NTSB 22

APPENDIX: V

DOCUMENT NUMBER: NTSB Record 22

DATE OF DOCUMENT: Unknown

TOTAL NUMBER OF PAGES: 01

TOTAL NUMBER OF PAGES WITHHELD ENTIRELY: 0

TOTAL NUMBER OF REDACTED PAGES: 0

DESCRIPTION OF DOCUMENT: Text and Chart concerning alignment of radar data for TWA flight 800

This record consists of a single page that was prepared by NTSB staff in order to discuss the collection of radar data and the coordination of the radar data with the cockpit voice recorder and flight data recorder. This page was incorporated into Addendum II to the Main Wreckage Flight Path Study to track the movement of the aircraft. Although the information on this page was included in Addendum II to the Main Wreckage Flight Path Study, at the time of the plaintiff's request under the Freedom of Information Act (FOIA), this single page was located in the investigative files of the NTSB without the other, related information from Addendum II. It was originally thought that this page was a draft of the information included in the Addendum. In the NTSB's response to a FOIA request by the plaintiff, at that time this single page was withheld

in its entirety. Subsequent evaluation of the information resulted in a determination that the document could be disclosed in its entirety without the release of material exempt under the FOIA. An unredacted copy of NTSB Record No. 22 was released in the Vaughn index filed in CV 02-8708-AHM and is still released in this Vaughn index.

The Sikorsky radar data were recorded at the Sikorsky aircraft plant in Stratford, CT. The radar data come from the FAA Center radar in Riverhead, NY and from Sikorsky's own radar in Shelton, CT (approximately 3 miles from their plant). The radar data from the FAA's Riverhead, NY Center radar are sent to Sikorsky via modem by the NAVY immediately after the NAVY receives them from the FAA. Because Sikorsky, FAA, NAVY, and NORAD all get essentially identical radar data from the Riverhead, NY radar, the Riverhead, NY portion of the Sikorsky, FAA, NAVY, and NORAD radar data are essentially identical. Note that the Sikorsky radar in Shelton, CT is a secondary radar system[4] only - no primary radar[5] data are available from this radar. The Sikorsky radar data were provided to the NTSB in range/true azimuth format relative to each radar site.

The radar data for TWA 800 (transponder code 2633) were converted from either range/azimuth or latitude/longitude data (depending on data source) to x/y position data relative to the FAA's Islip, New York Airport Surveillance Radar (ASR) radar site. The coordinate conversion was accomplished using NTSB software and FAA/Sikorsky-provided facility position and magnetic variation data. All radar data sets were aligned in x/y position assuming that the FAA Center radar data positions were the most accurate. Attachment II contains tabular listings of the facility position and magnetic variation data. Tabular listings of each radar data set will be presented in a separate addendum to this report.

The CVR group established time correlation between the FAA's Boston Center ATC voice recording and the CVR by aligning microphone keying signatures in the audio data. The FDR group then established time correlation between the FDR and the CVR by aligning CVR microphone keying signatures in the audio data with FDR microphone keying discrete data. This study establishes an additional time correlation between the FDR time base and all radar data sources. The time correlation was established by graphing and aligning TWA 800's radar altitude as a function of time with its FDR altitude as a function of time (see Attachment III). The following time correlation was established:

Data Source	Time Offset Required to Align Data Source Time Base with Boston Center Voice Time Base
Boston Center Radar Data	-1.25 seconds
New York Center Radar Data	-2.25 seconds
All New York TRACON ASR Radar Data	-0.25 seconds
NAVY Radar Data	-2.80 seconds
NORAD Radar Data	+75.715 seconds
Sikorsky Radar Data	N/A (anomalous times)

[4] Air traffic control secondary radar systems transmit coded electromagnetic signals (interrogation) that can be received by transponder-equipped aircraft. The aircraft receives the signal, decodes it, and then transmits a coded electromagnetic signal in response to the interrogation. Secondary returns can provide information on the aircraft's identity, altitude, and position.

[5] Air traffic control primary radar systems transmit electromagnetic signals that can be reflected by an object such as an aircraft. The position of the object can be determined by timing of the transmission and return of the electromagnetic signals, and by measurement of the direction in which the radar antenna is pointed when the signals are transmitted and returned.