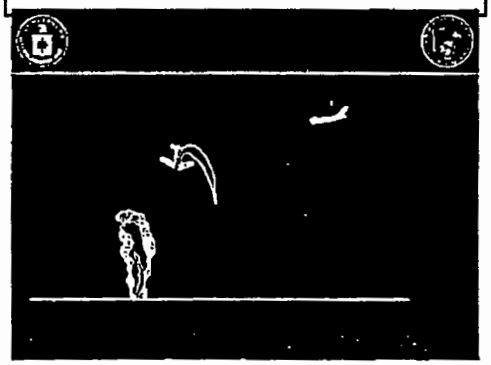
She observed the front of the aircraft separate from the back. She then observed burning pieces of debris falling from the aircraft.

Conclusion:

The eyewitness is observing events close to the final moments of TWA Flight 800. She reports the aircraft's wing separating and hearing a sound (the initial explosion sound takes 45 sec to arrive). The timing of the sound with the reported sightings is slightly off [redacted] [26] observations which was used to time the wing separation at 42 sec after the initial explosion. (b) (6) (b) (7) (c)

The eyewitness describes a "red streak" that terminated at the aircraft's wing. This observation matches other witnesses of seeing flames traveling upward [25], or a fire trail [26], or flames arcing up [45]. The trail ending at the aircraft's wing would indicate that the trail was the released. fuel from the wing tank.

Since the eyewitness did not observe the initial explosion, she could not have witnessed any events relative to a missile shooting down TWA Flight 800.

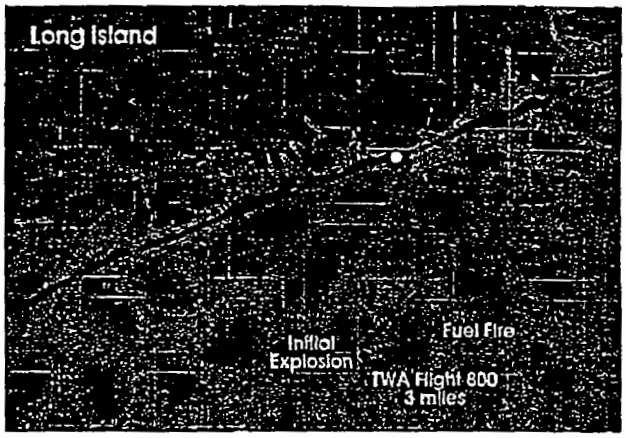


(b) (6)
(b) (7) (c)

Witness:
[redacted] [40]

Witness Location: 40.7915 N
072.6552 W
Distance From (ft):
Initial Explosion 53766
Second Explosion 50841
Fuel Fire 46182
Azimuth to (deg):
Initial Explosion 189.42
Fuel Fire 171.84
Time for Initial Sound to
Reach Witness (sec): 50.98

Group Assigned: 1



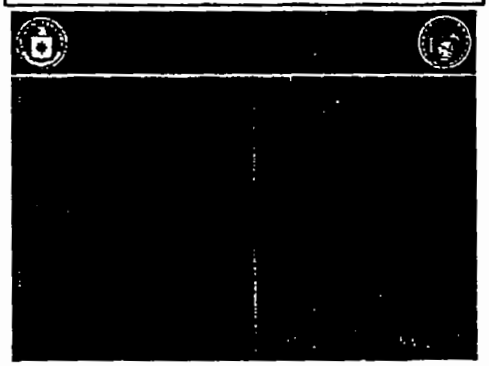
Observations:

The eyewitness was standing on a buildings deck, located on Dune Road in West Hampton, Long Island, N.Y.. He stated that while looking to the South towards the Atlantic Ocean, he observed a red-yellowish flare-type object arcing upward in the sky, followed by a larger reddish explosion. He then observed a flaming object fall out of the explosion area downward toward the ocean. The object separated into two burning sections shortly before he lost sight of them near the horizon.

Conclusion:

The eyewitness observations were limited to just the final moments of TWA Flight 800. The red-yellowish color is consistent with the end fuel fire, and he reported seeing two burning sections (the wing and fuselage sections) come from the large explosion. The ascending object observation at the end of TWA Flight 800's flight is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Since the eyewitness did not observe the initial explosion, he could not have witnessed any events relative to a missile shooting down TWA Flight 800.



(b) (6)
(b) (7) (c)

Witness:
[redacted] [41]

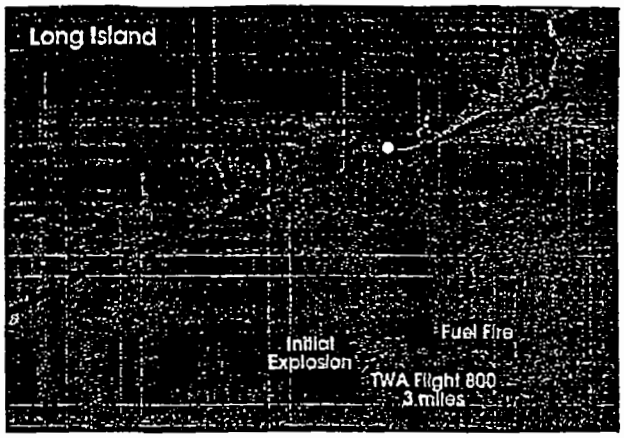
Witness Location: 40.7982 N
072.6638 W

Distance From (ft):
- Initial Explosion 55855
- Second Explosion 53226
- Fuel Fire 48987

Azimuth to (deg):
- Initial Explosion 186.60
- Fuel Fire 169.49

Time for Initial Sound to Reach Witness (sec): 52.84

Group Assigned: 1



Observations:

The eyewitness was on a boat in Moriches Bay. At approximately 8:30 PM, she saw a flare appear in the sky over the Barrier Island of Westhampton Beach. She mentioned to her boating companions that the object in the sky looked like a flare. She described the flare as bright orange or yellow. The flare traveled straight up and did not wiggle. She did not see a smoke trail.

She first saw the flare as it appeared over Dune Road on Westhampton Beach and originally thought is was a firecracker-type object. She said the object was in the air for a few seconds. She then looked away. When she looked at the flare again, it was on its way down. She did not see the flare hit anything.

Conclusion:

The eyewitness was observing events close to the end of TWA Flight 800s path, near the end fireball. She did not see any lateral motion (the flare went straight up) when she should have seen 17 degrees over the entire flight. The time frame the eyewitness reported is also short (assuming she did not look away for very long), not allowing time for the 50 seconds of the aircraft's flight.

Since the eyewitness did not observe the initial explosion, she could not have witnessed any events relative to a missile shooting down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [ ] [42]

Witness Location: 40.7369 N
072.8845 W

Distance From (ft):

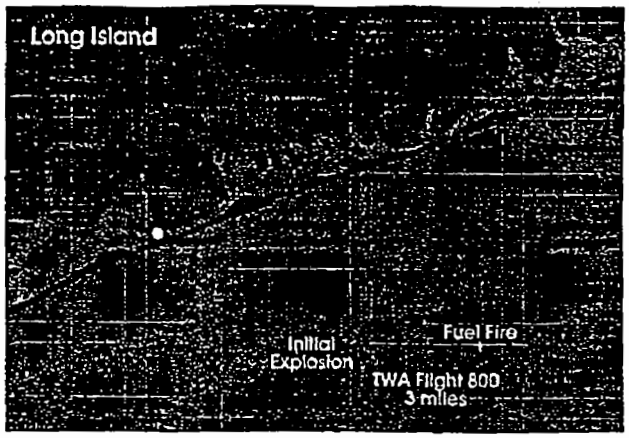
Initial Explosion	63864
Second Explosion	68324
Fuel Fire	74536

Azimuth to (deg):

Initial Explosion	121.19
Fuel Fire	110.18

Time for Initial Sound to Reach Witness (sec): 60.00

Group Assigned: 1



Observations:

The eyewitness was in his boat idling in the Great South Bay West of Smith Point Bridge. He saw a reddish/orange object projecting in an upward Southern position East of the Smith Point Bridge. He stated the object looked like a flare.

He maintained view of the object until he saw an explosion in the air. After the explosion, two large objects were seen falling from the sky. One piece was falling faster than the other. He believed the object was a firework until he got home and heard about the plane crash.

Conclusion:

The eyewitness observed the end fireball with the two large pieces falling out of the explosion. The reddish/orange object that the eyewitness first saw is also at the end of the event. The red/orange color is consistent with the fuel fire. The eyewitness did not see a 25 second descent phase between the ascent and the end fireball. And the eyewitness did not observe an 11 degree azimuth change during his observations. Finally, the ascending object observation is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Since the eyewitness did not observe the initial explosion, he could not have witnessed any events relative to a missile shooting down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [43]

Witness Location: 40.7961 N
072.6397 W

Distance From (ft):

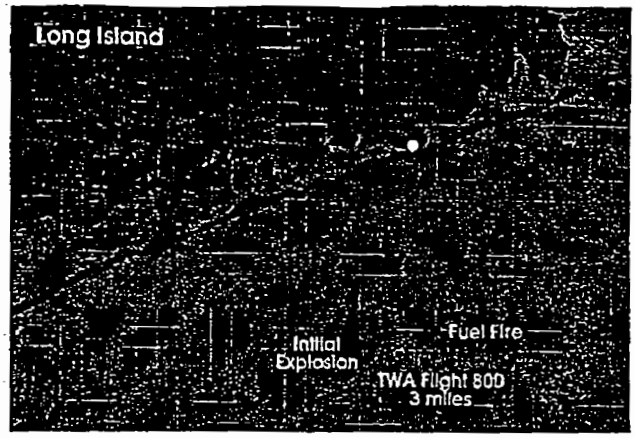
Initial Explosion	56259
Second Explosion	52888
Fuel Fire	47447

Azimuth to (deg):

Initial Explosion	193.45
Fuel Fire	177.26

Time for Initial Sound to Reach Witness (sec): 53.20

Group Assigned: 1

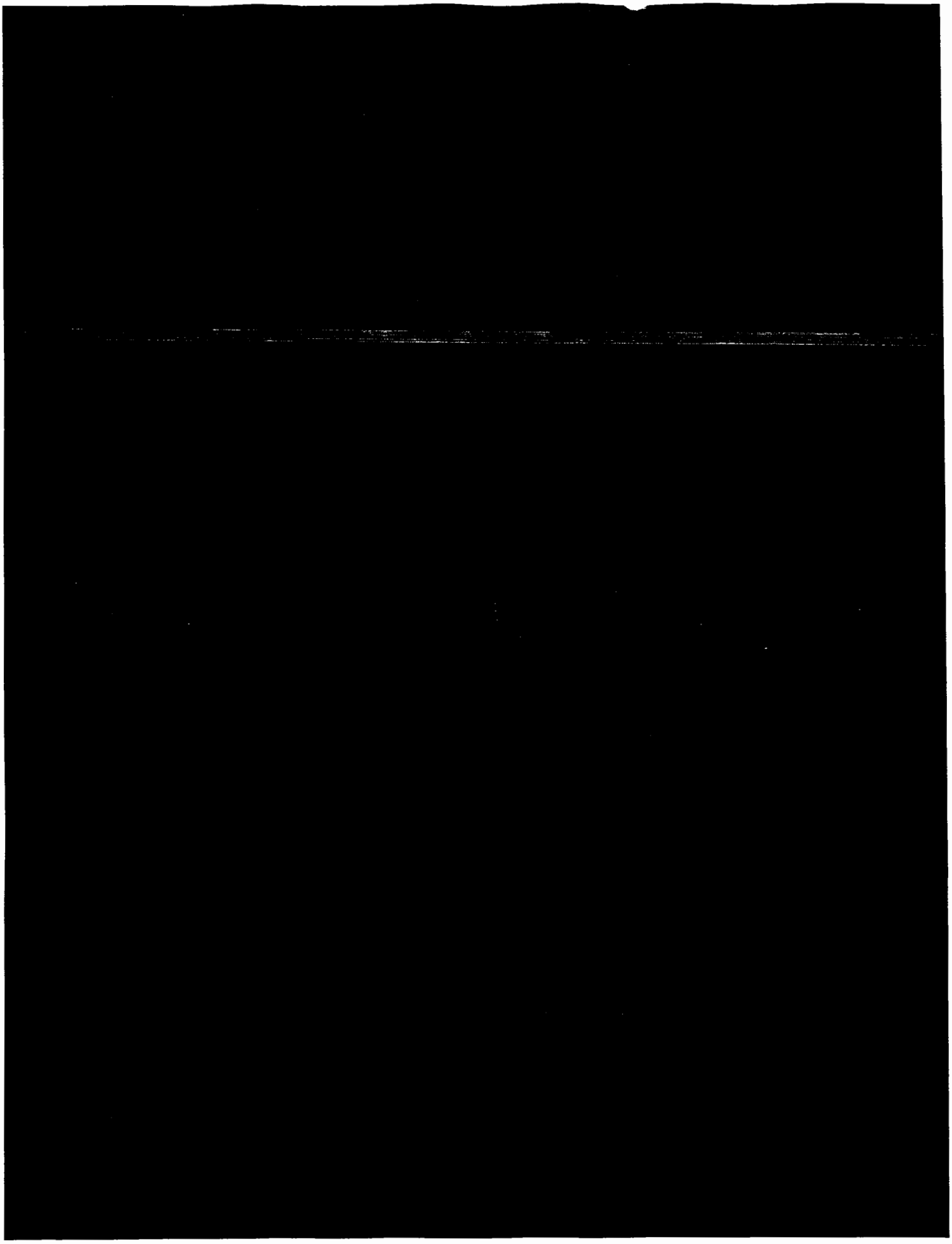


Observations:

The eyewitness was standing on Dune Road in Westhampton Beach, N.Y., when she noticed a very distinct line of black smoke rise up from the water. A second later she noticed a cloud of white smoke, followed by a big glowing red circle of fire rise up further into the atmosphere and come right down to the right of a dredge boat. She stated this event lasted approximately two seconds, followed by two loud "booms", then saw two more minor explosions.

Conclusion:

This eyewitness is observing the effects of TWA Flight 800's debris hitting the water and producing smoke clouds. If the eyewitness were observing events while the aircraft was still airborne, she should see more vertical and horizontal motion as well as a longer time frame. The loud "booms" that the eyewitness heard (produced by the initial explosion) should have arrived at 53.20 seconds, after the aircraft was already in the water (about 50 seconds).



(b) (6)
(b) (7) (c)

Witness:

[redacted] [45]

Witness Location: 40.7691 N
072.5862 W

Distance From (ft):

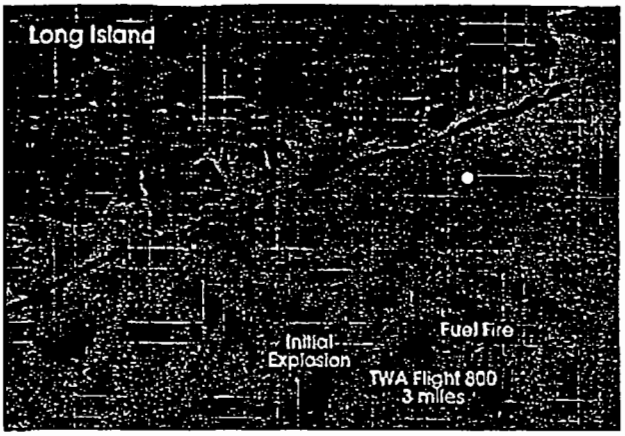
Initial Explosion	52820
Second Explosion	47733
Fuel Fire	39581

Azimuth to (deg):

Initial Explosion	211.86
Fuel Fire	198.4

Time for Initial Sound to Reach Witness (sec): 50.14

Group Assigned: 1



Observations:

The eyewitness was piloting a twin-engine plan Westbound along the South shore of Long Island when he saw a column of flame ignite to his Southwest. He stated that due to the shape and movement of the body of flame, he initially thought it was a flare, but he realized that what he was seeing was too huge and would be impossible to be a flare. He stated that the shape of the fire was an arc starting at a point near the surface of the ocean and igniting in an arch reaching toward the Northeast from the initial point. He stated that the ignition of the entire arc, from the initial point , up the arc, and back down the other side of the arc, took approximately 15 seconds. The initial point appeared small, but the arc fannedout to a wide area at tis other end. He noted that to observers on shore or from perspectives perpendicular to his own, the body of flames might appear as a flat sheet of fire.

He described the flame as being shaped like a cobra's head, narrow at the bottom and wider at higher up. He said that it looked almost like a napalm explosion. He noted that there was a gap at the top of the arc, making the arc actually two distinct fireballs. He felt the highest point of the arc was approximately 200 ft altitude.

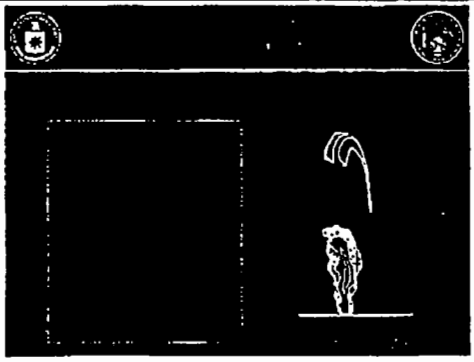
He flew directly to the flame, and based on instruments, determined that he was about seven to eight miles form the initial flame.

Conclusion:

The eyewitness is observing only the events at the end of TWA Flight 800's path due to the short time frame (15 seconds), the lack of lateral motion, and no 25 seconds descent phase before the fireball occurs. The ascending object observation at the end of TWA Flight 800's flight is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39].

The eyewitness gives a very detailed description of the forming and timing of the final fireball event, which looked like a "napalm explosion".

Since the eyewitness did not observe the initial explosion, he could not have witnessed any events relative to a missile shooting down TWA Flight 800.

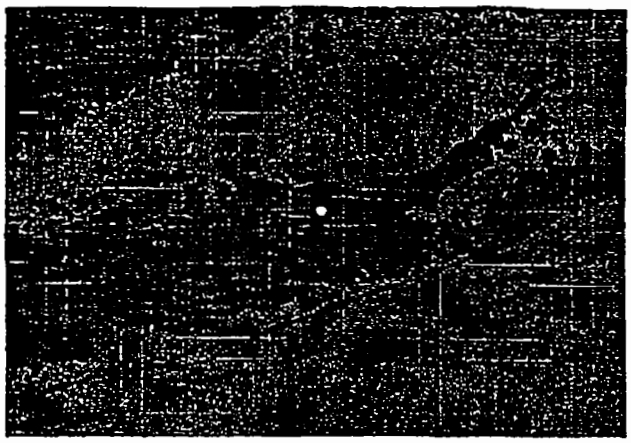


(b) (6)
(b) (7) (c)

Witness:
[redacted] [46]

Witness Location: 40.9231 N
072.8440 W

Distance From (ft):	
Initial Explosion	109923
Second Explosion	110553
Fuel Fire	110534
Azimuth to (deg):	
Initial Explosion	156.73
Fuel Fire	147.89
Time for Initial Sound to Reach Witness (sec):	101.7
Group Assigned:	**2**



Observations:

The eyewitness was looking in a Southerly direction while standing in an open field. He noticed what he believed to be a parchute flare off in the Southwest direction about forty (40) degrees above the horizon. This flare was bluish/red in color and was moving at a steady speed from West to East. He continued to watch this flare while trying to get his wife and friend to look. The flare traveled in this West to East direction for what he estimated was approximately 20 seconds, at which time it started to descend in a curved descent and the same speed. He estimated this curved descent lasted approximately 10 seconds when the flare then opened up in a bottle or cup shape that was red in color. A second or so later, this shape expanded outward on both sides in two pieces. At this point, he realized these were flames. The flames dropped in a square type shape with the flames more solid on the outsides.

At the time of this incident, he believed the flare, and subsequent flames, were about five miles from him to the South. He thought at the time that when the flare initially opened up into the red bottle shape that is was fireworks. He never heard any explosions.

Conclusion:

Due to the extended time frame of the eyewitness' observations (at least 30 seconds), and the height reached by the flare (he claims it was 40 degrees but the actually apex should be about 8.64 degrees). Although the eyewitness does not describe any ascent phase, he views the object for 20 seconds before the aircraft begins to descend. Therefore, it is likely that his observations begin during the ascent phase or close to the second explosion event. Finally, he describes two pieces coming out of the end fireball flame (the wing and fuselage).

The eyewitness does not describe anything that is not consistent with TWA Flight 800 pitching up at the initial explosion and then descending to the ocean. He does not describe any additional objects that could be a missile (just the aircraft).

(b) (6)
(b) (7) (c)

Witness: [redacted] [47]

Witness Location: 40.7517 N
072.9328 W

Distance From (ft):

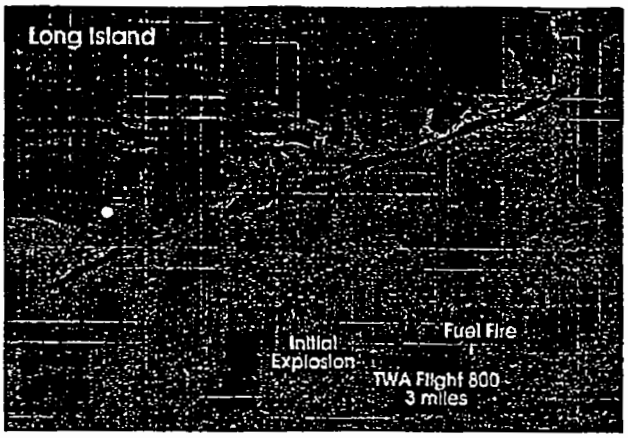
Initial Explosion	78104
Second Explosion	82673
Fuel Fire	88920

Azimuth to (deg):

Initial Explosion	119.48
Fuel Fire	110.45

Time for Initial Sound to Reach Witness (sec): 72.84

Group Assigned: 4



Observations:

The eyewitness was sitting on a dockm immediately in front of the Bellport Marina. He was looking over the bay, toward the Southeast, in the direction of Smith Point Park. He noticed noticed something which had three distinct stages, and lasted about one minute.

The first stage , he noticed an object, rising vertically from East to West, with a red "glow" about it. As it rose, the red glow coming from it was interrupted twice. After the second interruption, it again began to glow, and continued to climb quickly. He estimated that it took approximately 30 sec to reach its zenith.

In its second stage, after it reached its zenith, the object "arced" downward, for what seemed to be approximately 10 seconds.

In its third and final stage, the object sped off quickly on a flat horizontal course, for approximately 15 seconds. As it sped on its now horizontal course, there occurred a violent explosion which itself occurred in two stages.

The first stage of the explosion lasted only 1 to 2 seconds, and yielded only a small red explosion.

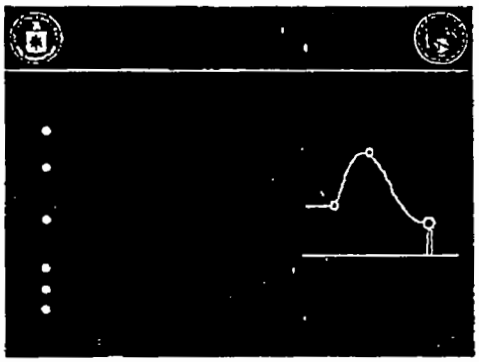
This was followed by a second stage explosion, which he described as a tremendous explosion, 'bright white" in color. He also recalled that the explosion resulted in two distinct pieces falling from the sky. He recalled that these falling pieces were medium to orange yellow.

Conclusion:

Although the timing of the eyewitness' observations do not exactly match the proposed TWA Flight 800 trajectory, he reports seeing an ascent, descent and final explosion. During the final explosion, he also notes seeing "two distinct pieces falling from the sky". The extended time and lateral motion reported also correltates with the aircraft flight path.

But, the eyewitness descibes the object as moving *East to West*, the opposite of the direction he should be seeing. There is no explanation for this motion, except that the eyewitness made an error in direction. Until this discrepency is cleared up, this witness will remain in Group 4 and not Group 2.

If the direction the object traveled were reversed, there would be no observations made by the eyewitness that would suggest that a missile was used to bring down the aircraft.



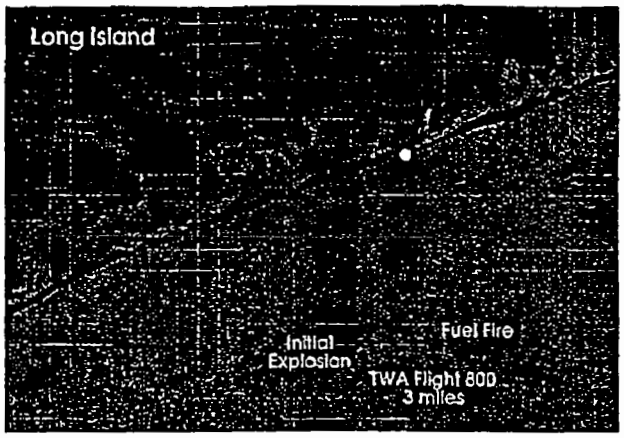
(b) (6)
(b) (7) (c)

Witness:
[redacted] [48]

Witness Location: 40.7939 N
072.6461 W

Distance From (ft):	
Initial Explosion	55090
Second Explosion	51894
Fuel Fire	46765
Azimuth to (deg):	
Initial Explosion	191.85
Fuel Fire	175.05
Time for Initial Sound to Reach Witness (sec):	52.16

Group Assigned: 2



Observations:

The eyewitness was sitting at a table facing the ocean when her attention was drawn to what she described as a "shooting star" with "quite a tail". This object was ascending in an upward arc. The witness saw this object ascend, descend, disappear from her view and then saw a "flicker" fo an explosion. The witness' next observation was of a "fireball" She estimated that the "shooting star" and the "fireball" was the same distance from her vantage point. After seeing the wreckage fall to the horizon, the witness stated that she heard three (3) "booms".

Conclusion:

The eyewitness is observing only the events at the end of TWA Flight 800's path due to the lack of lateral motion (instead of over 16 degrees of azimuth), and no 25 seconds descent phase before the fireball occurs. The "shooting star" observation is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39]. The sound from the initial explosion matches nicely with the eyewitness' seeing the debris hit the ocean (about 50 seconds) before the sound was heard (52 seconds).

Since the eyewitness did not observe the initial explosion, he could not have witnessed any events relative to a missile shooting down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:

[ ] [49]

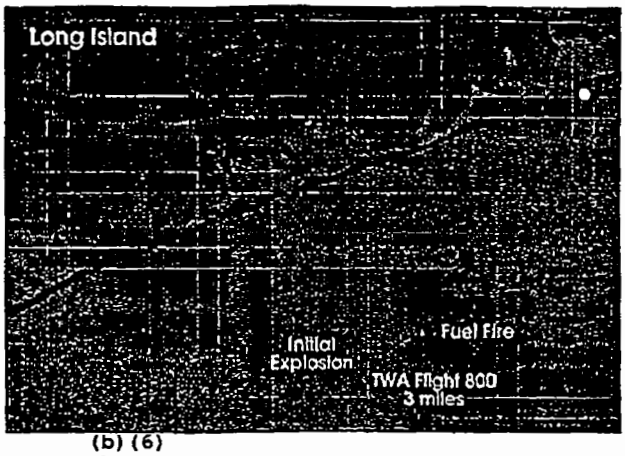
Witness Location: 40.8383 N
072.4754 W

Distance From (ft):
- Initial Explosion 91272
- Second Explosion 85536
- Fuel Fire 76154

Azimuth to (deg):
- Initial Explosion 219.89
- Fuel Fire 214.53

Time for Initial Sound to Reach Witness (sec): 84.77

Group Assigned: 1



(b) (6)
(b) (7) (c)

(b) (6)
(b) (7) (c)

Observations:

The eyewitness was on a boat in the Shinnecock Inlet with [ ][50] and [ ][110]. A friend's exclamation caused him to look to the West-Southwest. He saw a little yellow flame for a second, the length of which was approximately 1/4 inch at arm's length, approximately 25-30 degrees above the horizon. The flame did not appear to have any movement except possibly dipping.

He then saw something shoot off the little yellow flame which he described as a plume that grew in a direction of approximately 20 degrees right of vertical in two to three seconds. The plume was reddish orange in color and lightish grey at the top, approximately 1 foot in length at arm's length. The top of the plume turned into a fireball which spun and floated down to the horizon in approximately 6 seconds. The fireball was approximately 1.2 inches in length at arm's length.

The yellow flame maintained its intensity the entire time and went directly down to the water in about one secon.

Conclusion:

The eyewitness is observing only the events at the end of TWA Flight 800's path due to the short time frame of his observations, the lack of lateral motion, and no 25 seconds descent phase before the fireball occurs. The ascending object observation at the end of TWA Flight 800's flight is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39].

Since the eyewitness did not observe the initial explosion, he could not have witnessed any events relative to a missile shooting down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [50]

Witness Location: 40.8383 N
072.4754 W

Distance From (ft):

Initial Explosion	91272
Second Explosion	85536
Fuel Fire	76154

Azimuth to (deg):

Initial Explosion	219.89
Fuel Fire	214.53

Time for Initial Sound to Reach Witness (sec): 84.77

Group Assigned: 1

(b) (6)
(b) (7) (c)

(b) (6)
(b) (7) (c)

Observations:

The eyewitness was on a boat in the Shinnecock Inlet with [redacted][49] and [redacted][110].

He was watching some birds to 500-600 ft to the South when he saw a white line tracing up into the sky. He does not remember seeing the line come all the way from the horizon. The line went straight vertical the entire time for a total of 2 seconds. He remembered thinking it was a flare as he had just purchased some flares sometime earlier. The highest point of the "flare" white line was about one foot above the horizon and the line was consistent. At the top of the white line appeared little red light or orangish-red circle which hovered or floated for a second, after which, a big dark red explosion appeared about an inch below the little red light. This bigger explosion was about a quarter inch in length. As the bigger explosion came down it became less red and more smokey-grayer about half way down. The big explosion came down along pretty much the same line as the white line had gone up. The entire incident from the time the white line first appeared until the explosion met the horizon took approximately 10 to 15 seconds.

The FBI measured azimuth cited for this witness was 211.1 to 209.1 degrees, true North.

Conclusion:

The eyewitness is observing only the events at the end of TWA Flight 800's path due to the short time frame of his observations (10 to 15 seconds), the lack of lateral motion ("flare" and explosion on same vertical line), and no 25 seconds descent phase before the fireball occurs. The ascending object observation at the end of TWA Flight 800's flight is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39] and in the total time of 10-15 seconds. Finally, the estimated azimuth of this eyewitness (209 to 211 deg) more closely matches that of the end fuel fire (214.5) and not the initial explosion (219.9).

Since the eyewitness did not observe the initial explosion, he could not have witnessed any events relative to a missile shooting down TWA Flight 800.

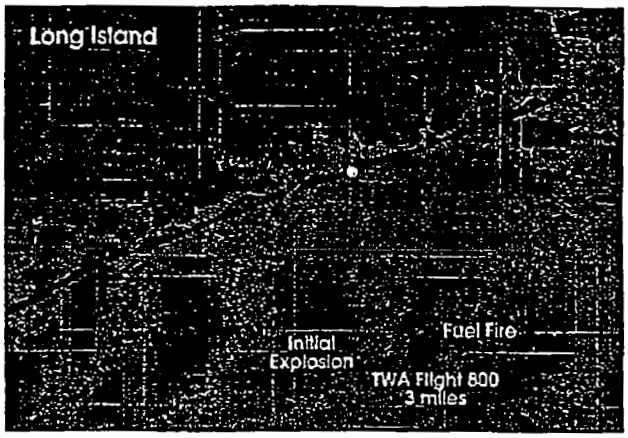
(b) (6)
(b) (7) (c)

Witness:
[redacted] [51]

Witness Location: 40.7811 N
072.6944 W

Distance From (ft):	
Initial Explosion	49294
Second Explosion	47737
Fuel Fire	45384
Azimuth to (deg):	
Initial Explosion	177.62
Fuel Fire	157.46
Time for Initial Sound to Reach Witness (sec):	47.01

Group Assigned: 1



Observations:

The eyewitness was on Dune Road in Westhampton, N.Y., when he observed what he thought was a "bright red flare" which seemed to be "very hot" ascending into the sky. He added that this object was trailing a "white smoke plume" behind it. He described this plume as being "consistent" in shape and tracking in an arc-like manner. He then lost sight of the object and then almost immediately saw a small flash followed by a large fireball which mushroomed and began to descend toward the horizon.

Conclusion:

The eyewitness is observing only the events at the end of TWA Flight 800's path due to the lack of lateral motion (instead of 17 degrees of azimuth), and no 25 seconds descent phase before the fireball occurs. The ascending object observation at the end of TWA Flight 800's flight is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39] and in the total time of 10-15 seconds.

Since the eyewitness did not observe the initial explosion, he could not have witnessed any events relative to a missile shooting down TWA Flight 800

(b) (6)
(b) (7) (c)

Witness:
[redacted] [52]

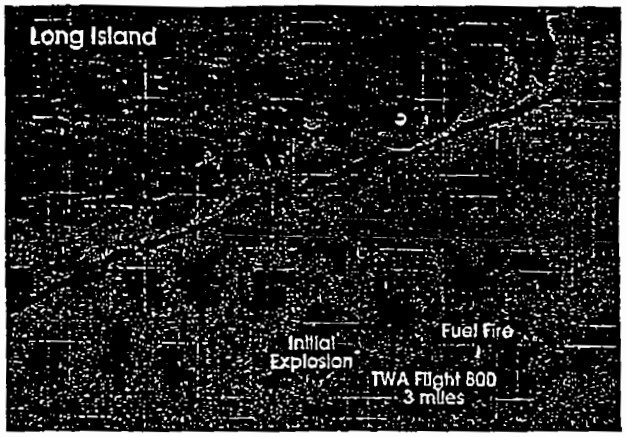
Witness Location: 40.8198 N
072.6501 W

Distance From (ft):
- Initial Explosion 64175
- Second Explosion 61221
- Fuel Fire 56268

Azimuth to (deg):
- Initial Explosion 189.15
- Fuel Fire 174.76

Time for Initial Sound to Reach Witness (sec): 60.28

Group Assigned: 1



Observations:

The eyewitness was on a track at the Westhampton High School walking in a Southwesterly direction when he observed just above his line of vision, an object (object number one) ascending from behind the trees.

Object one appeared to be bright white light with a reddish pink aura around it. The object maintained that appearance throughout his observation, except for the last second, when he believed the object impacted with another object. He compared the moving object to a "firework".

Initially, object one ascended almost vertically beyond the tree line with no apparent direction and at a moderate speed. Object one evolved into a "squiggly" pattern going up vertically and increasing in velocity and then arced off to the right in a SW direction.

He observed a second, stationary object (number two) that appeared to glitter in the sky. Object one was heading for object two, but initially he thought it would miss. In less than a sec, he believed object one impacted object two. He then observed a white "puff" (white flash) about the size of a small ball in the sky but heard no noise. Out of the puff came two objects that arched upward from the impact point trailing smoke. The objects appeared to turn into large rectangular balls of fire descending at an angle down past the trees.

The eyewitness believes in retrospect, the entire chain of events occurred in about seven seconds and at an azimuth of 171 to 173 deg.

Conclusion:

The eyewitness makes several observations that are unique, but the most interesting is the two object he reports seeing. However, it clear that the eyewitness is observing events only at the end fire ball because he describes the fireball event along with two separating pieces, and his observations are only over 7 seconds.

The eyewitness' azimuth of 171 to 173 degrees also more closely matches the fuel fire azimuth of 175 degrees over the initial explosion azimuth of 189 degrees.

Therefore, although all of this eyewitness' observations cannot be explained, there is evidence he could not have seen events close to the initial explosion and hence could not have observed a missile causing the initial explosion.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [53]

Witness Location: 40.7356 N
072.0822 W

Distance From (ft):
- Initial Explosion 114021
- Second Explosion 119527
- Fuel Fire 127116

Azimuth to (deg):
- Initial Explosion 106.52
- Fuel Fire 101.35

Time for Initial Sound to Reach Witness (sec): 105.5

Group Assigned: 2

Observations:

"The witness was in the vicinity of Sayville, N.Y. when he observed a bright light, ascending very quickly. He described this object as being 'very bright, like a firework rocket'."

Conclusion:

This eyewitness report (in its entirety to the left), gives little information to fix when the initial observation begins. Hence, we have put this eyewitness in Group 2 as the ascending object could have been the aircraft.

But, there is nothing in the eyewitness' account which would indicate that a missile was used to down TWA Flight 800, and he does not observe any object besides the one described.

(b) (6)
(b) (7) (c)

Witness:
[ ] [54]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to
Reach Witness (sec): ?

Group Assigned: 3(2)

Observations:

"this individual observed a 'shooting star' traveling up and across the sky (from West to East) immediately prior to witnessing the explosion. The witness described the object as moving much faster than the aircraft and ultimately closing on it."

Conclusion:

This eyewitness report (in its entirety to the left), gives little information to fix when the initial observation begins. He does describe the object "traveling up and across the sky" which would indicate more lateral motion. Therefore, it is likely the eyewitness saw the entire event from the initial explosion.

The eyewitness was placed in Group 3 because, although he does not describe two objects, he reports the "object as moving much faster than the aircraft and ultimately closing on it". If the eyewitness did not observe a second object (likely) then there is nothing inconsistent with his observations and TWA Flight 800 pitching up after the initial explosion, before falling to the ocean.

(b) (6)
(b) (7) (c)

Witness:
[ ] [55]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to
Reach Witness (sec): ?

Group Assigned: 1

Observations:

"this witness stated that he observed an object 'similar to a rocket' ascending into the air from just above the horizon, followed this object up until observing explosion."

(b) (6)
(b) (7) (c)

This eyewitness was with eyewitness [ ] [56].

Conclusion:

This eyewitness report (in its entirety to the left), gives little information to fix when the initial observation begins. However, since he does not describe any lateral motion, or an extended descent phase, he observed events only at the end of flight. Hence, we have put this eyewitness in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [56]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to
Reach Witness (sec): ?

Group Assigned: 1

Observations:

"this eyewitness saw an object similar to a rocket ascending almost straight up from the horizon. She described this object as being a 'reddish/blue flash'. She then heard a loud boom, but saw no smoke, fire, and did not observe any aircraft."

This eyewitness was with eyewitness [redacted] [55].

Conclusion:

This eyewitness report (in its entirety to the left), gives little information to fix when the initial observation begins. However, since she does not describe any lateral motion, or an extended descent phase, he observed events only at the end of flight. Her observations could be just the cloud of smoke that is caused by the aircraft debris burning on the water. Hence, we have put this eyewitness in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [57]

Witness Location: 40.7928 N
072.6503 W

Distance From (ft):

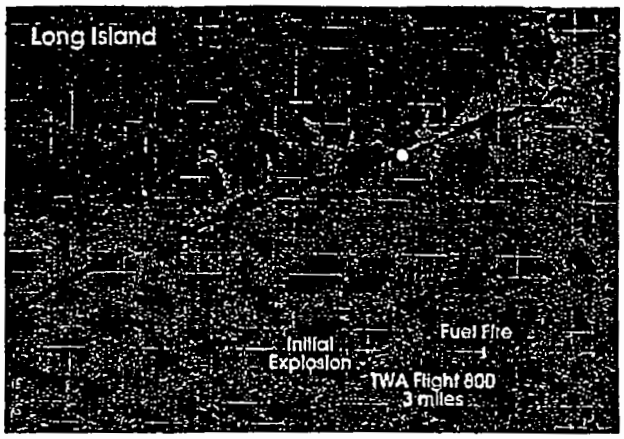
Initial Explosion	54470
Second Explosion	51397
Fuel Fire	46481

Azimuth to (deg):

Initial Explosion	190.74
Fuel Fire	173.58

Time for Initial Sound to Reach Witness (sec): 51.60

Group Assigned: 1



Observations:

"this witness, who was walking on the beaches of West Hampton heard a "booming" sound, she stated that she immediately looked towards the ocean and saw a grey smoke trail 'heading towards sky'."

Conclusion:

This eyewitness report (in its entirety to the left), is of the end events only. By the time the initial explosion sound reaches the witness (51.6 sec) the aircraft has already hit the water. By only observing events after hearing this "boom", he could not have seen the aircraft airborne. Therefore, his observations are of the cloud of smoke that is caused by the aircraft debris burning on the water. Hence, we have put this eyewitness in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [58]

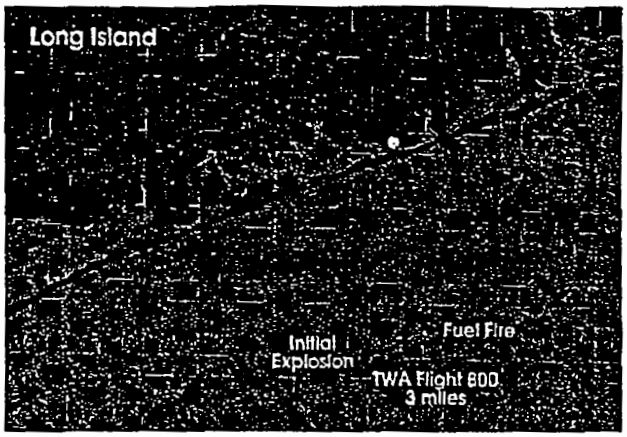
Witness Location: 40.8020 N
072.6594 W

Distance From (ft):
- Initial Explosion 57380
- Second Explosion 54626
- Fuel Fire 50140

Azimuth to (deg):
- Initial Explosion 187.65
- Fuel Fire 171.15

Time for Initial Sound to Reach Witness (sec): 54.20

Group Assigned: 3(1)



Observations:

"this woman was at the West Hampton Yacht Club, facing the ocean, when she observed a 'bright orange flare' traveling upward from the horizon for approximately five (5) seconds; witness followed the trajectory of the 'flare' up to the point when it struck the aircraft, destroying it. She described a series of large explosions and a fireball falling from the sky."

Conclusion:

This eyewitness report (in its entirety to the left), is of the end events only. The short observation time (around five seconds), no extended descent phase, and the description of 'large explosions and a fireball falling from the sky' indicate this eyewitness was only seeing events at the end of TWA Flight 800's path. Hence, we would normally place this eyewitness in Group 1.

However, the eyewitness was placed in Group 3 because, although she does not describe two objects, she reports that she "followed the trajectory of the 'flare' up to a point when it struck the aircraft". The eyewitness should be re-interviewed to ensure that she did observe two separate objects.

Since the eyewitness observations are limited to the end event, she did not see a missile cause the initial explosion on TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [59]

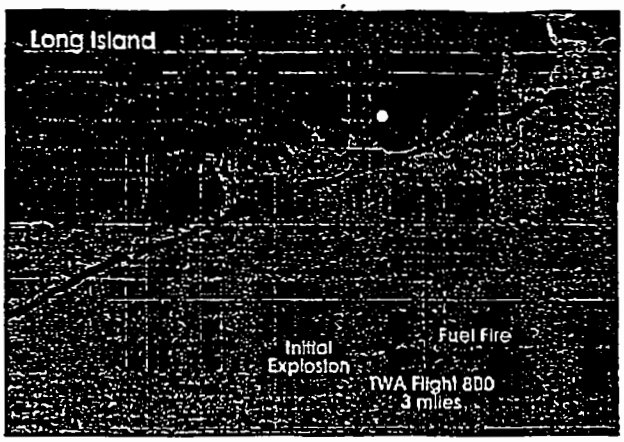
Witness Location: 40.8244 N
072.6663 W

Distance From (ft):
- Initial Explosion 65288
- Second Explosion 62780
- Fuel Fire 58505

Azimuth to (deg):
- Initial Explosion 185.03
- Fuel Fire 170.53

Time for Initial Sound to Reach Witness (sec): 61.28

Group Assigned: 1



Observations:

"this individual, who was sitting on a bench in Westhampton observed 'a flame come up out of the water', heard three 'booms' in the distance".

Conclusion:

This eyewitness report (in its entirety to the left), is of the end events only. The timing of the sounds (61 seconds) is well past the time the aircraft hits the water (50 sec). Therefore, his observations are of the cloud of smoke that is caused by the aircraft debris burning on the water. Hence, we have put this eyewitness in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [60]

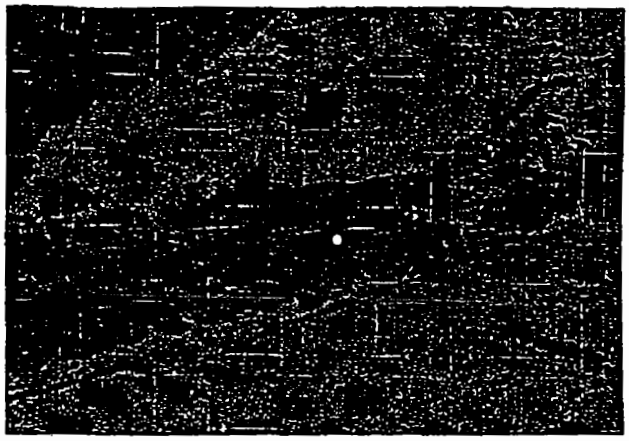
Witness Location: 40.8742 N
072.8079 W

Distance From (ft):
- Initial Explosion 89641
- Second Explosion 90160
- Fuel Fire 90152

Azimuth to (deg):
- Initial Explosion 158.10
- Fuel Fire 147.24

Time for Initial Sound to Reach Witness (sec): 83.29

Group Assigned: 3(1)



Observations:

"this witness, who was in Manorville, New York observed a 'red flare' ascending toward aircraft, becoming brighter then dimmer; observed this object descending vertically."

Conclusion:

This eyewitness report (in its entirety to the left), does not describe any lateral motion (expected about 11 degrees of azimuth change), nor an extended descent phase. The 'red flare' does describe the end event fireball. Therefore, his observations are of only the end events, placing this eyewitness in Group 1.

However, the eyewitness was placed in Group 3 because, although he does not describe two objects, he reports that the red flare "ascended toward aircraft". The eyewitness should be re-interviewed to ensure that he did observe two different objects.

Since the eyewitness observations are limited to the end event, he did not see a missile cause the initial explosion on TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [61]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: 3(1)

Observations:

'this individual, who was with his wife stated that he saw a 'red glowing' object ascending toward TWA 800 immediately prior to its destruction. He added that immediately after the explosion, he observed a trail of smoke drifting from the vicinity of where he had seen this object ascending".

Conclusion:

This eyewitness report (in its entirety to the left), is of the end events only. The eyewitness reports seeing a trail of smoke drifting right after the object struck TWA Flight 800. Therefore, his total observation time was too short to view the initial explosion. Also, he does not report an extended descent phase as would be expected if he had observed the entire event. Therefore, his observations are mostly of the cloud of smoke that is caused by the aircraft debris burning on the water. Finally, the ascending 'red glowing' object observation is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45]. These observations allow us to place this eyewitness in Group 1.

The eyewitness does report seeing "a 'red glowing' object ascending toward TWA 800". It is important to determine if the eyewitness actually saw two objects or only one.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [62]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: 2

Observations:

'this eyewitness observed a 'flare' ascending from the horizon. He added that this 'flare' rose up, appeared to slow down or stop then descend. He then reported seeing a large explosion."

Conclusion:

The eyewitness' statement is reproduced in its entirety in the left-hand box.

Although it is possible that the eyewitness observed only the end event, there is a lack of any data (time, sound, location) that could fix the time of his observations. Therefore, he was placed in Group 2, observing the entire event.

The eyewitness observes each of the phases the aircraft goes through after the initial explosion. It ascends, descends, and then generated a large fireball. Depending on the time of the eyewitness' observation, it is possible he is viewing the entire event.

The eyewitness does not describe anything that is not consistent with the flight of TWA 800 after the initial explosion and pitch up. He does not observe a second object. Therefore, this eyewitness did not see a missile during his reported observations.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [63]

Witness Location: 40.7669 N
072.7539W

Distance From (ft):

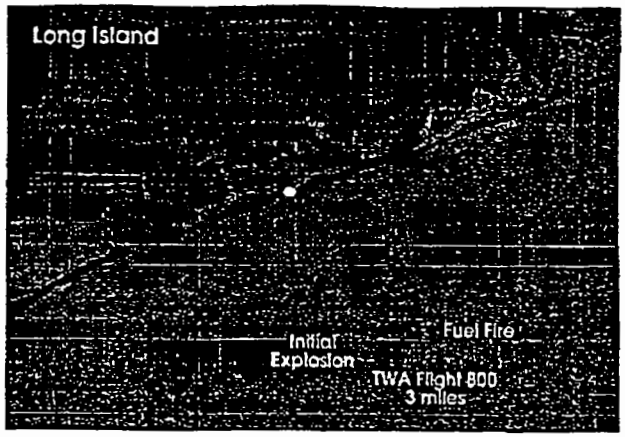
Initial Explosion	47796
Second Explosion	48638
Fuel Fire	49943

Azimuth to (deg):

Initial Explosion	157.22
Fuel Fire	137.33

Time for Initial Sound to Reach Witness (sec): 45.69

Group Assigned: 2



Observations:

"this individual was fishing with a friend in the Moriches Inlet when he observed what appeared to be a 'flare' rising from the surface of the water, at a very rapid rate of speed. He added that after attaining an unknown altitude, the object appeared to change altitude and course, then he saw a small flash/explosion, then a second, more powerful explosion and ensuing fireball."

Conclusion:

The eyewitness' statement is reproduced in its entirety in the left-hand box.

Although it is likely that the eyewitness observed only the end event, there is a lack of any data (time, sound, location) that could fix the time of his observations. Therefore, he was placed in Group 2, observing the entire event.

The eyewitness observes each of the phases the aircraft goes through after the initial explosion. It ascends, descends (change altitude?), and then generated a large fireball. Depending on the time of the eyewitness' observation, it is possible he is viewing the entire event.

The eyewitness does not describe anything that is not consistent with the flight of TWA 800 after the initial explosion and pitch up. He does not observe a second object. Therefore, this eyewitness did not see a missile during his reported observations.

(b) (6)
(b) (7) (c)

Witness:

[redacted] [64]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: 1

Observations:

"this eyewitness reported hearing a 'loud bang' in the vicinity of her home; witness also observed a large, black cloud drifting away from the vicinity of where she thought the noise had originated."

Conclusion:

The eyewitness' statement is reproduced in its entirety in the left-hand box.

Although the exact location of the eyewitness is not known, she was at her home (and hence land) so sound from the initial explosion should take at least 50 seconds to reach her, about the same time as TWA Flight 800 takes to hit the water. Therefore, her subsequent observations of the large, black cloud could only be the smoke generated by the aircraft burning in the water.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

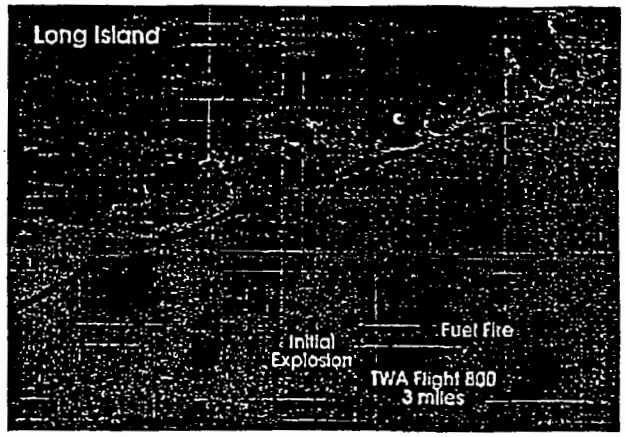
(b) (6)
(b) (7) (c)

Witness:
[redacted] [65]

Witness Location: 40.8194 N
072.6507 W

Distance From (ft):	
Initial Explosion	64005
Second Explosion	61065
Fuel Fire	56138
Azimuth to (deg):	
Initial Explosion	189.03
Fuel Fire	174.57
Time for Initial Sound to Reach Witness (sec):	60.13

Group Assigned: 1



Observations:

The eyewitness was walking along the track at Westhampton High School when she observed a bright white light arching into the sky from West to East. It appeared to her to be emanating from Westhampton Beach, at an angle not exactly vertical, and travel over the ocean. At the time, she thought it was a firework.

This light reached high into the sky, at an angle of greater than 45 degrees, and it took approximately three (3) seconds to reach its apex. At its apex, she observed that the light appeared to fizzle out, then moments later, a huge explosion occurred, consisting of a bright oblong wall of flames, originating from the apex of the white light. After the flames disappeared, she saw grey smoke in the general area in the sky where the flames where.

She saw no smoke with the white light during its ascent, and did not hear any sound or explosion.

Conclusion:

The eyewitness is observing events only at the end of TWA Flight 800's path. The oblong wall of flames, matches the observation of other witnesses of the fuel fire at the end. The fact that the ascent phase of the object was only three seconds does not allow for her observations to be of the initial event (over 40 seconds earlier). And finally, the light ascending observation is very similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45]. These observation place this witness in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

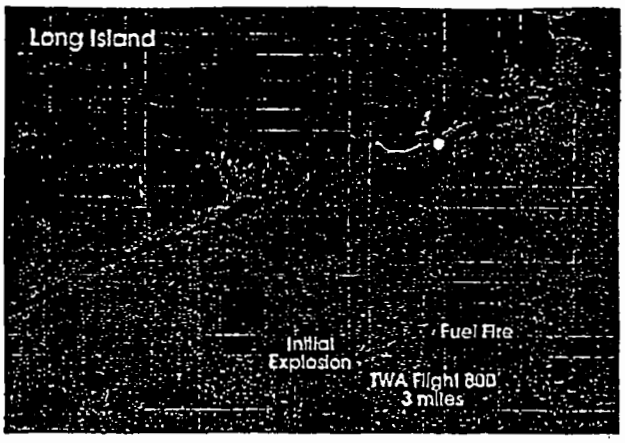
(b) (6)
(b) (7) (c)

Witness: [redacted] [66]

Witness Location: 40.8038 N
072.6125 W

Distance From (ft):	
Initial Explosion	61099
Second Explosion	57069
Fuel Fire	50474
Azimuth to (deg):	
Initial Explosion	199.71
Fuel Fire	185.97
Time for Initial Sound to Reach Witness (sec):	57.52

Group Assigned: 1



Observations:

"this individual was riding a motorcycle on Dune Road in the direction of Westhampton when his attention was drawn toward the ocean as he noticed a 'red flame streak toward the sky' in a Westerly direction. He described this flame as being 'like a flare being launched... it had a head, followed by a small tail, and its path was defined by a narrow trail of smoke.' He then observed several explosions and a fireball descending toward the ocean.

Conclusion:

The eyewitness' report (reproduced in its entirety in the left-hand box) is of the end events only. He does not describe any lateral motion when a 13 degree azimuth change would be expected if he had seen the entire event. Further, he did not observe the extended descent phase of the aircraft. Finally, a "red flame streak toward the sky" is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45]. These observations allow us to place this eyewitness in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [67]

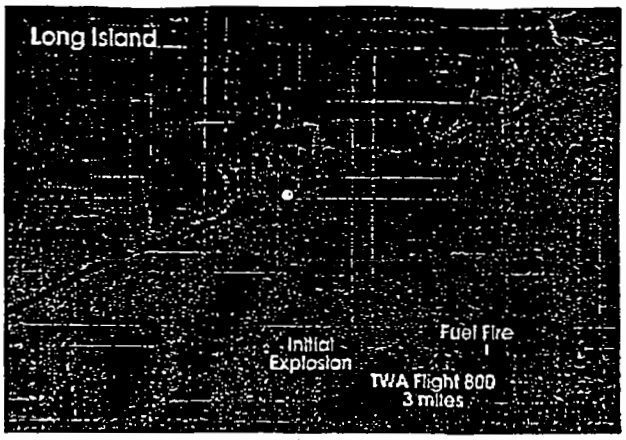
Witness Location: 40.7669 N
072.7539 W

Distance From (ft):
- Initial Explosion 47796
- Second Explosion 48638
- Fuel Fire 49943

Azimuth to (deg):
- Initial Explosion 157.22
- Fuel Fire 137.33

Time for Initial Sound to Reach Witness (sec): 45.69

Group Assigned: 1



Observations:

"this eyewitness was fishing in Moriches Inlet with friends when he observed what appeared to be a reddish-orange flare ascending from above the horizon. He added that he saw this object reach its peak and then begin falling. During the fall it separated into two 'strips'."

Conclusion:

The eyewitness' report (reproduced in its entirety in the left-hand box) is of the end events only. He does not describe any lateral motion when a 20 degree azimuth change would be expected if he had seen the entire event. Further, he did not observe the extended descent phase of the aircraft. Finally, a "red dish-orange flare ascending" is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45]. These observations allow us to place this eyewitness in Group 1.

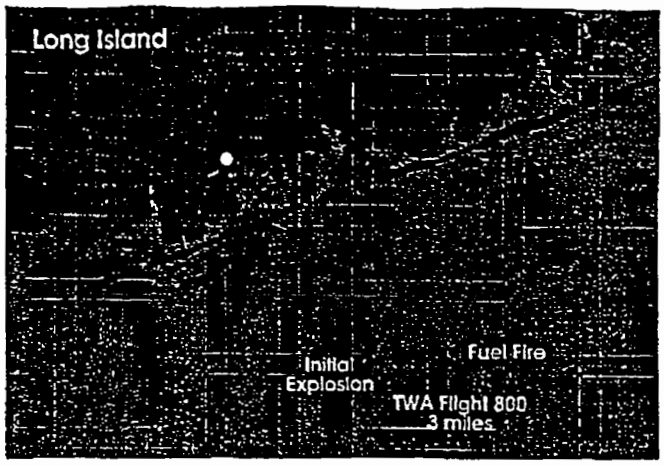
Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [68]

Witness Location: 40.7970 N
072.8313 W

Distance From (ft):	
Initial Explosion	67970
Second Explosion	70165
Fuel Fire	72965
Azimuth to (deg):	
Initial Explosion	144.04
Fuel Fire	130.78
Time for Initial Sound to Reach Witness (sec):	63.69
Group Assigned:	**3(1)**



Observations:

The eyewitness was standing on a dock at the Forge River Marina in Mestic when a young bog noticed something that appeared to be a flare flying up into the air. The flying object was relatively slow in flying up and took about four or five seconds before hitting the airplane. The smoke, which trailed this object, was whitish in color and the band of smoke was narrow. It looked like a flare or Roman candle flying into the air. The object flew at an angle into the air and neither it, nor its impact with the plane, made any noise. There was one flame which came from the object, then a second once it struck the plane. The flying object was very bright, but not uncomfortable/blinding to look at.

The object seemed to take off from Dune Road or the left side of the inlet.

Conclusion:

This eyewitness is observing events only at the end of TWA Flight 800's flight. Given the lack of lateral motion (14 degrees for the entire flight after the initial explosion), no descent phase, and the short time (4 to 5 seconds) of observation before the final explosion/fuel fireball, this eyewitness can be placed in Group 1.

The eyewitness does report seeing a flare which impacted the airplane. This observation is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [69]

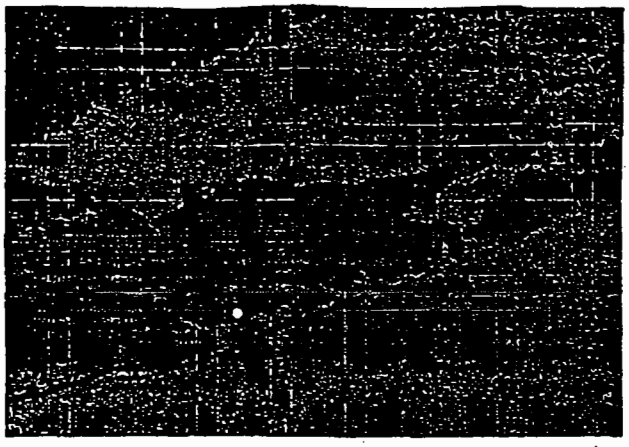
Witness Location: 40.7431 N
073.0287 W

Distance From (ft):
- Initial Explosion 100864
- Second Explosion 106109
- Fuel Fire 113305

Azimuth to (deg):
- Initial Explosion 110.43
- Fuel Fire 104.21

Time for Initial Sound to Reach Witness (sec): 93.49

Group Assigned: 1



Observations:

"this individual was sitting in a car in a park in Patchogue Bay with her friend, looking Southeast toward the ocean. She stated her attention was drawn to what she thought was a flare, ascending over the ocean at a 'steady, remarkable pace.' She added that she watched as this 'flare' rose for approximately ten seconds before it 'pulsed brightly in a small, concentrated area.' She stated that approximately two seconds after this pulse, she saw a 'large object seemingly stopping its forward momentum while igniting into a fireball'.

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. Given the lack of a descent phase, and the short time (10 seconds) of observation before the final explosion/fuel fireball, this eyewitness can be placed in Group 1.

The eyewitness' observation of a flare ascending at a remarkable pace is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45], however, the ten second time frame is longer than the 2 to 3 seconds other witnesses report..

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [70]

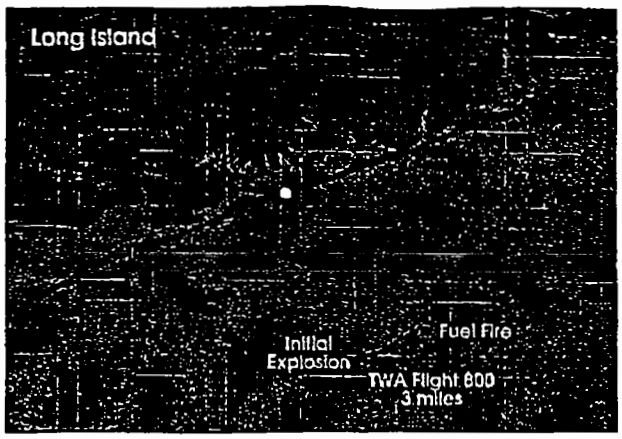
Witness Location: 40.7669 N
072.7539 W

Distance From (ft):
- Initial Explosion 47796
- Second Explosion 48638
- Fuel Fire 49943

Azimuth to (deg):
- Initial Explosion 157.22
- Fuel Fire 137.33

Time for Initial Sound to Reach Witness (sec): 45.69

Group Assigned: 1



Observations:

'this individual was fishing for crabs in the Moriches Inlet during the evening of July the 17th when he observed what he described as the 'biggest Roman Candle [I] had ever seen' rise from an unknown point of origin in the Southeast. He added that this 'Roman Candle' rose into the sky, began arcing, then exploded into a large fireball".

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. Given the lack of a descent phase, and the short time of his observations before the final explosion/fuel fireball, this eyewitness can be placed in Group 1.

The eyewitness' observation of a "Roman Candle" ascending is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45], however, the ten second time frame is longer than the 2 to 3 seconds other witnesses report..

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [71]

Witness Location: 40.7535 N
073.1828 W

Distance From (ft):

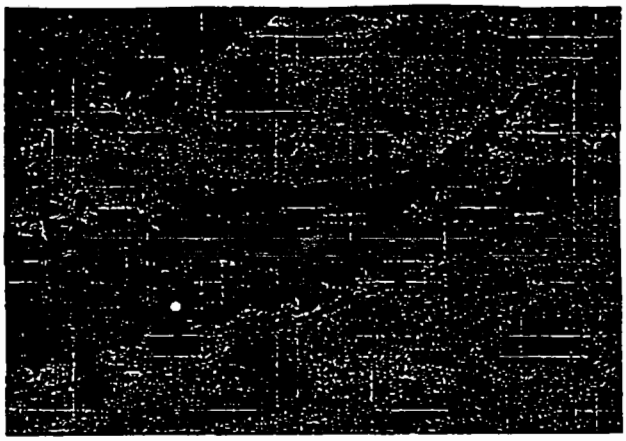
Initial Explosion	142526
Second Explosion	148062
Fuel Fire	155645

Azimuth to (deg):

Initial Explosion	105.80
Fuel Fire	101.63

Time for Initial Sound to Reach Witness (sec): 131.5

Group Assigned: 1



Observations:

"this individual, who was driving on the Southern State Parkway in Suffolk County, reported seeing an object ascending from the horizon into the sky trail a tail of grey smoke. To the best of his recollection, he made these observations at approximately 2015 on the evening of July 17th."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The eyewitness does not see a descent phase, and the short time of his observations indicate he did not see the initial explosion which is 50 seconds before the aircraft hits the water. Further it is unusual for a witness not to observe the final explosion/fuel fireball, indicating that this his observations were most likely after the airplane was already in the water. Therefore, this eyewitness can be placed into Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [72]

Witness Location: ? N
? W

Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?

Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: 3(1)

[redacted]

Observations:

"this eyewitness reported seeing an object resembling a flare streak through the air, then witnessed the explosion of TWA 800. She added that she believes that this object originated in the West Hampton Beach Area."

[redacted]

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. Given the lack of a descent phase, and the short time of his observations before the final explosion/fuel fireball, this eyewitness can be placed in Group 1.

The eyewitness' observation of a "flare streaking though the air" just before the explosion of TWA Flight 800 is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45.

The wording of the eyewitness' statement does report seeing a flare streak through the air and then seeing the explosion of TWA Flight 800, placing her in Group 3 also. It is important to determine if the eyewitness actually saw two objects or only one

Even though the eyewitness was placed in Group 3, it is clear that she did not observe the events close to the initial explosion, and therefore could not have seen a missile down TWA Flight 800.

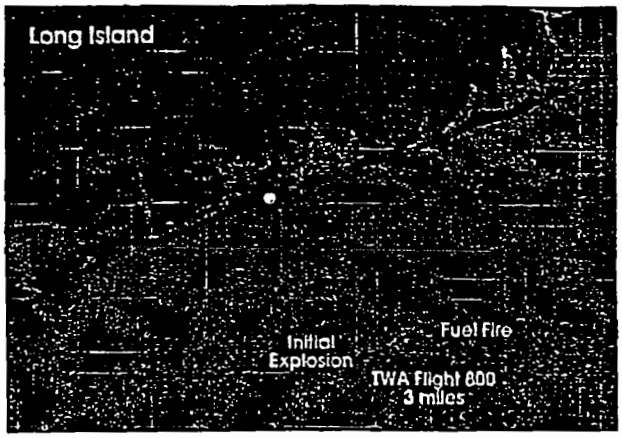
(b) (6)
(b) (7) (c)

Witness:

[redacted] [73] [73]

Witness Location: 40.7624 N
072.7762 W

Distance From (ft):	
Initial Explosion	49076
Second Explosion	50749
Fuel Fire	53210
Azimuth to (deg):	
Initial Explosion	149.82
Fuel Fire	142.30
Time for Initial Sound to Reach Witness (sec):	46.82
Group Assigned:	1



Observations:

Eyewitnesses were making their way to "Great Gun Beach Marina' after surfing by Great Gun Beach in Moriches Bay West of the Moriches Inlet. They saw what appeared to be a flare rising from the ocean side of the sand dune. The flare went straight up, with one eyewitness seeing black smoke, assumed it had burned out. They said the flare did not appear to be an ordinary flare, and it could have been something like a fireworks, but the burst at the end of the flare seemed pretty unusual. The flare disappeared into black smoke behind a dune and it burst pretty low over the horizon.

The eyewitnesses also reported the event as looking like a flame rising up over the Atlantic Ocean, then arching over in an Easterly direction. Then they saw a flash of bright light followed by a large red and orange fire type glow. Two items engulfed in this fiery glow were falling down, disappearing behind sand dunes on the horizon.

Afterwards, the FBI measured a azimuth for these eyewitnesses observations at 136.1 to 141.1 degrees, true North.

Conclusion:

These eyewitnesses' report is only of events at the end of TWA Flight 800's flight. The observations made by these witnesses do not include a descent phase, shows no lateral motion, has only a short time span before the final explosion/fuel fireball, and include seeing two items fall out of the final explosion. Finally, the eyewitnesses cited an azimuth (136 to 141) deg) that more closely matches the fuel fire (142.3) than the initial explosion (149.8). Therefore, these eyewitnesses can be placed in Group 1.

The eyewitnesses' observation of a "flare" ascending immediately prior to the fireball is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Since the eyewitnesses did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [74]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: 1

Observations:

"while surfing saw something shoot up from the ground, then fireball and saw the wings of plane separate and fall."

Conclusion:

The eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The observations made by this eyewitness does not include a descent phase, has only a short time span before the final explosion/fuel fireball, and includes seeing the wings of plane separate and fall out of the final fireball. Therefore, these eyewitness can be placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [75]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: 1

Observations:

The eyewitness, who was with her husband, was sitting on a Mascot Dock, located at the end of South Ocean Street, in Patchengh, Long Island. She was facing in an Southeasterly direction, when she noticed a flare like object traveling upward from a North to South direction. She next saw a bright orange fireball in the sky. She believes that the flare like object was orange in color and lasted for about five seconds.

She advised that the fireball then fell to the ocean, followed by black smoke. She is uncertain about the origin of the flare like object. She did not hear anything during her observations.

Conclusion:

The eyewitness' report includes observations of only at the end of TWA Flight 800's flight. The observations made by this eyewitness does not include a descent phase, has only a short ascent time (5 seconds) before the final explosion/fuel fireball. Therefore, this eyewitness can be placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800

(b) (6)
(b) (7) (c)

Witness:
[redacted] [76]

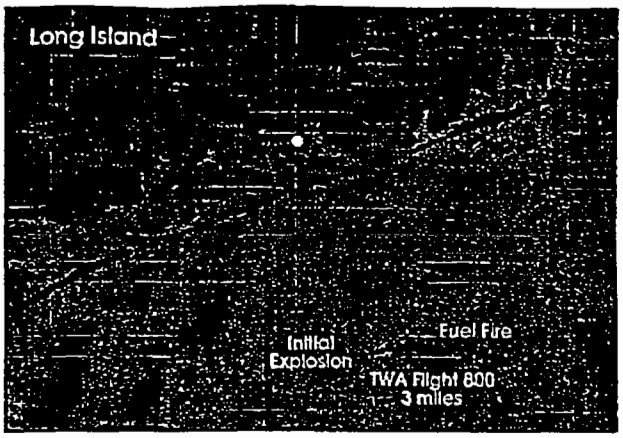
Witness Location: 40.8045 N
072.7499 W

Distance From (ft):
- Initial Explosion 60339
- Second Explosion 60381
- Fuel Fire 60129

Azimuth to (deg):
- Initial Explosion 163.24
- Fuel Fire 147.01

Time for Initial Sound to Reach Witness (sec): 56.84

Group Assigned: 1



Observations:

"this eyewitness sitting on a deck behind his house in East Moriches, New York when a flash of light drew his attention to the Southeast. Upon turning in the direction of the flash, he saw a red-orange light, which he believed to be a large flare ascending into the sky in a 'very high arc'. He added that when this 'flare' reached its apex, it separated into 'two reddish-orange balls' which then fell toward the horizon."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The lack of any descent phase, the short time of his observations before the final explosion/fuel fireball which has 'two reddish-orange balls' falling out of it, and no large lateral motions (expect over 16 degrees of azimuth change) in the eyewitness' report, indicate this eyewitness can be placed in Group 1.

The eyewitness' observation of an ascending red orange flare just prior to the end fireball is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [77]

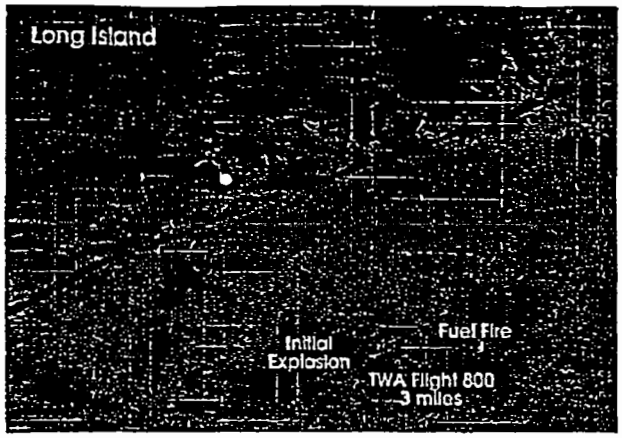
Witness Location: 40.7747 N
072.8150 W

Distance From (ft):
- Initial Explosion 58758
- Second Explosion 61118
- Fuel Fire 64328

Azimuth to (deg):
- Initial Explosion 142.95
- Fuel Fire 127.93

Time for Initial Sound to Reach Witness (sec): 55.43

Group Assigned: 1



Observations:

"Mastic Beach (Moriches Bay) - the witness was sitting on the deck of his home watching aircraft when he observed a 'slash as if a flare had ignited leaving a trail of red and orange'. As the flare descended, there was a second eruption of two (2) 'umbrella-like' showers of red-orange fire which fell to the surface. The witness stated that there was a fairly heavy surface haze on the ocean."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The eyewitness was viewing events close to the end fireball since his observations are encompass only for a short period of time and he did not observe the aircraft's descent phase. In addition, he observed 'two 'umbrella-like' showers of red-orange fire" which were the wing and fuselage of the aircraft. The flare ascending also matches other eyewitness reports near the final fireball such as witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c

Witness:

[redacted] [78]

Witness Location: 40.7807 N
072.8542W

Distance From (ft):

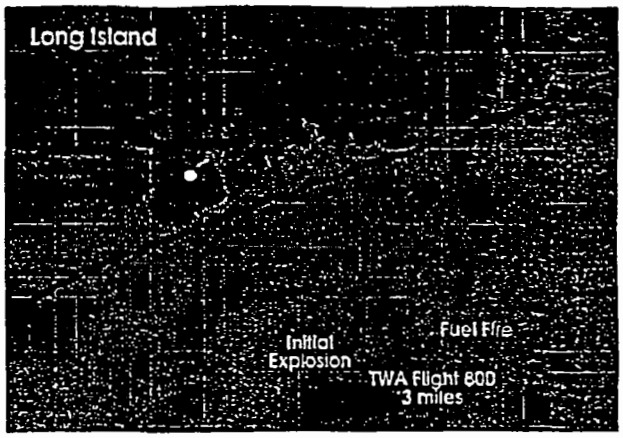
Initial Explosion	67425
Second Explosion	70403
Fuel Fire	74373

Azimuth to (deg):

Initial Explosion	136.69
Fuel Fire	124.10

Time for Initial Sound to Reach Witness (sec): 63.20

Group Assigned: 1



Observations:

The eyewitness was walking on the local high school track when she took notice of an object above the tree line in the sky. This object was ascending at a very high rate of speed and at the tip was a very bright light with a bright yellowish or orange tail. She observed this for less than five seconds when she temporarily lost it. She assumed it was some type of fireworks display. Within a few seconds, her friend [redacted] [108] stated something like, "my God people are dying". [redacted] explained to the eyewitness that she had a few seconds earlier been viewing an aircraft heading in that direction. Further, the now fireball that they were both looking at together was the result of a plane exploding. The eyewitness stated that neither she nor her friend [redacted] knew the size or type of aircraft that had exploded into flames and came down into the horizon beyond the tree line.

The eyewitness advised that she did not observe the aircraft and only observed this "bottle rocket type missile" ascending from left to right at a very high rate of speed for several seconds prior to losing it.

(b) (6)
(b) (7) (c

(b) (6)
(b) (7) (c

(b) (6)
(b) (7) (c

Conclusion:

This eyewitness' observations are limited to events at the end of TWA Flight 800's flight. Given the lack of a descent phase, and the short time of her observations before the final explosion/fuel fireball (less than five seconds), no large lateral motion (expected over 12 degrees of azimuth change), this eyewitness only viewed events near the end of TWA Flight 800's path and can be placed in Group 1.

The eyewitness' observation of an fast, ascending object for less than five seconds is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [79]

Witness Location: ? N
? W

Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?

Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: 1

Observations:

"this witness who was walking with is wife on the beach at Fire Island observed what he described as 'an object in the sky shooting white lights like a sparkler'. He added that this object 'developed' into a cylinder-shaped orange/red fireball which fell straight down to the horizon and disappeared."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. He does not describe any objects ascending before the orange/red fireball. Therefore, this eyewitness was placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [80]

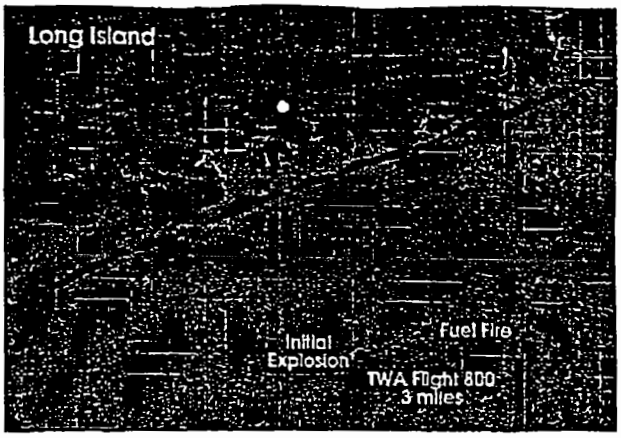
Witness Location: 40.8282 N
072.7621 W

Distance From (ft):
- Initial Explosion 69587
- Second Explosion 69650
- Fuel Fire 69234

Azimuth to (deg):
- Initial Explosion 162.63
- Fuel Fire 148.56

Time for Initial Sound to Reach Witness (sec): 65.15

Group Assigned: 1



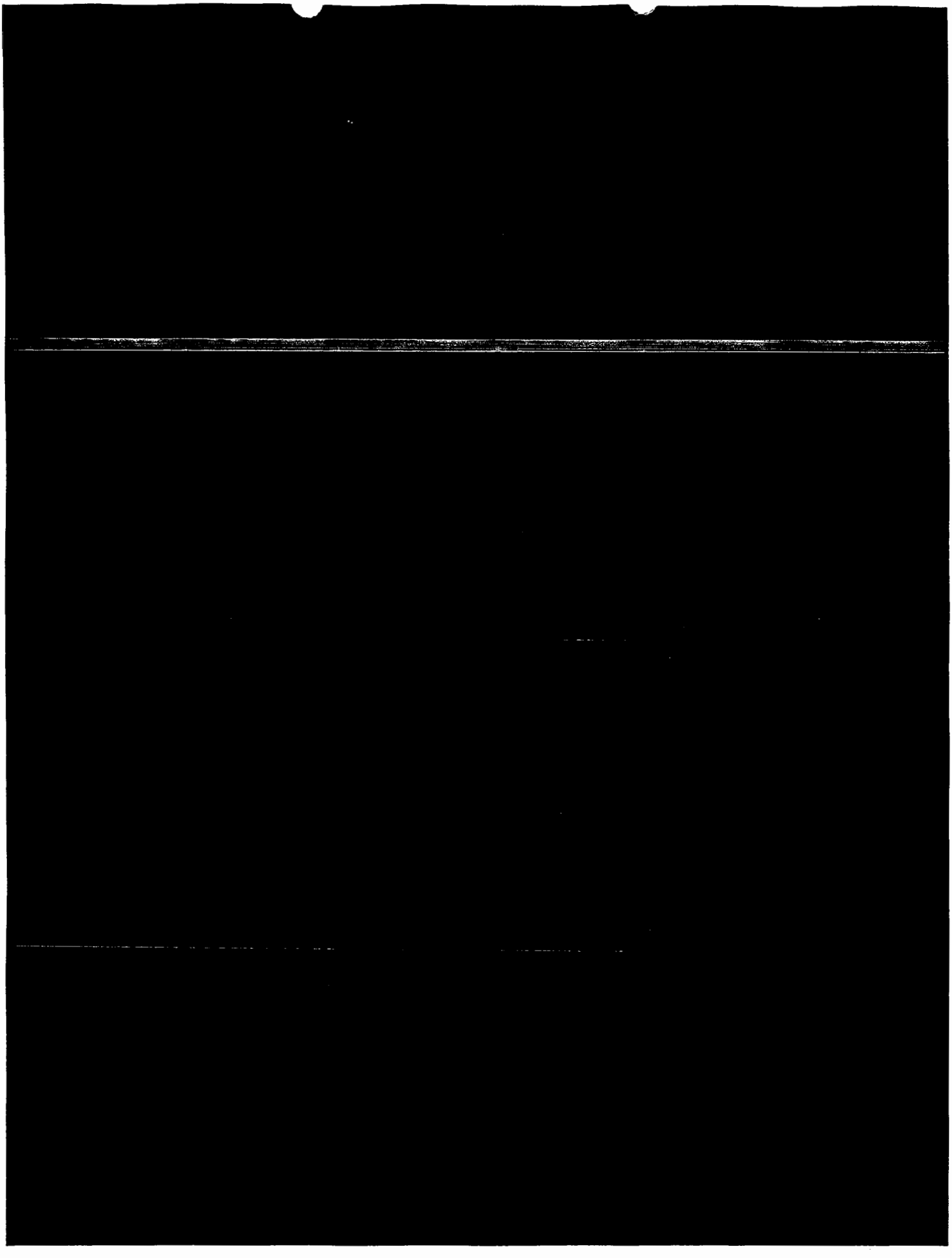
Observations:

"the witness was driving West-bound on Highway 27, approximately one (1) mile North of the ocean at East Moriches when his attention was drawn to an object, which he described as 'shooting star' traveling East to West at a 45 degree angle. He further described the object as being 'small, orange-red in color and appearing to twinkle,' and 'leaving a trail like a comet'. He stated that after the object traveled slowly in a direction for approximately ten (10) seconds, it exploded in mid-air sending an airplane wing falling through the fire, The witness thought that what he had witnessed was a small plane exploded after catching fire."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. He describes event starting only ten seconds before the end fireball (which included an observation of a wing falling off). Also, he does not describe an ascending object. Therefore, this eyewitness can be placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.



(b) (6)
(b) (7) (c)

Witness:
[redacted] [82]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to
Reach Witness (sec): ?

Group Assigned: 1

Observations:

"this witness, an New York State Police Inspector was sitting on the lawn of the Moriches Yacht Club when he observed an 'orange streak' which was a considerable distance from his location. He watched this streak travel for a few seconds before it split into two (2) pieces then erupted into a large ball of flame and fell. He saw a puff of white smoke which seemed to linger in the sky in the vicinity of where the orange streak had first appeared."

Conclusion:

The eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The observations made by the eyewitness are very short and include the description of the end fireball, including seeing two separate pieces (wing & fuselage) falling from the explosion. In addition, he did not report the "orange streak" as ascending before the explosion, Therefore, the eyewitness can be placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [83]

Witness Location: 40.6230 N
073.2595 W

Distance From (ft):

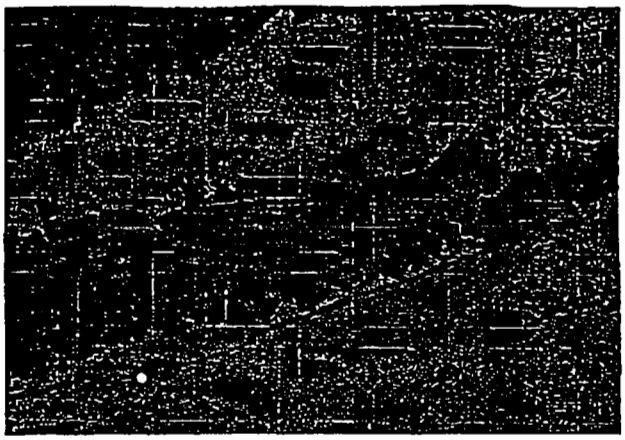
Initial Explosion	158608
Second Explosion	165085
Fuel Fire	174423

Azimuth to (deg):

Initial Explosion	86.78
Fuel Fire	84.63

Time for Initial Sound to Reach Witness (sec): 146.2

Group Assigned: 2



Observations:

"this individual, who was sitting on the beach (Robert Moses State Park, field number five) observed a 'flash' out of the corner of his left eye. His initial thoughts were that it might have been either a camera flash on the water or a bolt of lightning out at sea. He stated that when he looked in the direction of the flash, he saw a 'small white star point followed by a fine smoke trail' which may have been wavering slightly. He followed this 'star point' as it appeared to ascend and arch in a Northeasterly direction, then take a subtle downward arc. He continued following the 'star point' until it disappeared for a few seconds, then in the same location where he had last seen the object, he observed a 'bright orange ribbon.' He then observed the object falling from the sky, rotating and turning end over end as it fell".

Conclusion:

The eyewitness' report (in its entirety to the left) is either of the entire event or just the end event, depending on the total time of his observations. If the ascent/descent part of his observations are short, they represent the events just prior to the end fireball, including the ascending object other eyewitnesses had reported [25], [26], [39], or [45]. If the observations are around 40 seconds, then the eyewitness observed the ascent of the aircraft after the initial explosion. Since it is unclear which Group (1 or 2) this eyewitness should be placed in, we have placed him in Group 2.

However, the eyewitness does not make any observations that are inconsistent with TWA Flight 800 pitching up after the initial explosion. He does not report seeing two objects. Therefore, this eyewitness did not observe a missile down TWA Flight 800.

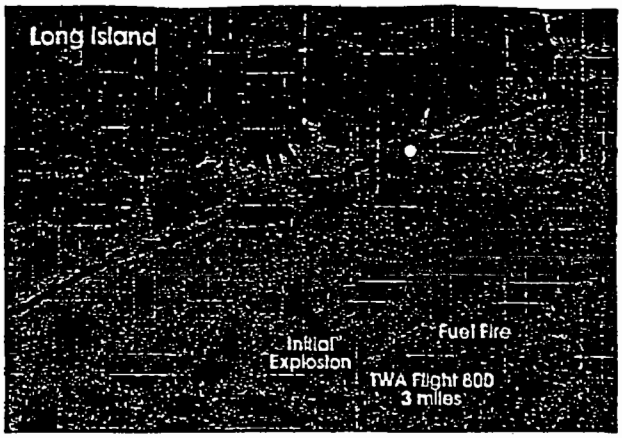
(b) (6)
(b) (7) (c)

Witness: [redacted] [84]

Witness Location: 40.7998 N
072.6454 W

Distance From (ft):	
Initial Explosion	57235
Second Explosion	54054
Fuel Fire	48893
Azimuth to (deg):	
Initial Explosion	191.60
Fuel Fire	175.49
Time for Initial Sound to Reach Witness (sec):	54.07

Group Assigned: 1



Observations:

"this eyewitness, who was looking South out of the window of her kitchen on Jessup Road in West Hampton observed an 'orange/red streak' across the horizon over Dune Road in the direction of the Barrier Island. She stated that she walked outside of her home and saw a huge fireball in the direction of where she thought the 'streak' to have been heading."

Conclusion:

The eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The observations made by the eyewitness do not include a descent phase, shows no lateral motion (expected 16 degrees of azimuth change for entire event), and only viewed a short time span before the final explosion/fuel fireball Therefore, the eyewitness was placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [85]

Witness Location: 40.7822 N
072.7369 W

Distance From (ft):

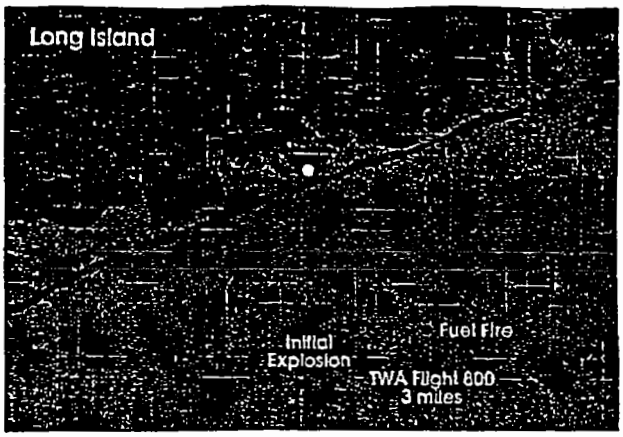
Initial Explosion	51532
Second Explosion	51496
Fuel Fire	51375

Azimuth to (deg):

Initial Explosion	164.46
Fuel Fire	145.44

Time for Initial Sound to Reach Witness (sec): 48.99

Group Assigned: 1



Observations:

"this individual was sailing in Moriches Bay with his family when he observed something 'pop up' from behind the dunes on the beach. At fire, he thought that someone was shooting fireworks on the beach. He described this object as a 'rising trail of white or silvery smoke' which 'ended of smoke quickly turned into a brilliant orange flash."

Conclusion:

The eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The observations made by the eyewitness do not include a descent phase, shows no lateral motion (expected 9 degrees of azimuth change for entire event), and only viewed a short time span before the final explosion/fuel fireball Therefore, the eyewitness was placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted][86]

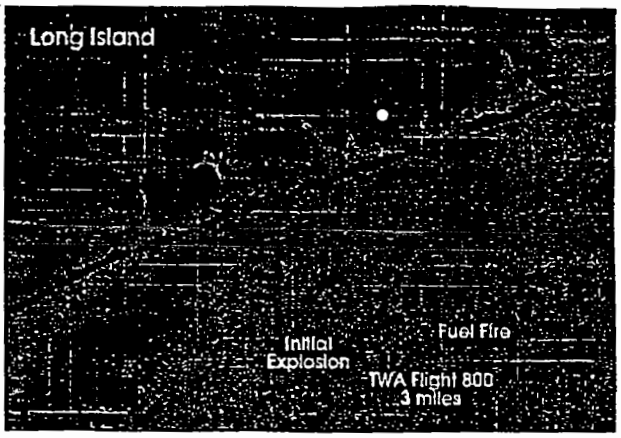
Witness Location: 40.8244 N
072.6664 W

Distance From (ft):
- Initial Explosion 65286
- Second Explosion 62781
- Fuel Fire 58509

Azimuth to (deg):
- Initial Explosion 185.01
- Fuel Fire 170.51

Time for Initial Sound to Reach Witness (sec): 61.28

Group Assigned: 1



Observations:

"this witness, a thirteen year old boy advised that as he lay in bed in Westhampton, New York on the evening of July 17, he observed what he believed to be a fireworks rocket or flare ascend from the horizon and track upwards. He remembered that he made this observation at approximately 2020, and immediately after seeing it he attempted to bring it to the attention of others who were sitting on a deck below his room. The young man added that approximately fifteen (15) minutes later, he saw the same type of object falling toward the ocean, once again ascending into the sky. Once again he rose from bed to alert the others, but by the time he was able to get to the window, all of the others were staring at a large orange fireball which was."

Conclusion:

The eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The later observations made by the eyewitness do not include an extended descent phase, shows no lateral motion (instead of the 14 degrees in azimuth change expected for the entire event), and only includes a short time span before the final explosion/fuel fireball. Therefore, the eyewitness can be placed in Group 1.

The first observation, 15 minutes prior to TWA Flight 800's destruction, could not have played a part in the aircraft's destruction.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [87]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: I

Observations:

The eyewitness was seated in the jumpseat (cockpit) of Virgin Air Flight 009, inbound from London to J.F.K. She stated that as the flight was in the process of descending into New York, she looked out the port-side cockpit window and observed what she characterized as 'an orange-white flare', which ascended, 'bulged' then exploded into a fireball. She stipulated that the 'flare' gave an indication that it appeared to be going slightly back, as if it was changing directions and going back on itself. She did not recall seeing any smoke. She likened the ascent/descent to a "roller-coaster" with the ascent ending with that appeared to be a "big bang" followed by the descent. She advised that "it seemed all integral", transitioning from ascent to descent in a fluid motion. The flare streak remained relatively the same width with exception of the bulge and final explosion with the flare 'wiggling' to the surface. Sparks appeared about the bulge and fell towards the surface. She estimated that she observed the ascending light for approximately three seconds and the descending one for approximately ten seconds.

She remembers the pilot or navigator noting the incident and marking the plane' distance at six miles."

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. She observed events that are clearly the end fireball, observed no descent phase before the end fireball, and the entire time period of her observations are too short to include the initial explosion. The eyewitness' observation of an "orange-white flare" ascending immediately prior to the fireball is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [88]

Witness Location: 40.6167 N
072.7097 W

Distance From (ft):

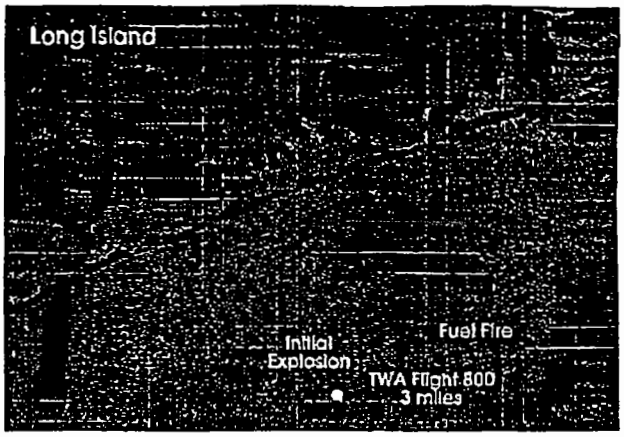
Initial Explosion	12391
Second Explosion	18093
Fuel Fire	23615

Azimuth to (deg):

Initial	30.45
Fuel Fire	50.20

Time for Initial Sound to Reach Witness (sec): 17.04

Group Assigned: 2



Observations:

The eyewitness was on board US AIR 217, seated in the right front portion of the aircraft.

The eyewitness's attention was first drawn to a small aircraft about 500-700 feet below, that was a light-colored, propeller driven plane. The plane was traveling in a Southwesterly direction.

About ten seconds after the small airplane had passed underneath, he noticed a small flare-like projectile traveling in an East-Northeasterly direction, originating from his 2:00 position. It appeared as though the projectile was ascending as it traveled, but he was unable to clearly determine that fact. The projectile traveled for approximately 3 to 4 seconds, appeared to brighten in intensity for the next 2 to 3 sends, and then culminate in what appeared to be a small explosion.

A second, much larger explosion immediately followed, and it quickly accelerated in both size and shape. The second fireball was accompanied by billowing smoke containing both dark and light colored regions. He continued to watch the fireball as it appeared to descend towards the water. However, simultaneously with the fireball's impact with the water, Flight 217 flew over the top of it and he lost his view.

He never observed any smoke trail and the projectile appeared out of nowhere, traveled straight, and consisted of one very defined burning point of bright white light. All he saw was the projectile at all times.

Conclusion:

The eyewitness observed the entire TWA Flight 800 trajectory after the initial explosion to impact with the water. The timing of the small aircraft passing underneath (the P-3 on radar-see below) to the start of the projectile (a reported 12 seconds compared to the actual 10 seconds), matches well. This places the eyewitness in Group 2.

The eyewitness describes a bright white projectile that is most likely ascending, followed by a series of explosions and final fireball. This description is similar to the one [redacted][1] provided.

(b) (6)
(b) (7) (c)

The eyewitness did not see any secondary objects, and only saw the one projectile, which was the aircraft. His observations are consistent with the aircraft pitching up and ascending after the initial explosion and then descending to the ocean. There is nothing in his observations that indicate he observed a missile.

(b) (6)
(b) (7) (c)

Witness: [redacted] [89]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: 1

Observations:

The eyewitness was the pilot a chartered Boeing 737 on a Southerly direction passing over Hampton, N.Y. and turning to a Westerly direction and observed an approaching aircraft. What drew his attention to this aircraft was what he originally thought was the aircraft's nose light. The light was of unusual intensity and was off color of the usual white light, being a brilliant yellow color.

His aircraft was at approximately 18000 ft and he was traveling "almost nose to nose" with this oncoming aircraft. Because of the brilliance and off color of the light, he believed that the oncoming aircraft may have an engine fire.

He continued to visually track the aircraft and the brilliant light with no smoke trail, and as such, discounted the possibility of an engine fire to that aircraft.

At this time, he was 15 to 19 miles from the oncoming aircraft, and decided to blink his inboard wing light to signal to the oncoming aircraft. It was at this time he observed the oncoming aircraft "inflight explosion", observed fire and then two (2) pieces of what he believes to be the oncoming aircraft going down, possibly the wings, parallel to the water.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The observations made by the witness do not include a descent phase, has only a short time span before the final explosion/fuel fireball (though the actual time frame would be helpful), and include seeing two pieces fall out of the final explosion. Therefore, the eyewitness can be placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [90]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to
Reach Witness (sec): ?

Group Assigned: 1

Observations:

"this witness, who participated in a night air refueling exercise in an UH-60 Blackhawk helicopter stated that he observed a streak of red light, with the trajectory of a 'shooting star'. He added the object appeared to maneuver in an arc; observed an explosion at the 'end of the streak' then a second, larger explosion which appeared to engulf the first."

Conclusion:

The eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The observations made by the witness do not include an extended descent phase, shows no lateral motion (although the eyewitness was close), has only a short time span before the final explosion/fuel fireball. Therefore, the eyewitness can be placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [91]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: 1

Observations:

"this individual was the first officer on Piedmont Airline Flight 3112 from Washington, D.C. to New Haven, Connecticut. He stated that at approximately 2030 on July 17, 1996 while flying in the vicinity of the site of the explosion, he observed a flash, like 'bright coals being flung forward, in a parabola.' He initially thought that he was observing debris burning up upon re-entry into the atmosphere. He then described this ball separating into two (2) balls which fell downward. He realized shortly after this that he was witnessing an object exploding."

Conclusion:

The eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The observations made by the eyewitness is of only the final fireball event, and does lacks an ascent motion, a descent phase, any lateral motion, and is only over a short time span. Therefore, the eyewitness can be placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:

[redacted] [92]
[92]

Witness Location: 40.7022 N
072.7730 W

Distance From (ft):

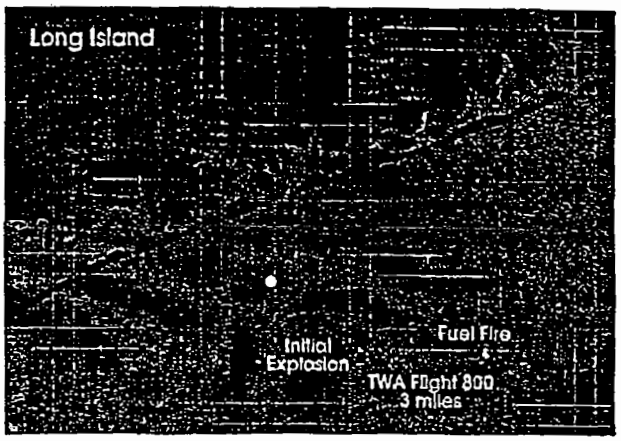
Initial Explosion	31388
Second Explosion	35220
Fuel Fire	41272

Azimuth to (deg):

Initial Explosion	105.08
Fuel Fire	99.13

Time for Initial Sound to Reach Witness (sec): 31.49

Group Assigned: 1



Observations:

"both of these individuals were operating a commercial fishing vessel approximately four(4) miles South of Fire Island when they observed what they described as a 'very large projectile' ascend from the water into the sky toward the vicinity of the explosion of TWA 800. Both witnesses stated that this projectile, which originated Southeast of their position, trailed a very large column of smoke . They also advised that this projectile was visible for several moments, then seemed to disappear before they reported seeing a bright flash in the direction of where the aircraft exploded. [The United Stated Coast Guard considers (one eyewitness) to be a reliable and credible source of information, having previously provided information regarding search and rescue operations in the area."

Conclusion:

These eyewitnesses' reports is only of events at the end of TWA Flight 800's flight. The reporting lacks any descent phase, involves only a short time frame before the final explosion/fuel fireball, and has no large lateral motions (expect about 6 degrees of azimuth change). The "projectile" reported by the eyewitnesses is most likely the smoke trail of the burning debris hitting the water, followed by the flash of smaller explosions. Therefore, the eyewitnesses' observations were placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, they could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [93]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to
Reach Witness (sec): ?

Group Assigned: 1

Observations:

'witness was on a fishing boat South of Moriches, New York at approximately 2015, he observed a dark blue boat, approximately eight (8) to nine (9) feet in length with three (3) occupants heading out to ocean. The witness added that at approximately 2018, he heard the engine cut off. Subsequently the witness hears a sound similar to a 'bottle rocket only louder' followed by a 'pop'. The witness then sees the front of the aircraft on fire and hears three (3) loud explosions. The witness then heard the boat's engines start up again and then hears the boat moving away at a high rate of speed. The witness sees the tail of the plane spiraling downward."

Conclusion:

The eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. Events that place his observations at the end include the lack of any descent phase, the overall short time of his observations before the final explosion/fuel fireball, and the timing of the three loud explosions (although the exact position of this eyewitness is not known, it should take sound from the initial explosion about 40 seconds to reach him). Therefore, the eyewitness observations were placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [94]

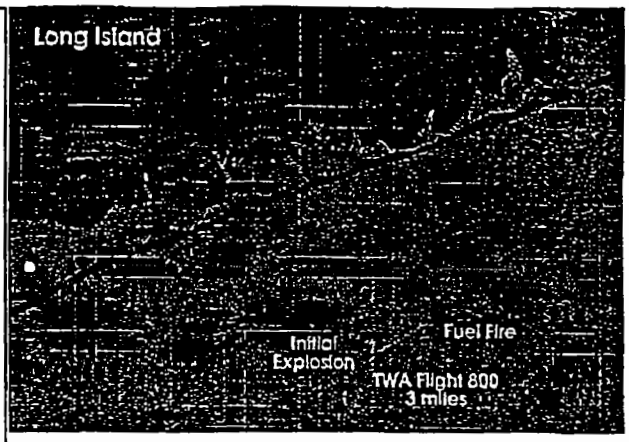
Witness Location: 40.7134 N
073.0144 W

Distance From (ft):
- Initial Explosion 93792
- Second Explosion 99407
- Fuel Fire 107240

Azimuth to (deg):
- Initial Explosion 105.08
- Fuel Fire 99.13

Time for Initial Sound to Reach Witness (sec): 87.06

Group Assigned: 1



Observations:

"witness was traveling on ferry from Patchogue to Davis Park observed a flare-like object shoot up into sky from water level from East of the direction in which the ferry was traveling."

Conclusion:

The eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. Her reporting lacks any descent phase, involves only a short total observation time, and has no large lateral motions (expected about 6 degrees of azimuth change). Therefore, the eyewitness' reporting indicate her observations should be placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

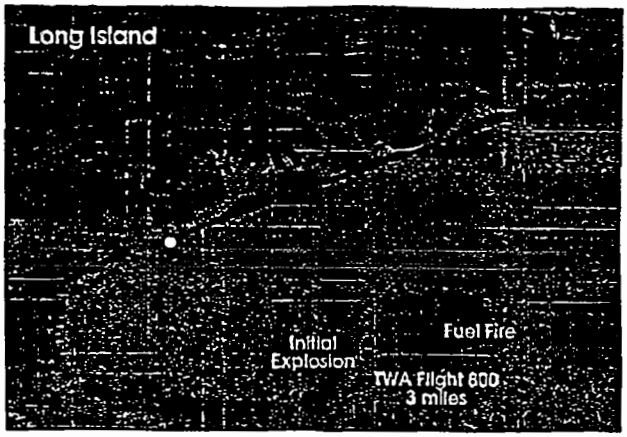
(b) (6)
(b) (7) (c)

Witness: [redacted] [95]

Witness Location: 40.7303 N
072.8725 W

Distance From (ft):	
Initial Explosion	59783
Second Explosion	64283
Fuel Fire	70603
Azimuth to (deg):	
Initial Explosion	120.87
Fuel Fire	109.28
Time for Initial Sound to Reach Witness (sec):	56.34

Group Assigned: 1



Observations:

"this individual was surfing in the ocean South of Smith's Point when he observed an object resembling a 'flare' which ascends, drops 'straight down' approximately three inches, and as it drops, its size increases slightly. He added that this object had a tail approximately the same size as the 'flare' itself, as well as a 'smokey, fiery' trail. After dropping, the object explodes to the size of a quarter (at arm's length) and breaks into two pieces, one described as 'big and fiery' the second as 'smaller.' The witness likened the larger piece to the size of the moon, fiery orange/yellow in color, and appeared to be spinning. He likened the smaller piece to being 'ten percent [the size] of the bigger piece.' Approximately twenty seconds later, he and his friends heard a deep rumbling which lasted for three (3) to four (4) seconds."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The eyewitness did not report seeing a descent phase, reported only a short overall time for his observations before the final explosion/fuel fireball (which eventually breaks into two pieces), and no large lateral motions (expected over 11 degrees of azimuth change). The sound from the initial explosion should take about 56.3 seconds to reach the eyewitness, which is sooner that the twenty seconds after the fireball reported (which would be about 65 seconds after the initial explosion). Overall, the eyewitness' report places his observations in Group 1.

The eyewitness' observation of an ascending flare just prior to the end fireball is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:

[redacted] [96]
[96]
[96]

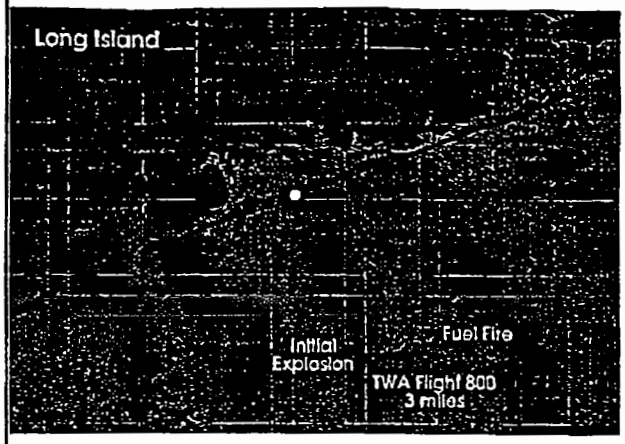
Witness Location: 40.7661 N
072.7486 W

Distance From (ft):
- Initial Explosion 46977
- Second Explosion 47653
- Fuel Fire 48744

Azimuth to (deg):
- Initial Explosion 158.73
- Fuel Fire 138.37

Time for Initial Sound to Reach Witness (sec): 44.97

Group Assigned: 1



Observations:

"these eyewitnesses who were surfing in the ocean off Moriches Inlet, saw what they described as a 'flare' which left the surface, rise over the horizon and explode."

Conclusion:

These eyewitness' reports (in their entirety to the left) are only of events at the end of TWA Flight 800's flight. The eyewitnesses do not report seeing a descent phase, report only a short overall time for their observations before the final explosion, and no large lateral motions (expected over 20 degrees of azimuth change). This reporting places their observations in Group 1.

The eyewitness' observation of an rising flare just prior to an explosion could be similar (though lacking in details) to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

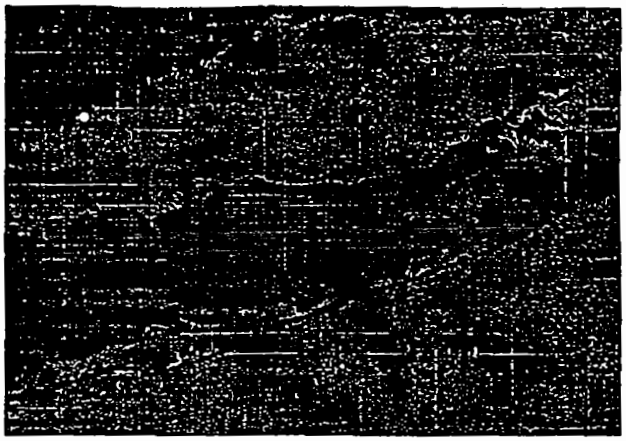
Since the eyewitness did not observe the events close to the initial explosion, they could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [97]

Witness Location: 40.0833 N
073.3956 W
Distance From (ft):
Initial Explosion 252152
Second Explosion 255694
Fuel Fire 259802
Azimuth to (deg):
Initial Explosion 128.98
Fuel Fire 125.58
Time for Initial Sound to
Reach Witness (sec): 231.9

Group Assigned: 1



Observations:

"this witness who was facing the water in Norwalk, Connecticut stated that she saw a 'bright cherry-red line' ascend in to the sky in the distance. She added that after several moments this 'line' seemed to explode, and then explode again at a lower altitude."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The eyewitness is over 47 miles away from the event, making it difficult to observe a small missile in flight. Further, her reporting does not include a descent phase, only encompasses a short total time of observation, and shows no lateral motion (although the total expected azimuth change of 3.4 degrees is small, it would not look like a "bright cherry-red line"). Therefore, this eyewitness' reporting places her observations in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [98]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to
Reach Witness (sec): ?

Group Assigned: 1

Observations:

"this individual, who was sitting at her home facing the Long Island in Sound Wilford, Connecticut, observed a 'bright reddish-orange light,' like a 'lightning streak' going straight up into the sky. She stated that the streak was not straight, but appeared to 'zig-zag' as it ascended. She stated that she was aware that what she was seeing was far to the South."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The eyewitness is over 40 miles away from the event (the exact location of the eyewitness has not been determined), making it difficult to observe a small missile in flight. Further, her reporting does not include a descent phase, and only encompasses a short total time of observation. Therefore, this eyewitness' reporting places her observations in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [99]

Witness Location: 40.2540 N
072.4417 W

Distance From (ft):
- Initial Explosion 231715
- Second Explosion 227770
- Fuel Fire 220602

Azimuth to (deg):
- Initial Explosion 197.03
- Fuel Fire 193.76

Time for Initial Sound to Reach Witness (sec): 213.2

Group Assigned: 1

Observations:

"the witness, who was sailing on the Long Island Sound off of Westbrook, Connecticut, observed what she described as a 'red flare' rising up from the horizon at a position just East of due South (magnetic). She stated that this object ascended almost vertically from approximately 30 degrees off of the horizon (bearing slightly to the right). She added that at the top of the arc (which she estimated to be 70 degrees off the horizon), she saw three (3) to four (4) flames, then approximately one (1) to two(2) seconds later, she observed a large cloud of orange light which flashed once."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The eyewitness is about 42 miles away from the event, making it difficult to observe a small missile in flight. Further, her reporting does not include a descent phase, and only encompasses a short total time of observation. Therefore, this eyewitness' reporting places her observations in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

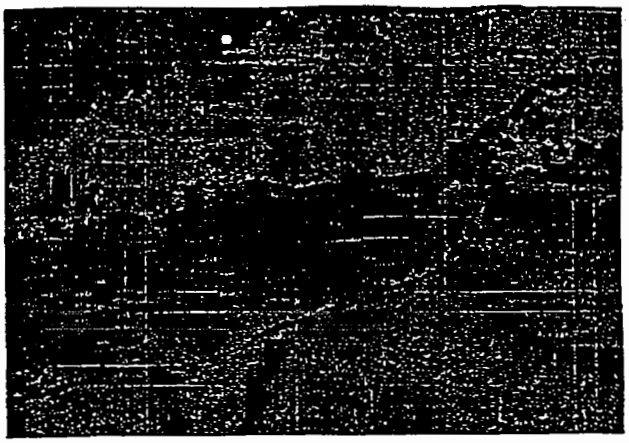
(b) (6)
(b) (7) (c)

Witness:
[redacted] [100]

Witness Location: 41.2227 N
073.0566 W

Distance From (ft):	
Initial Explosion	233587
Second Explosion	234406
Fuel Fire	234258
Azimuth to (deg):	
Initial Explosion	154.04
Fuel Fire	149.88
Time for Initial Sound to Reach Witness (sec):	214.9

Group Assigned: 1



Observations:

"the witness, who was sitting on the porch of a house in Milford, Connecticut stated that he observed what he thought was either a flare or fireworks rising in the South from approximately 30 degrees off of the horizon. He added that the object rose almost straight up, with a slight right arc. The witness could not see any smoke or whatever object was emanating the light. He added that the orange dot, which ascended rapidly climbed 'six inches at arms' length.' The object then appeared to make a 'brilliant half dome-appearing flash."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The eyewitness is over 44 miles away from the event, making it difficult to observe a small missile in flight. Further, his reporting does not include a descent phase, and encompasses only a short total time of observation before the final explosion. Therefore, this eyewitness' reporting places his observations in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [101]

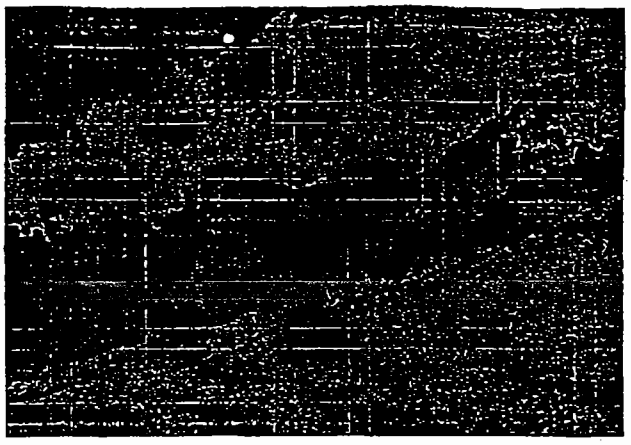
Witness Location: 41.2227 N
073.0566 W

Distance From (ft):
- Initial Explosion 233587
- Second Explosion 234406
- Fuel Fire 234258

Azimuth to (deg):
- Initial Explosion 154.04
- Fuel Fire 149.88

Time for Initial Sound to Reach Witness (sec): 214.9

Group Assigned: 1



(b) (6)
(b) (7) (c)

Observations:

"this witness, who was with [redacted] [100] provided a similar description of the series of events and characterized the light source as appearing 'like a welder's arc'."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The eyewitness is over 44 miles away from the event, making it difficult to observe a small missile in flight. Further, his reporting (similar to [redacted] [100]) does not include a descent phase, and encompasses only a short total time of observation before the final explosion.
Therefore, this eyewitness' reporting places his observations in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

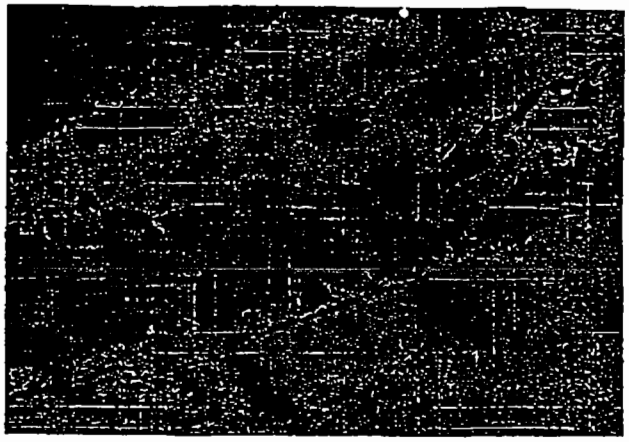
(b) (6)
(b) (7) (c)

(b) (6)
(b) (7) (c)

Witness:
[redacted] [102]

Witness Location: 41.2672 N
072.6526 W
Distance From (ft):
Initial Explosion 226663
Second Explosion 224226
Fuel Fire 219214
Azimuth to (deg):
Initial Explosion 182.41
Fuel Fire 178.47
Time for Initial Sound to
Reach Witness (sec): 208.5

Group Assigned: 1



Observations:

"this witness, who was fishing at Circle Beach in Madison, Connecticut stated that he observe what he thought was a 'flare' rising from approximately 30 degrees off the horizon to an apex of approximately 45 degrees off the horizon when it appeared to 'drop down' forming 'an expanding cone of orange light'."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The eyewitness is over 41 miles away from the event, making it difficult to observe a small missile in flight. Further, his reporting does not include a descent phase, and only encompasses a short total time before the final explosion. Therefore, this eyewitness' reporting places his observations in Group 1.

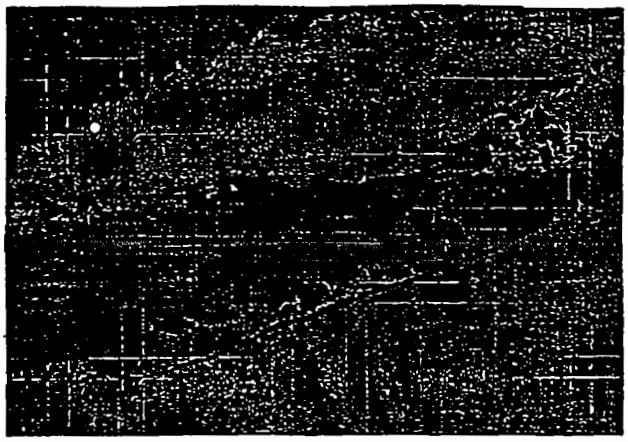
Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [103]

Witness Location: 41.0678 N
073.3748 W
Distance From (ft):
Initial Explosion 244155
Second Explosion 247717
Fuel Fire 251869
Azimuth to (deg):
Initial Explosion 128.81
Fuel Fire 125.31
Time for Initial Sound to
Reach Witness (sec): 224.6

Group Assigned: 1



Observations:

"this witness was on a boat in Long Island Sound near Norwalk, Connecticut observed what she described as a 'brilliant red flare' which rose from just above the horizon into the sky in what appeared to be a straight line. She added that when this flare reached its apex, it exploded into a 'brilliant red ball'."

Conclusion:

This eyewitness' report (in its entirety to the left) is only of events at the end of TWA Flight 800's flight. The eyewitness is over 46 miles away from the event, making it difficult to observe a small missile in flight. Further, her reporting does not include a descent phase, and only encompasses a short total time before the final explosion. Therefore, this eyewitness' reporting places her observations in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [104]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to
Reach Witness (sec): ?

Group Assigned: 1

Observations:

The eyewitness is a Suffolk County Park Policeman.

"That at approximately 2030 hours on the evening of July 17th while he and his partner were on routine patrol during the evening of July 17th when they received a radio call which alerted then to the possibility of a boat in distress which had fired off a flare. He and his partner arrived at Smith Point Park and were told by a number of individuals that a plane had crashed into the ocean."

Conclusion:

This eyewitness did not directly observe nor hear anything associated with the TWA Flight 800 disaster. Therefore, his observations are placed in Group 1 (for record keeping purposes only).

(b) (6)
(b) (7) (c)

Witness: [redacted] [105]

Witness Location: 40.7632 N
072.7723 W

Distance From (ft):

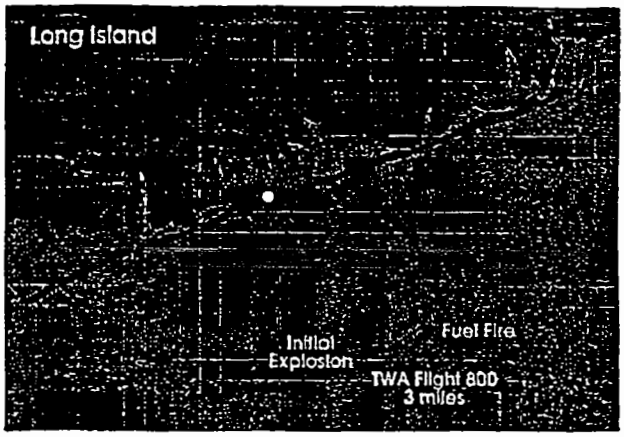
Initial Explosion	48798
Second Explosion	50331
Fuel Fire	52600

Azimuth to (deg):

Initial Explosion	151.08
Fuel Fire	132.25

Time for Initial Sound to Reach Witness (sec): 46.57

Group Assigned: 1



Observations:

The eyewitness was standing on the dock on the bayside of the Great Gun Beach Dock at Fire Island.

The eyewitness was told to look into the sky at a red flare that was ascending. He watched the flare for approximately ten seconds. He did not see an airplane at this time. A couple of seconds later, he saw what he thought was an explosion of a parachute flare but quickly realized that due to the size of the flames it was definitely not a flare descending toward to the ground.

He said it seemed like the flare was only a mile or two away but later he learned it was about six to eight miles away.

Conclusion:

This eyewitness' report is only of events at the end of TWA Flight 800's flight. The eyewitness did not report seeing a descent phase, reported only a short overall time for his observations before the final explosion/fuel fireball (ten seconds), and no large lateral motions (expected about 18 degrees of azimuth change). Therefore, the eyewitness' report places his observations in Group 1.

The eyewitness' observation of an ascending red flare just prior to the end fireball is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45]. However, he observes this flare for ten seconds, which is longer than the 2 to 3 seconds of the other observers.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

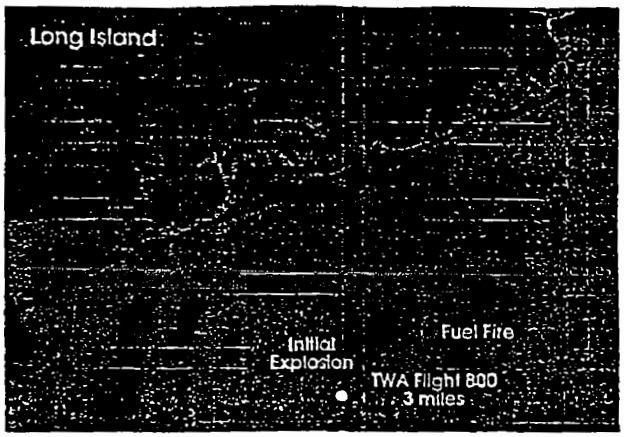
(b) (6)
(b) (7) (c)

Witness: [redacted] [106]

Witness Location: 40.6167 N
072.7097 W

Distance From (ft):	
Initial Explosion	12391
Second Explosion	18093
Fuel Fire	28148
Azimuth to (deg):	
Initial Explosion	30.45
Fuel Fire	50.20
Time for Initial Sound to Reach Witness (sec):	17.04

Group Assigned: 2



Observations:

The eyewitness was aboard USAIR Flight 217 in window seat 6F. As he stared out the window he saw an aircraft moving off to the East, and a short time later, he observed another airplane proceeding in an Easterly direction to the right and below his aircraft. He noticed that this large aircraft had what he took to be its landing lights on, and could observe cabin lights. He estimates the aircraft was about 10,000 ft below his airplane (which was 22,000 ft). He watched the aircraft for approximately thirty to forty seconds. It banked left, then proceeded straight in a path that would take it underneath the USAIR airplane. As he observed it, the aircraft exploded and a large round orange fireball appeared which seemed to emanate from the front area of the plane. The fireball was approximately twice the size of the aircraft. The plane seemed to stop in mid-air "like a bus running into a stone wall - no forward motion."

Approximately one second after the first explosion it exploded again and an orange and yellow fireball appeared, the size of which was about fifty to seventy five percent larger than the first explosion. This second explosion occurred almost in the same location as the first explosion and flame from this second explosion seemed to shoot towards the front of the aircraft ahead of the path of the vessel.

(b) (6)
(b) (7) (c)

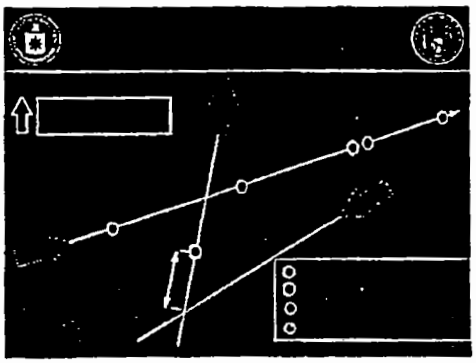
Eyewitness [redacted] [88] was one seat in front of this eyewitness.

Conclusion:

The eyewitness is describing events close to the initial explosion as shown by his total observation time of 30 to 40 seconds before the end fireball. However, the eyewitness did not characterize the direction (up/down/level) the aircraft took after the first observation. This could help corroborate other witness' observations near the initial explosion of an ascending object.

The eyewitness' observation of flames shooting from the second explosion towards the front is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Although the eyewitness was observing events outside of his window, he did not observe any object resembling a missile. The entire observation was just of the TWA Flight 800 aircraft. Therefore, this eyewitness did not observe a missile down TWA Flight 800.



(b) (6)
(b) (7) (c)

Witness:
[redacted] [107]

Witness Location: 40.8752 N
072.5084 W

Distance From (ft):

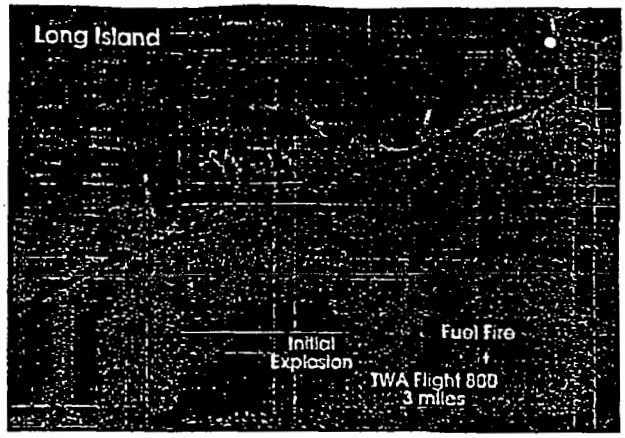
Initial Explosion	97026
Second Explosion	91952
Fuel Fire	83463

Azimuth to (deg):

Initial Explosion	210.61
Fuel Fire	204.07

Time for Initial Sound to Reach Witness (sec): 90.00

Group Assigned: 1



Observations:

The eyewitness had just finished walking around the running track at Hampton Bays High School. As she was walking towards the parking lot she turned around to call her children over to the car. When she looked up in the sky and observed what she termed as a "dud Roman Candle or flare." This flare was white in color with a gray smoke trail. The flare seemed to move from a Southwesterly direction to a more Westerly direction. As it was moving in this direction it appeared to ascend on a diagonal. She stated the speed of the flare was fast. The flare went only "so high" but it seemed to be still moving West. Since she thought this was a Roman Candle that did not function correctly, she turned back and headed for the parking lot. She did not hear any sounds associated with this flare.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The eyewitness did not report seeing a descent phase, reported only a short overall time for her observations, and no large lateral motions (expected about 6.6 degrees of azimuth change). Therefore, the eyewitness' report places her observations in Group 1.

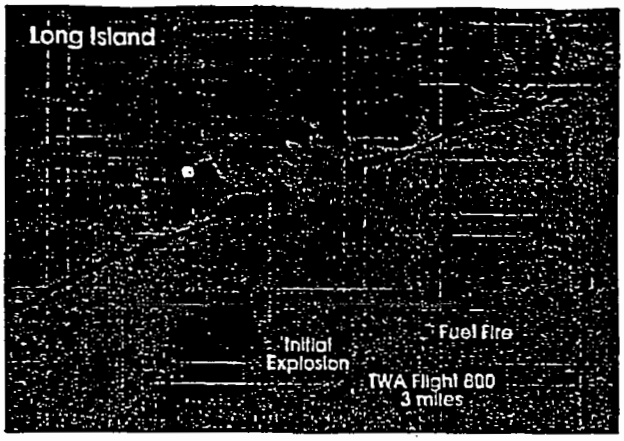
Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [108]

Witness Location: 40.7807 N
072.8542 W
Distance From (ft):
Initial Explosion 67425
Second Explosion 70403
Fuel Fire 74373
Azimuth to (deg):
Initial Explosion 136.69
Fuel Fire 124.10
Time for Initial Sound to
Reach Witness (sec): 63.20

Group Assigned: 1



(b) (6)
(b) (7) (c)

Observations:

The eyewitness was walking with her friend, [redacted] [78], on a local high school track.

The eyewitness noticed a plane because of the sun reflecting off of it. After noticing the plane she did not maintain eye contact with it for approximately 30 seconds. When she came to the curve in the track, she noticed a large bright lights and remembered saying something to the effect of "my God people are dying". She was positive the bright light - explosion was from the aircraft that she had just observed a few seconds before.

She advised that at no time did she see any foreign object whatsoever appear in the sky or near the aircraft in question.

Conclusion:

This eyewitness' report is mainly of events at the end of TWA Flight 800's flight. The observations 30 seconds earlier (sun glint of aircraft) may have been associated with the disaster, but does not give any information). For the second observations, the eyewitness did not report seeing an ascent nor a descent phase, reported only a short overall time for her observations before the final explosion, and no large lateral motions (expected over 12 degrees of azimuth change). Therefore, the eyewitness' report places his observations in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [109]

Witness Location: 40.7883 N
072.6687W

Distance From (ft):

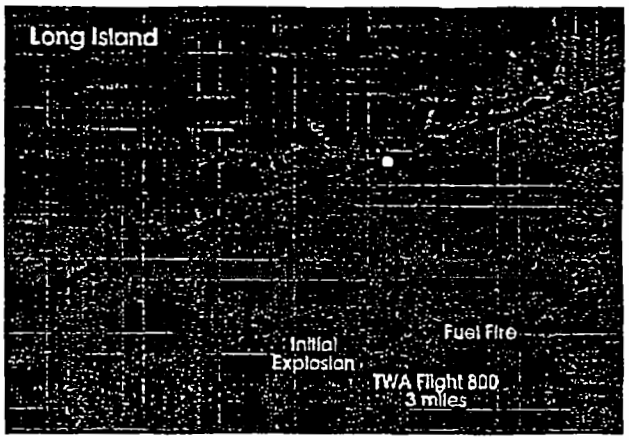
Initial Explosion	52123
Second Explosion	49634
Fuel Fire	45719

Azimuth to (deg):

Initial Explosion	185.57
Fuel Fire	167.00

Time for Initial Sound to Reach Witness (sec): 49.52

Group Assigned: 1



Observations:

The eyewitness was on Dune Road, when he noticed an explosion in the sky. The eyewitness, who is a former EOD in the Marine Corps, stated the initial colors of the explosion were white, yellow and orange and that it reminded him of napalm or the crack of a bomb. He then heard two to three explosions and the sound of thunder. Afterwards, he saw black smoke and flames fall from the area of the explosion to the ocean.

He noticed a vapor line from the ocean up to the sky, like a firework. He saw this vapor line after the initial blast, but thought it could have come from the ground of possibly from the horizon.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The eyewitness did not see a descent phase, reported only a short overall time for his observations before the final explosion/fuel fireball (described as like napalm), and no large lateral motions (expected over 18 degrees of azimuth change). Finally, the sound from the initial explosion should take about 49.5 seconds to reach the eyewitness, which correlates with the end fireball observation Therefore, the eyewitness' report places his observations in Group 1.

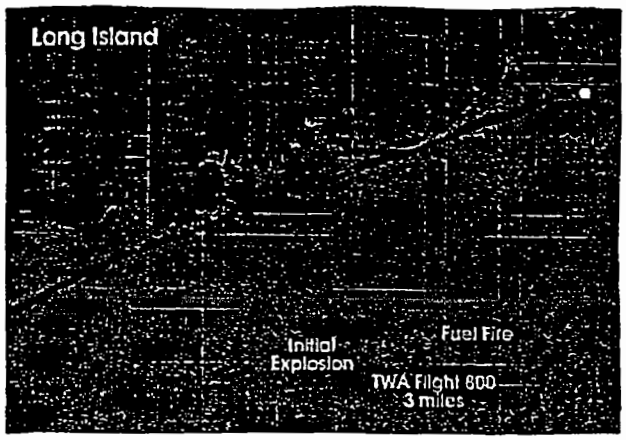
Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[ ] [110]

Witness Location: 40.8383 N
072.4754 W
Distance From (ft):
Initial Explosion 91272
Second Explosion 85536
Fuel Fire 76154
Azimuth to (deg):
Initial Explosion 219.89
Fuel Fire 214.53
Time for Initial Sound to
Reach Witness (sec): 84.77

Group Assigned: 1



(b) (6)
(b) (7) (c)

(b) (6)
(b) (7) (c)

Observations:

The eyewitness was in a boat fishing in the ocean off Shinnecock Inlet (also in boat was [ ][49] and [ ][50].

The eyewitness saw what he thought was a flare straight behind the boat or a little to the right of the boat. He was not able to estimate the height of the flare. He described the flare as a white wispy trail that went straight up. When he saw this, he said, "Look at the flare"". To the other people on the boat. He followed the flare for about five seconds, when the flare turned into an orange burst which looked to be several miles South of the mile marker. The lighting was such that he could still see the mile marker that was about half mile from his location.

Conclusion:

The eyewitness' is only of events at the end of TWA Flight 800's flight. The eyewitness did not report seeing a descent phase and reported only a short overall time for his observations before the final explosion/fuel fireball (five seconds). Therefore, the eyewitness' report places his observations in Group 1.

The eyewitness' observation of an ascending flare just prior to the end fireball is somewhat similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [111]

Witness Location: 40.8008 N
072.9032 W

Distance From (ft):
- Initial Explosion 81010
- Second Explosion 84378
- Fuel Fire 88769

Azimuth to (deg):
- Initial Explosion 132.42
- Fuel Fire 122.18

Time for Initial Sound to Reach Witness (sec): 75.46

Group Assigned: 1

Observations:

The eyewitness and a group of friends were at a water hole off Old Country Road, in the vicinity of the Suffolk County Police Department firearms range. The group was gathered on the West bank clearing of the water hole.

The eyewitness was in the water approximately ten feet off the shore, facing South. He observed a reddish/orange flare ascending in the sky. The flare was followed by a white vapor trail and appeared to be heading towards him from beyond the trees, but moving at a slight angle from right to left.

The eyewitness then left he water and was standing on the sand but close to the water's edge. From this vantage point, he observed an explosion in the sky. He described two large balls of fire and smaller pieces of fire falling out of the sky.

He then moved further away from the water to the top of the hill, but still on the sand. At this point the fire balls had fallen out of sight. He heard sounds like rolling thunder, and felt slight vibrations in the ground.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The observations made by the witness do not include a descent phase, shows no large lateral motion (instead of the 10 degrees expected for the entire event), and his total observations encompassed only a short time span before the final explosion/fuel fireball (which included the two fireballs other eyewitnesses report). Therefore, the eyewitness can be placed in Group 1.

The eyewitness' observation of a "flare" ascending immediately prior to the fireball is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

The time the initial explosion sound arrived (75.5 secs) matches the observations, but adds little data as the entire event had already finished.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [112]

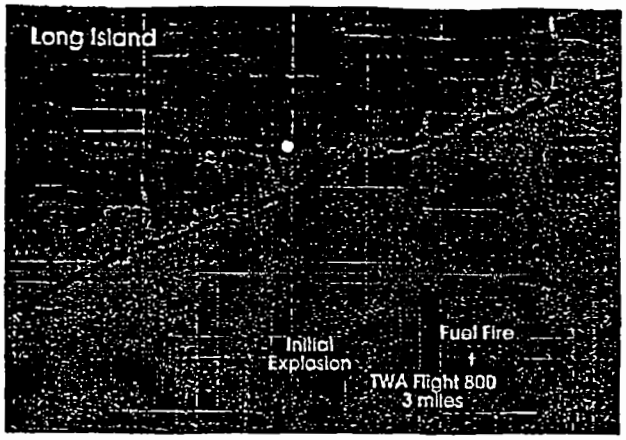
Witness Location: 40.8009 N
072.7565 W

Distance From (ft):
- Initial Explosion 59646
- Second Explosion 59932
- Fuel Fire 60061

Azimuth to (deg):
- Initial Explosion 161.20
- Fuel Fire 144.86

Time for Initial Sound to Reach Witness (sec): 56.22

Group Assigned: 1



(b) (6)
(b) (7) (c)

Observations:

The eyewitness was at a slip at Abbotts Harts Cove Marina after boating with her husband [redacted] [113].

Soon after arriving at the slip, while looking South of her position, she saw what appeared to be a flare rising through the sky. The flare was already in mid-air when she first saw it, she did not see it leave the ground. The flare had an orange tail and was traveling South to Southwest. She watched the flare rise through the air and then come down a little before it exploded. She did not see a plane before she saw the explosion. The explosion occurred approximately ten seconds after she first saw the flare in the sky.

She first realized that a plane had exploded when she saw the plane break into two pieces as it fell straight to the ground. From the position she was in at the time she saw the explosion, she was able to point out in the sky the flares course of travel, as well as the point of the eventual explosion.

The azimuth that the FBI provided for the observations of this eyewitness was between 138.1 to 146.1 degrees.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The observations made by the witness do not include a descent phase and her total observations encompassed only a short time span (ten seconds) before the final explosion/fuel fireball (which included the two pieces other eyewitnesses report). Further, the 138.1 to 146.1 degrees azimuth is closer to the fuel fire azimuth (145 deg than the initial explosion 161 deg). Therefore, the eyewitness can be placed in Group 1.

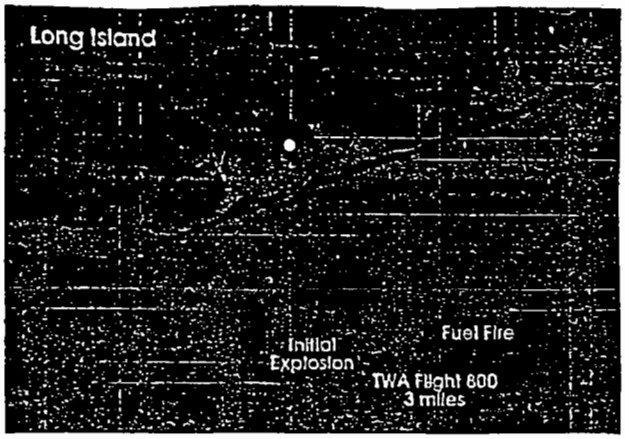
The eyewitness' observation of a "flare" ascending immediately prior to the fireball is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45]. However, the ten second ascent time is somewhat long compared to the other eyewitnesses observations of 2 to 3 seconds.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

Witness:
Jack Corrao [113]

Witness Location: 40.8009 N
072.7565 W
Distance From (ft):
Initial Explosion 59646
Second Explosion 59932
Fuel Fire 60061
Azimuth to (deg):
Initial Explosion 161.20
Fuel Fire 144.86
Time for Initial Sound to
Reach Witness (sec): 56.22

Group Assigned: 1



(b) (6)
(b) (7) (c)

Observations:

The eyewitness was at a slip at Abbotts Harts Cove Marina after boating with his wife [redacted] [112].

Soon after arriving at the slip, while looking South of his position, he saw what appeared to be a flare rising through the sky. He could not determine if the flare was rising up or dropping down. The flare was already in mid-air when he first saw it; he did not see it leave the ground. He does not know if the flare had a tail, and he is not sure what direction the flare was traveling. However, he said the flare ended in a big ball of flames. He did not see a plane before he saw the explosion. He did not know how long he saw the flare before he saw the explosion. He is able to describe where the flare was located in the sky when he first saw it, and where in the sky he saw a big ball of flames.

The azimuth that the FBI provided for the observations of this eyewitness was between 138.1 to 146.1 degrees.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. Based on his account and his wife's [redacted] [112] (which gives more details), the observations made by the witness do not include a descent phase and her total observations encompassed only a short time span (ten seconds) before the final explosion/fuel fireball (which included the two pieces other eyewitnesses report). Further, the 138.1 to 146.1 degrees azimuth is closer to the fuel fire azimuth (145 deg than the initial explosion 161 deg). Therefore, the eyewitness can be placed in Group 1.

(b) (6)
(b) (7) (c)

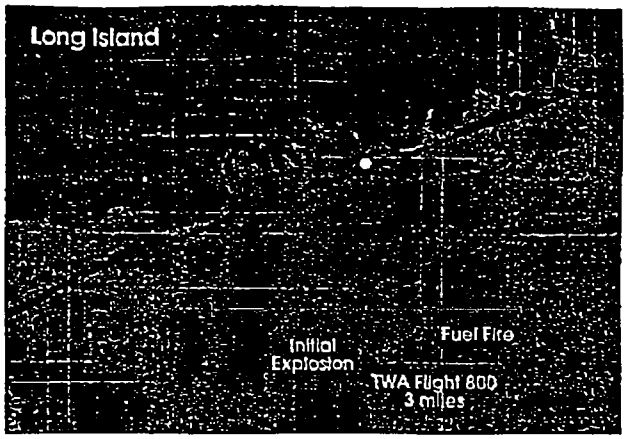
Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [114]

Witness Location: 40.7842 N
072.6833 W
Distance From (ft):
Initial Explosion 50393
Second Explosion 48417
Fuel Fire 45371
Azimuth to (deg):
Initial Explosion 181.16
Fuel Fire 161.60
Time for Initial Sound to
Reach Witness (sec): 47.98

Group Assigned: 1



(b) (6)
(b) (7) (c)

(b) (6)
(b) (7) (c)

Observations:

The eyewitness was at a condo with his wife [redacted] [115] and daughter-in-law, [redacted] [116].

(b) (6)
(b) (7) (c)

The eyewitness's daughter-in-law [redacted] [106] was heading out the sliding glass door when she let out a scream.

He turned and followed her out the door. He observed what he described as a large red flamed object or fireball which separated into two (2) objects and two (2) red flamed objects or fireballs fell into the ocean. He stated the entire event took only a few seconds. He then heard three (3) or four (4) loud noises coming over the water from the direction of the explosion.

He also observed white smoke over the water where the red-flames objects or fireball hit the water.

The azimuth that the FBI provided for the observations of this eyewitness was 163.1 degrees.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The observations are clearly just final explosion/fuel fireball, which also featured the two fireballs reported by other eyewitnesses. The azimuth where the eyewitness reported seeing these events (163 deg) more closely matches the end fireball azimuth (162 deg) than the initial explosion azimuth (181 deg). Given the short time span of his observations prior to the end fireball, the eyewitness can be placed in Group 1.

The timing of the fireballs hitting the ocean just prior to the sound from the initial explosion reaching the eyewitness, fixes the length of the entire event as just under 48 seconds.

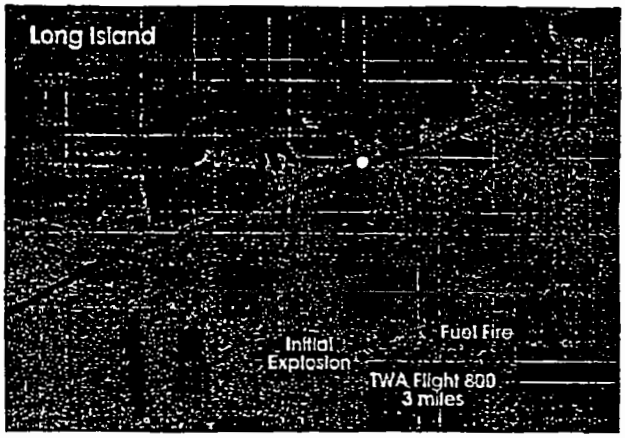
Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [115]

Witness Location: 40.7842 N
072.6833 W
Distance From (ft):
Initial Explosion 50393
Second Explosion 48417
Fuel Fire 45371
Azimuth to (deg):
Initial Explosion 181.16
Fuel Fire 161.60
Time for Initial Sound to
Reach Witness (sec): 47.98

Group Assigned: 1



(b) (6)
(b) (7) (c)

(b) (6)
(b) (7) (c)

Observations:

The eyewitness was at a condo with her husband [redacted] [114] and daughter-in-law, [redacted] [116].

(b) (6)
(b) (7) (c)

The eyewitness heard her daughter-in-law [redacted] [106] let out a scream and went out a sliding glass door onto a deck.

She turned and saw a huge intense orange, yellow and red fireball, that looked pear shaped, drop from the sky into the ocean.

She ran upstairs and called the police and described to them what she has seen, and the smoke column which was present in he view as she spoke to the police officer. The column was larger at the top and smaller at the bottom, or cone-shaped. Two large noises or booms reached the condo and shook the ground. This took place after the fireball reached the surface of the water and came a few seconds apart.

The azimuth that the FBI provided for the observations of this eyewitness was 163.1 degrees.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The observations are clearly just final explosion/fuel fireball, which also featured the two fireballs reported by other eyewitnesses. The azimuth where the eyewitness reported seeing these events (163 deg) more closely matches the end fireball azimuth (162 deg) than the initial explosion azimuth (181 deg). Given the short time span of her observations prior to the end fireball, the eyewitness can be placed in Group 1.

The timing of the fireballs hitting the ocean just prior to the sound from the initial explosion reaching the eyewitness, fixes the length of the entire event as just under 48 seconds.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [116]

Witness Location: 40.7842 N
072.6833 W

Distance From (ft):

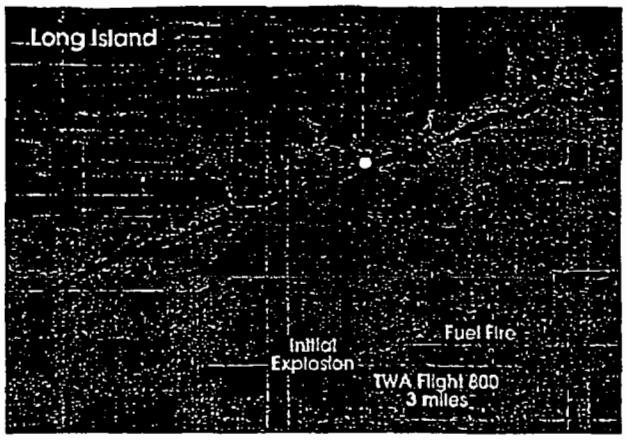
Initial Explosion	50393
Second Explosion	48417
Fuel Fire	45371

Azimuth to (deg):

Initial Explosion	181.16
Fuel Fire	161.60

Time for Initial Sound to Reach Witness (sec): 47.98

Group Assigned: 1



(b) (6)
(b) (7) (c)

(b) (6)
(b) (7) (c)

Observations:

The eyewitness was at a condo with her parents-in-law [redacted][114] and [redacted][115].

The eyewitness was walking out the sliding glass door into the deck which overlooks the ocean when she noticed something in the sky. She then saw a huge fireball, which was brilliant orange and red color with gray edges around it. There was another smaller fireball.

Within a few seconds, she heard two large booms which shook the deck and rattled the ground. The fireballs became two large distinct smoke streaks falling to the ocean surface. Rumbling noises came over the water afterward.

The streaks turned into a circular smoke column which eventually disappeared. At the top of the column was a small gray and white cloud.

The azimuth that the FBI provided for the observations of this eyewitness was 163.1 degrees.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The observations are clearly just final explosion/fuel fireball, which also featured the two fireballs reported by other eyewitnesses. The azimuth where the eyewitness reported seeing these events (163 deg) more closely matches the end fireball azimuth (162 deg) than the initial explosion azimuth (181 deg). Given the short time span of her observations prior to the end fireball, the eyewitness can be placed in Group 1.

The timing of the fireballs hitting the ocean just prior to the sound from the initial explosion reaching the eyewitness, fixes the length of the entire event as just under 48 seconds.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [117]

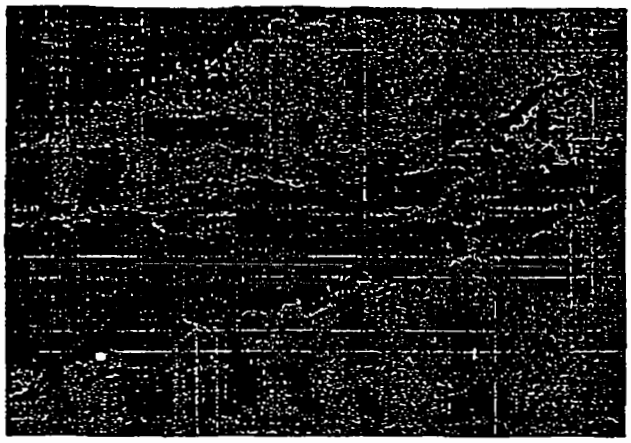
Witness Location: 40.6627 N
073.3696 W

Distance From (ft):
- Initial Explosion 188888
- Second Explosion 195179
- Fuel Fire 204112

Azimuth to (deg):
- Initial Explosion 91.62
- Fuel Fire 89.41

Time for Initial Sound to Reach Witness (sec): 173.9

Group Assigned: 1



Observations:

The eyewitness was standing on the bleachers at a softball field at Venetian Shores, Lidenhurst, New York. She was as far South as "you can go on land", near the water. She was facing Southeast, watching a star.

To the right of the star, a "yellowish-white" light, "all glowing", was coming up, it arched, from the right of the star, going left. It went in front of the star and then exploded like a big bright light. It was bright "yellowy-orange." She saw one piece falling straight down, also bright yellow-orange in color. She saw the rising light originate, she thought it was from the water.

She said it was like fireworks, it rose in a matter of seconds. It's angle was an arch. She would say it came from the ocean. It's angle was like part of a "U". She did not notice smoke, only light, and no round part.

She added that it was a dark, clear, night. She reiterated that she saw one burst of light and then one piece falling. She said she did not see an airplane.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The observations made by the witness were from over 35 miles away. The observations do not include a descent phase and her total observations encompassed only a short time span before the final explosion/fuel fireball (which included a separating piece or a total of two pieces falling). Therefore, the eyewitness can be placed in Group 1.

The eyewitness' observation of an ascending light eventually making a "U" shape is similar to other witnesses seeing flames traveling upward [25], or a fire trail [26], or in inverted Nike "whoosh' symbol red streak [39], or flames arcing up [45].

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [118]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: 2

Observations:

The eyewitness was on an open porch of the West Hampton Yacht Squadron. She was facing South overlooking the bay and Dune Road. She saw a red flare arching in the sky. She did not see where it originated from. The flare arched in the sky and then came straight down as if it had a parachute attached to it. The flare was very bright and appeared to be in the bay area.

Suddenly the red flare burst into a large ball of red flames. The large ball of flames descended halfway down the sky and then burst into a larger ball of flames. She heard the second explosion, but not the first. The second explosion caused the object to separate and plummet down South of Dune Road into the ocean. After she lost sight of the objects, she continued to hear two more explosions.

Conclusion:

The eyewitness' report could be of the entire event or just the end fireball. Two pieces of data would help fill in the questions regarding this eyewitness - her exact location and the total time of her observations. If the entire observation is relatively short, then the eyewitness would only be seeing events near the end fireball. If longer, she could be describing the initial ascent of TWA Flight 800 , followed by the second explosion and then the end fireball. Therefore, the eyewitness' observations were placed in Group 2.

Assuming the eyewitness observed events close to the initial event, she did not observe any other objects moving to hit the aircraft. Her observations would be consistent with the TWA Flight 800 pitching up at the initial explosion before eventually falling to the ocean.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [119]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to
Reach Witness (sec): ?

Group Assigned: 1

Observations:

The eyewitness was at the West Hampton Yacht Squadron in Westhampton Beach standing on an outside deck. He heard someone say "Look!" and turned his attention South over the ocean. He observed a red flare arching in the sky and descending downward. As it descended downward, he heard a "thump" and then there was a sudden burst of flames. This large body of flames then split into two smaller masses, and descended away from each other and out of view beyond Dune Road.

He did not see the flare until it arched in the sky. Initially it was so bright he thought it was only about 1/4 mile away in the bay area. The flare did not have a tail as it arched but he did observe a tail of smoke as the flare descended. The flare took several seconds to descend which caused him to expect to see a parachute attached to it. After the masses descended South of Dune Road, he realized it occurred much farther away, and must have been something larger than a flare.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The observations do not include a long descent phase (a few seconds) and his total observations encompassed only a short time span before the final explosion/fuel fireball (which included seeing the flame split into two smaller pieces- fuselage and wing). The timing of the sound from the initial explosion would also match his observations of the final fireball. (Although the exact location of this eyewitness is unknown, it takes at least 50 seconds for sound to reach land). Therefore, the eyewitness can be placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [120]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to
Reach Witness (sec): ?

Group Assigned: 1

Observations:

The eyewitness was walking on the beach at Rodgers Pavillion on Dune Road, Westhampton Beach, New York. While she was looking at the sky, she observed a white colored object that appeared to be fireworks traveling up in the sky. The object traveled fast and left a trail. The object appeared to come from the water. Seconds later, she observed a big, reddish/orange fireball. Two fireballs fell from the sky. Up to this point, she did not hear any sounds. The second fireball was smaller than the first. After the second fireball fell, she heard a thunderous noise for about five seconds.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The observations do not include a long descent phase (a few seconds) and her total observations encompassed only a short time span ("seconds later") before the final explosion/fuel fireball (which included seeing two fireballs - fuselage and wing). The timing of the sound from the initial explosion would also match her observations of the final fireball. (Although the exact location of this eyewitness is unknown, it takes at least 50 seconds for sound to reach land). Therefore, the eyewitness can be placed in Group 1.

Since the eyewitness did not observe the events close to the initial explosion, she could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [162]

Witness Location: 40.7850 N
072.7977 W

Distance From (ft):

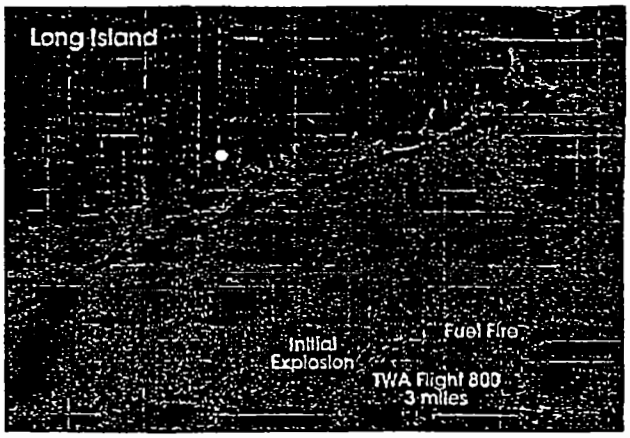
Initial Explosion	59546
Second Explosion	60898
Fuel Fire	63145

Azimuth to (deg):

Initial Explosion	147.08
Fuel Fire	133.30

Time for Initial Sound to Reach Witness (sec): 56.10

Group Assigned: End



Observations:

Eyewitness was seated on a picnic table on the east side of the Moriches Yacht Club. He observed an orange trail ascending over the sand dunes . He first observed the orange trail 3-inches over Fire Island (or about 7 degrees for a 24-inch arm). The object traveled in a Southerly direction at a 75 degree angle. He observed the ascending object for 5 to 6 seconds before it disappeared.

Approximately 4 seconds later, he observed a big orange ball in the sky for one to two seconds. The big orange ball was replaced with a white ball of smoke. The eyewitness measured 9 inches above the horizon for the location of the orange ball (about 20 degrees elevation).

Approximately 1 to 2 seconds after he observed the white ball of smoke, he observed an orange/yellow fire trail that descended from the sky which grew brighter as it fell. Two to 3 seconds after the descent of the fire trail, he observed the fire trail split into two streaks. He watched the two fire trails fall behind the dunes.

Approximately 6 to 7 seconds after the two streaks disappeared, he heard a large boom. Two to three seconds later, he heard two smaller booms.

Twice the eyewitness was timed from his first observation to the two successive booms at 39 seconds.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The timing of the eyewitness account is 15 seconds before the initiation of the two fireballs. Based on other eyewitness accounts, the fireball event is at the end of TWA Flight 800's trajectory.

The total time of 39 seconds does not match the entire total of his observations. However, the second series of explosions, which occurred at TWA Flight 800's peak altitude, should have reached this eyewitness is about 57 seconds. Therefore, the 39 seconds indicate that the observations began 18 seconds after apogee, or close to the end event. Likewise, if it takes 5 seconds for the fireballs to fall behind the dunes, then the time elapsed from the initial observation to the first boom is about 27 seconds. Since the initial explosion sound should take 56 seconds to arrive, the observations would begin 29 seconds after the initial explosion, past the aircraft's apogee.

Since the eyewitness did not observe the events close to the initial explosion, he could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness:
[redacted] [198]

Witness Location: ? N
? W
Distance From (ft):
Initial Explosion ?
Second Explosion ?
Fuel Fire ?
Azimuth to (deg):
Initial Explosion ?
Fuel Fire ?
Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: End

Observations:

Eyewitness was at water hole with four friends. He was wading in the water approximately 4 feet from the bank. He observed an "orange flare" flying up into the air from the Southeast immediately above the tree line from a direction left to right. The "orange flare" ascended to, and appeared to impact with, a "speck" in the air above and at a higher altitude from where the "orange flare" appeared. The speck was light gray in color. A piece of the aircraft believed to be a wing, came straight down in a near vertical path to the tree line from the speck. The rest of the speck, descended at a slight angle from a direction of right to left. Approximately 3 to 5 seconds after the remainder of the speck descended behind the tree line, an "earthquake rumble" was heard and felt.

The path of the "orange flare" was further described as ascending vertically and arching to the right, the final angle of its path being approximately 15 deg to the right of vertical. He was certain of the left to right motion, but recalled the amount of horizontal movement was small. He estimated that the ascending object took approximately 3.5 seconds to reach the gray "speck". The orange flare exploded increasing in size from a penny to the size of a quarter. He estimated that the entire event, from his first observation to the disappearance of the fireball took 5.5 seconds.

Conclusion:

The eyewitness's observations are only of the final moments of TWA 800's flight. His observations most closely match the end event with a large fireball and a directly descending fireball that takes only a few seconds to pass behind the tree line. His entire observations took only about 5.5 seconds, not close to the 50 seconds the aircraft needed to hit the water. Finally, his observations took place slightly before the loud boom was heard. For eyewitnesses on land, it takes a minimum of 50 seconds for sound from the initial explosion to reach them.

Due to the short time period of the eyewitness's observations, the timing of the loud boom, and the general description of the observations, the eyewitness observations are of only the last few moments of TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [199]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: End

Observations:

Eyewitness was at the West Hampton Yacht Squadron in Westhampton Beach staring out into Atlantic Ocean due South. She observed a red light, like a boat flare, with a smokey white stream following it, shoot up from the horizon. The red flare went straight up into the sky for about two or three seconds. Suddenly, the red flare expanded into a much larger fireball. There was no sound heard at this point. Then a red flame funneled down from the fireball, and descended downward when a second, much larger fireball erupted. This larger fireball then split into two smokey trails which continued to descend downward and away from each other beyond Dune Road.

She then heard three deep rumbling sounds.

Conclusion:

The eyewitness' report is only of events at the end of TWA Flight 800's flight. The eyewitness only observed an ascending flare for 2 or 3 seconds, followed by a large fireball, that descended and broke into two pieces. The latter observation is consistent with the fuel fire produced as the aircraft's wing detached near the end of TWA Flight 800's trajectory.

This eyewitness' total observation time was not provided, however, the limited ascent phase and quick transition to the final fireball event indicates that the overall observation time is limited.

If the eyewitness' observations between the first fireball and the final breakup is longer, then she would have seen the explosion near the apogee of TWA Flight 800's trajectory, and not the initial explosion. In addition, the short time of the red light from the horizon would not be consistent with the time a missile would take to reach the aircraft.

In either case, the eyewitness did not observe the initial explosion, therefore, she could not have seen a missile down TWA Flight 800.

(b) (6)
(b) (7) (c)

Witness: [redacted] [-]

Witness Location: ? N
? W

Distance From (ft):
- Initial Explosion ?
- Second Explosion ?
- Fuel Fire ?

Azimuth to (deg):
- Initial Explosion ?
- Fuel Fire ?

Time for Initial Sound to Reach Witness (sec): ?

Group Assigned: End

Observations:

The eyewitness was sitting on a couch speaking with a friend on the telephone, when she saw a small "red point of light" travel up in the sky from left to right. Immediately the dot turned into an explosion and thick streams of fire came down as she walked over to the large windows through which she had witnessed the event. She recalled the color of the explosion as yellow. It was thick and fell vertically downward. She further recalled seeing other shapes coming down.

The red light she saw traveling upward was traveling at about the same speed as a bottle rocket. She could see the red light go all the way up to the point of explosion. It had traveled left to right just angled slightly to the right of vertical. It took approximately 5 seconds for the red light to ascend.

Conclusion:

The eyewitness's observations are only of the final moments of TWA Flight 800's trajectory. The description of the events following the "red point of light" explosion matches the final moments of TWA Flight 800 with thick streams of fire (similar to the cascade of flames described by other eyewitnesses) falling vertically. Since the observations began about 5 seconds before this event, she could not have seen the initial explosion on the aircraft, nor what caused it.

PROOF OF SERVICE BY MAILING

I am over the age of 18 and not a party to the within action. I am employed by the Office of United States Attorney, Central District of California. My business address is 300 North Los Angeles Street, Suite 7516, Los Angeles, California 90012.

On **August 16, 2005**, I served:

SECOND DECLARATION OF TERRY N BUROKER

on each person or entity named below by enclosing a copy in an envelope addressed as shown below and placing the envelope for collection and mailing on the date and at the place shown below following our ordinary office practices. I am readily familiar with the practice of this office for collection and processing correspondence for mailing. On the same day that correspondence is placed for collection and mailing, it is deposited in the ordinary course of business with the United States Postal Service in a sealed envelope with postage fully prepaid.

Date of mailing: **August 16, 2005**. Place of mailing: Los Angeles, California.

Person(s) and/or Entity(s) to Whom mailed:

John F. Dunne, Jr. Esq.
1601 Cloverfield Boulevard
2nd Floor South Tower
Santa Monica, California 90404-4084

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

I declare that I am employed in the office of a member of the bar of this court at whose direction the service was made.

Executed on: **August 16, 2005** at Los Angeles, California.

OLIVIA ROMERO