

NTISUB/B/104-76/004

AIRCRAFT ACCIDENT REPORT. WOLFE INDUSTRIES, INCORPORATED,
BEECH 65-A90 KING AIR. N57V, AMERICAN UNIVERSITY CAMPUS.
WASHINGTON, D. C. JANUARY 25, 1975

National Transportation Safety Board
Washington, D. C.

28 January 1976



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TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NTSB-AAR-76-4	2. Government Accession No.	3. Document's Catalog No. NTISUB/B/104-76/004	
4. Title and Subtitle <u>Aircraft Accident Report -</u> Wolfe Industries, Inc., Beech 65-A90 King Air, N57V, American University Campus, Washington, D. C. January 25, 1975		5. Report Date January 28, 1976	6. Performing Organization
7. Author(s)		8. Performing Organization Report No.	
9. Performing Organization Name and Address National Transportation Safety Board Bureau of Aviation Safety Washington, D. C. 20594		10. Work Unit No. 1698	11. Contract or Grant No.
12. Sponsoring Agency Name and Address NATIONAL TRANSPORTATION SAFETY BOARD Washington, D. C. 20594		13. Type of Report and Period Covered Aircraft Accident Report January 25, 1975	
		14. Sponsoring Agency Code	
About 1210 e. s. t. on January 25, 1975, a Wolfe Industries, Inc., Beech 65-A90, King Air (N57V) crashed while conducting a VOR/DME approach to runway 18 at Washington National Airport, Washington, D. C. The aircraft struck the top of a 398-foot radio transmission tower located on the American University campus about 5 nmi northwest of the runway and approximately 1/2 mile north of the instrument approach course. Five persons on board the aircraft were fatally injured. The aircraft was destroyed. The National Transportation Safety Board determines that the probable cause, of this accident was an unauthorized descent below the published minimum approach segment altitude during an instrument approach in instrument meteorological conditions for reasons undetermined. While recognizing that Air Traffic Control should have issued crossing altitude restrictions with the approach clearance and should have issued a more timely safety advisory, the Board, however, is unable to conclude that the issuance of such altitude restrictions and safety advisory in these circumstances would have prevented the occurrence of the accident.			
17. Key Words VOR/DME approach, radar arrival, landing approach, unauthorized descent, air traffic control procedures, minimum crossing altitude		18. Distribution Statement This report is available to the public through the National Technical Information Service, Springfield, Virginia 22151	
19. Security Classification (of this report) UNCLASSIFIED	20. Security Classification (of this page) UNCLASSIFIED	21. No. of Pages 67	22. Price

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SA-448

File No. 3-0002

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D. C. 20594

AIRCRAFT ACCIDENT REPORT

Adopted: January 28, 1976

WOLFE INDUSTRIES, INC.
BEECH 65-A90 KING AIR, N57V
AMERICAN UNIVERSITY CAMPUS
WASHINGTON, D. C.
JANUARY 25, 1975

SYNOPSIS

About 1210 e.s.t, on January 25, 1975, a Wolfe Industries, Inc., Beech 65-A90, King Air (N57V) crashed while conducting a VOR/DME approach to runway 18 at Washington National Airport, Washington, D. C. The ceiling was 700 feet overcast and the visibility was more than 20 miles.

The aircraft first struck the top of a 398-foot radio transmission tower, 763 feet m.s.l., located on the American University Campus about 5 nmi northwest of the runway. The main wreckage crashed in the backyard of a residence located on the campus grounds.

Five persons on board the aircraft--two flight crewmembers and three passengers--were fatally injured. The aircraft was destroyed by impact and fire. No persons on the ground were injured.

The National Transportation Safety Board determines that the probable cause of this accident was an unauthorized descent below the published minimum approach segment altitude during an instrument approach in instrument meteorological conditions for reasons undetermined,

While recognizing that Air Traffic Control should have issued crossing altitude restrictions with the approach clearance and should have issued a more timely safety advisory, the Board, however, is unable to conclude that the issuance of such altitude restrictions and safety advisory in these circumstances would have prevented the occurrence of the accident.

1. INVESTIGATION

1.1 History of Flight

At 1047^{1/} on January 25, 1975, Wolfe Industries, Inc., Beech 65-A90 King Air (N57V) departed Columbus, Ohio, on an instrument flight plan to the Washington National Airport, Washington, D. C. Two pilots and three passengers were aboard the corporate business flight.

The flight into the Washington area was routine, and no problems were reported with the aircraft or its systems. At 1158:20, N57V contacted Washington Approach Control and reported that the flight was maintaining an altitude of 8,000 feet. The approach controller advised the flight to maintain 8,000 feet and to depart Aldie Intersection ^{2/} on a heading of 100° "for (radar) vectors to the final approach course" for landing on runway 18 at Washington National Airport.

At 1204:20, the approach controller cleared N57V to descend to, and maintain, 5,000 feet. The flight acknowledged the clearance. At 1204:51, when the flight was about 18 nmi NW of the airport, approach control cleared N57V to descend to, and maintain, 3,000 feet and to fly on a heading of 120°. The flight acknowledged this clearance and reported out of 7,200 feet at that time.

At 1205:56, the approach controller advised the flight, "King Air five seven Victor fifteen northwest cleared VOR/DME runway one eight approach." The flight replied, "Okay we're cleared for the approach, fifty seven Victor." The approach controller then requested, "Two five seven Victor like for you to keep your airspeed up as much as you can on final."

At 1207:44, when the aircraft was about 12 nmi NW of the airport, N57V was requested to contact the tower, at which time communications with the flight were transferred from approach control to the Washington National Tower (local control) radio frequency. At 1209:45, the local controller, after observing the radar target of N57V to the left of the final approach course, advised the flight, "November five seven Victor looks slightly left of course." The flight replied, "Okay we'll check."

1/ All times herein are eastern standard, based on the 24-hour clock.

2/ The intersection of the Victor 4 Airway and the Casanova VOR 039° radial, 28 nmi WNW of the Washington National Airport.

The local controller stated that when he first observed the radar target associated with N57V on his radar (BRITE) display, it was between 8 and 9 miles NW of the airport and approximately 1 mile to the left of the final approach course. He said that the aircraft appeared to be paralleling the approach course at that point. He also stated that he did not, at any time, notice the altitude information relating to N57V on his radar display.

Meanwhile, the approach controller was monitoring the progress of N57V. The transcription of certain "background conversations" (see Appendix H) indicates that at 1209:02 a remark was made concerning the aircraft's failure to "pick up that radial." at 1209:08 comment was made concerning "some towers down there": at 1209:32 the question was asked whether "that guy shouldn't be that low up there, should he?"; and at 1209:39 a statement was made "***a thousand feet up there, (is that what it is?)".

Thereafter, at 1210:00, the approach controller, who had been watching the radar target and associated altitude information of N57V on his radarscope, called the local controller on the intercom and advised, "Five seven victor looks pretty low up there and a little bit off the radial." The approach controller stated that at the time of this observation, N57V was between 5 and 7 miles from the airport, 1/2 to 1 mile to the left of the approach course and at an altitude of 1,200 feet as displayed on the altitude readout associated with the radar target. The local controller acknowledged this message, and, at 1210:05, transmitted the following: "November five seven victor I show left of course. Does that check?" There was no reply from N57V to this advisory nor were there any further communications with the flight.

At approximately 1210, N57V struck the top of a radio transmission tower located on the campus of American University about 5 nmi from the approach end of runway 18. The tower rose 398 feet above the ground level.

When the aircraft struck the tower, its left wing and left gear separated. The remainder of the aircraft crashed behind a private residence located on the campus, about 920 feet from the radio tower.

An aeronautically qualified witness, who was standing near the base of the radio tower when the plane struck, stated that the sky was overcast and that the bottoms of the clouds were obscuring the top 30 feet of the tower. Although light rain was falling, he said the forward

visibility was very good. He first heard the sound of a low-flying aircraft, but could not see anything when he looked in the direction of the noise. He stated that a few seconds later, "... as I was looking at the tower to see where the overcast was. to measure it on the tower, the aircraft flew into my field of view and struck the tower.. .. It appeared to be in straight and level flight, and it was at the base of the overcast. I could see the cockpit. It appeared the aircraft had just gone VFR at the moment of the tower.. .. I saw the left wing depart the aircraft. The aircraft continued what looked to me to be in its line of flight, and then began tumbling. There was no explosion in the air ... and there was no explosion until it impacted the ground." The witness also stated that the engines sounded normal and were running at a "relatively high rpm. "

1.2 Injuries to Persons

<u>Injuries</u>	<u>Crew</u>	<u>Passengers</u>	<u>Others</u>
Fatal	2	3	0
Nonfatal	0	0	0
None	0	0	

1.3 Damage to Aircraft

The aircraft was destroyed by impact and ground fire.

1.4 Other Damage

The radio tower was damaged slightly. Two high-voltage wiring circuits attached to the structure were broken. A small detached building, located behind a private residence, was damaged slightly by impact and smoke; two windows in a campus residence hall were broken by falling debris.

1.5 Crew Information

The captain and the copilot were qualified to serve as crewmembers on this flight. (See Appendix B.)

1.6 Aircraft Information

The aircraft was certificated and maintained according to Federal Aviation Administration (FAA) requirements. (See Appendix C.)

1.7 Meteorological Information

For the times indicated. the official surface weather observations at Washington National Airport were, in part, as follows:

0955 -- measured ceiling, 400 feet overcast, visibility -- 3 miles. light rain, fog, temperature -- **51° F**, dew point -- **48° F**, wind -- 180° at 10 **kn**; altimeter setting -- 29.55 **in**; runway 36 visual range -- 1.400. variable to more than 6,000 feet, fog bank over river and runway 36.

1051 -- measured ceiling. 400 feet overcast, visibility -- 10 miles, light rain, temperature -- **52° F**. dew point -- **49° F**, wind -- 180° at 8 **kn**; altimeter setting -- 29.51 **in**; pressure falling rapidly, fog bank over river.

1125 -- Special, measured ceiling, 500 feet broken, 1,000 feet, overcast, visibility -- 10 miles. wind -- 180° at 6 **kn**; altimeter setting -- 29.45 **in**; pressure falling rapidly. fog bank over river.

1154 -- measured ceiling, 700 feet overcast, 'visibility more than 20 miles: temperature -- **53° F**; dew point -- **51° F**; wind -- 200° at 10 **kn**, altimeter setting -- 29.41 **in**; visibility lower north. pressure falling rapidly, rain ended at 1115.

1221 -- Local, measured ceiling, 700 feet broken, 1,200 feet overcast, visibility more **than** 20 miles; wind -- 190° at 10 **kn**; altimeter setting -- 29.38 **in**; pressure falling rapidly.

The area winds aloft, as measured at Dulles Airport, were as follows:

0700

Altitude	Direction	Speed
ft. msl	degrees true	<u>kn</u>
1.000	205	18
2.000	225	29
3.000	240	34
4,000	240	37

1900

<u>Altitude</u> <u>ft. msl</u>	<u>Direction</u> <u>degrees true</u>	<u>Speed</u> <u>kn</u>
1,000	270	24
2,000	270	32
3,000	270	37
4,000	270	41

The 24-hour terminal forecast for Washington National Airport on January 25, 1975. valid beginning 1000 was, in part, as follows:

1000 - 1700, ceiling, 1,000 feet broken, 2,500 feet overcast, visibility -- 4 mile; light rain and fog: wind -- 180° at 10 kn; variable to ceiling 500 obscured; visibility -- 1/2 mile, moderate rain and fog.

The continuous automatic terminal information service (ATIS) transmission relevant to the approach of N57V was as follows:

1130:57 (Initial Broadcast QUEBEC)

This is Washington National Airport information Quebec measured ceiling 500 broken, 1,000 overcast visibility 10, temperature 51°, wind 180 degrees 6. altimeter 29.45 in. pressure falling rapidly north operation ILS runway 36 approach in use fog bank reported over the river. This is information Quebec.

(Broadcast every 34 seconds until 1157:55)

1157:55 (Initial Broadcast ROMEO)

This is Washington National Airport information Romeo weather. Measured ceiling 700 overcast, visibility more than 20, temperature 53°, wind 200 degrees 10, altimeter 29.41, VOR DME runway 18 approach in use. Advise you have Romeo.

(Broadcast every 26 seconds until 1254 when Romeo terminated)

1.8 Aids to Navigation

There were no reported failures or malfunctions of any of the navigational radio aids (NAVAIDS) or associated components which served Washington National Airport when N57V was conducting the landing approach.

Following the accident, the FAA flight-checked all of the NAVAID facilities and system components and found them to be operating satisfactorily.

The published procedure for a VOR/DME approach to runway 18 uses the Washington VOR/DME facility, which is located on the Washington National Airport. (See Appendix D.) This procedure requires that an inbound course of 153° be flown from the 11 DME ³/fix with a minimum crossing altitude of 3,000 feet at that point. After the aircraft passes the 11 DME fix, the procedure prescribes minimum crossing altitudes of 2,100 feet at the 7 DME fix, 1,500 feet at the 5 DME fix, and 900 feet at the 3 DME fix (the final approach fix (FAF)). After passing the FAF, descent can begin to the authorized minimum descent altitude (MDA) of 720 feet.

According to the chief pilot for Wolfe Industries, Jeppesen approach charts were used by the captain of N57V. On the date of the accident, the current Jeppesen approach chart for the VOR/DME runway 18 approach was dated November 30, 1973.

1.9 Communications

There were no reported difficulties with air-to-ground communications between N57V and the Washington National Tower. Persons familiar with the voice of the crewmembers listened to the ATC recording and identified the copilot as making all transmissions from N57V. (See Appendix E.)

The Safety Board noted that at 1205 an erroneous altimeter setting of 30.41 was transmitted to a Piedmont Airlines flight immediately preceding N57V on the approach. Both aircraft were on the approach control radio frequency at the time of this transmission. The captain of the

3/ Distance measuring equipment - reference in nautical miles from the VORTAC facility to the aircraft and displayed numerically on the DME indicator in the cockpit.

Piedmont flight recalled hearing only the last ~~two~~ digits ("41") of the transmitted setting. He stated that it was within the range that he had expected and advised the copilot that the altimeter was the same as the ATIS information that they had previously received.

The Piedmont flight completed the approach without incident.

1.10 Aerodrome and Ground Facilities

Not involved.

1.11 Flight Recorders

There were no flight recorders installed in N57V nor were they required.

1.12 Wreckage

The aircraft's left wing and left engine propeller were the first components to hit the 398-foot radio tower. The contact point was 720 feet m. s. l. The highest point of the tower was 763 feet m. s. l.; ground elevation at that point is 365 feet m. s. l. When the left wing struck the tower, it separated from the aircraft and landed about 300 feet southeast of the tower. The remainder of the aircraft continued on a heading of 165°, magnetic, for approximately 920 feet, and crashed in the backyard of a residence located on the American University campus. The total wreckage was confined to an area approximately 956 feet long and 48 feet wide.

The fuselage was fragmented and consumed by ground fire. The right wing remained with the fuselage and was damaged by impact and ground fire. The left wing, which had separated just outboard of the engine nacelle at wing station (WS) 99, was found complete from that point to the wingtip with the outboard flap and the aileron still attached. The wing leading edge, outboard of the separation point for approximately 2 feet, was bent up and aft.

The right and left wing flap actuators were recovered in the fully retracted position. The cockpit flap selector handle was found in the full "up" position, which corresponds to a flap-retracted position.

Because the aircraft broke up and was burned extensively, the integrity of the flight control system before impact could not be determined. The continuity of all control cables was disrupted somewhere between the cockpit and their respective attach points.

The landing gear assemblies and the mechanical actuators were recovered. All of the actuators were fully extended. The landing gear selector handle in the cockpit was found in the "up" position, which corresponds to a gear retracted position.

Examination of both engines revealed no evidence of failure or malfunction before impact.

Only the captain's encoding altimeter was recovered in the wreckage. The front and rear sections of the instrument were sheared off and could not be found. The remainder of the case was dented and burned. The barometric setting was 29.40 in and the altitude counter was at 550 feet. The altitude pointer and the failure monitor warning flag were missing. The copilot's altimeter was not recovered.

Both course indicators were recovered. The captain's instrument was found with a heading indication of 174°, a selected heading of 174°, and a selected course of 154°. The course deviation needle was positioned three "dots" to the right of center, the "to/from" indicator showed "to"; the heading and navigation failure warning flags were masked.

The copilot's instrument showed a heading of 176°, a selected heading of 144°, and a selected course of 144°. The "to/from" indicator showed "to", and the heading and instrument failure warning flags were masked. The DME showed 5.4 miles.

1.13 Medical and Pathological Information

Postmortem examinations of the captain and copilot disclosed no evidence of incapacitating disease.

1.14 Fire

There was no evidence of in-flight fire. The major portion of the fuselage and right wing were consumed by ground fire, and portions of the vertical and horizontal stabilizers were damaged by ground fire.

1.15 Survival Aspects

This accident was not survivable.

1.16 Tests and Research

1.16.1 Altimeter Examination

Under the direction of the Safety Board, the captain's encoding altimeter, an Intercontinental Dynamics Corporation Type **No. 519, S/N 570**, was **disassembled** and examined. Following are some of the findings of that examination:

1. The **wheel** on the altitude counter drum assembly, which indicates hundreds of feet, was bent over by the figure numeral '5', thereby suggesting a **500'** reading at impact. The gear which drove the counter had marks on the teeth which suggested that impact occurred when the reading was between **400'** and **500'** of altitude. This gear was out of mesh with the gear which normally drove it; **so** the counter could have moved after initial impact,
2. **An** electrical test was made on the altitude alerter potentiometer, which was directly geared to the altitude pointer and counter drum assembly. The electrical readout was equal to an indicated altitude **of 940** feet. However, the stator of the Potentiometer could be rotated by hand. Further examination showed that a lug on the potentiometer had been bent over by an integrated circuit cam on the amplifier card. When the card and potentiometer stator were placed in their normal positions. the potentiometer resistance ratio was equal **to** a reading of 500 feet.
3. The transducer [capsule bellows assembly) was completely crushed and destroyed. **By** repositioning the transducer yoke to its apparent position **st** impact, an altitude of approximately **2,500** feet above the low stop was indicated. At **29.40** in. Hg barometric setting. this would correspond **to a** reading on the pointer of between 500 and 600 feet.

he report concluded that:

"Using the above information obtained from this severely damaged altimeter, the probable altitude indication at the time electrical power to the altimeter was interrupted was 500 $\pm$ 100 feet."

1.16.2 Automated Radar Terminal Service Data and Derivation of Flight Track and Descent Profile

Since there was no flight data recorder on N57V, the Safety Board derived a flight track and descent profile (see Appendix F) based on data from the Automated Radar Terminal Service System (ARTS-III).

The ARTS-LU system installed at Washington National Airport processes the transponder beacon return from all selected aircraft within a specified range of the approach control radar site. The raw data from the beacon return consist of azimuth and range referenced to the antenna location and an encoded pressure altitude for aircraft equipped with a Mode 'C' transponder. These raw data are processed into positional coordinates which are differentiated with respect to the data receipt time to acquire a ground speed for the target.

The processing equipment also applies a correction, based on the current sea level barometric pressure, to the raw altitude data to produce a mean sea level altitude, resolved to the nearest 100 feet. The received altitude data, resolved to 100-foot increments, are generated within the aircraft by an altimetry system and, as such, include those errors which may be inherent within that airborne system. The data thus generated are selectively displayed on the air traffic controller's video display. In addition to the video display, the raw data and calculated parameters for all received targets are stored on a computer-generated magnetic tape.

The Safety Board derived the flight profile by applying the appropriate scale factor and the local magnetic variation (7° west) to the range and azimuth data processed by the ARTS-LU system.

The descent profile is a plot of altitude versus distance traveled to point of impact. The altitude data were taken from the transponder reported pressure altitude as decoded and corrected to mean sea level by the ARTS-LU system.

The positions of the aircraft at the times of pertinent radio communications and background conversation which were recorded on the ATC tape were established by comparing directly the ARTS-III and ATC time references.

Although the plot was derived from the best available information, the accuracy of the track and profile depends on the accuracy of the ARTS-III range and azimuth data and the resolution of the reported and processed data. Therefore, the plot may not represent an exact factual display.

The descent profile for N57V showed that close to the approximate 11 DME fix, the aircraft was descending through 3,000 feet and leveled off at 2,100 feet. It remained at 2,100 feet until near the 8.3 DME position and then began to descend to 1,200 feet. This altitude was maintained to a point about 6.5 DME, where a further descent began and was conducted in three small increments down to an altitude of 800 feet. This altitude was maintained until the approximate 5 DME position. After this point, there were no further transponder replies processed.

The flight track of the aircraft crossed the 333° radial of the Washington VOR (approach course) at the 9 DME point and about a 20° intercept angle. The aircraft maintained this course and proceeded through and beyond the radial and 4/5 mile to the east of it. This distance from the radial was maintained until the aircraft was abeam the 7 DME position at which time the track began a gradual correction toward the 333° radial. The aircraft collided with the tower at a point approximately 1/2 mile to the left of the inbound approach course and abeam of the 5.3 DME position on that radial.

1.17 Other Information

1.17.1 Air Traffic Control Procedures

The procedures and phraseology to be used by FAA personnel to provide terminal air traffic control services are set forth in FAA Handbook 7110.8D (January 1, 1975). Terminal Air Traffic Control. The handbook states that controllers are to be familiar with the provisions which pertain to their operational responsibility and to exercise their best judgments if they encounter situations not covered therein. The following are excerpts from this handbook which were relevant to the approach of N57V.

Section 9. Radar Arrivals

1360. ARRIVAL INSTRUCTIONS

Issue all of the following to an aircraft before it reaches the approach gate:

a. Position relative **to** the final approach fix.
If the final approach fix **is** not portrayed **on** the radar display or if none **is** prescribed in the procedure, issue position information relative to the navigation aid which provides final approach guidance **or** relative **to** the airport.

b. Vector to intercept the final approach course, if required.

c. Approach clearance, except when conducting a radar approach. If terrain or traffic does not **permit** unrestricted descent to lowest published altitude . specified in approach procedure prior **to** final approach descent. controllers shall:

(1) Defer issuance **of** approach clearance until there are no restrictions or,

(2) Issue altitude restrictions with approach clearance specifying when **or** at what point unrestricted descent can be made.

* * * * *

Section 15, Additional Services

1540. APPLICATION

Provide additional services **to** the extent possible contingent upon your capability to fit it **into** the performance **of** higher priority duties and **on** the basis of the following:

a. provision of a service is not mandatory because many factors (such as limitations of the radar. volume **of** traffic, communications frequency congestion and your workload) could prevent you **from** providing it.

b. **'You have complete discretion** for determining if you are to provide or continue to provide a service **in** a particular case.

c. Your decision not to provide or continue to provide a service in a particular case is not subject to question by the pilot and need not be made **known** to him.

1545. SAFETY ADVISORY

Issue an advisory to radar-identified aircraft whenever radar observation reveals a situation which, in your judgment, **is** likely to affect the safety **of** aircraft.

1546. ALTITUDE DEVIATION INFORMATION

If you observe **an** automatic altitude report **showing** continuous deviation of **300** feet **or** more from **the** assigned altitude **of** an aircraft, issue altitude readout information to the pilot. **Except** during **climb** or descent, apply this procedure **to** aircraft whose automatic readout has been verified.

On December 27, 1974, following **the** TWA Flight 514 accident at Berryville, Virginia, **on** December 1, 1974, the Director, Air Traffic Service (ATS) FAA, issued a general notice (CENOT) to **all** controller personnel pertaining **to** the issuance **of** approach clearances. This **CENOT** referenced a notice to airmen (**NOTAM**) that had been previously issued in connection **with** that accident defining pilot responsibilities with respect **to** approach clearances:

Notice N 7110.374 **subject/approach clearances** **CWL**
June 1, 1975 the following NOTAM has **been** issued to
pilots QOT pilots are **reminded** that while operating
under **IFR** on an unpublished route or while being radar
vectored, they may not, upon receiving a clearance for
an instrument approach, descend below **the** applicable
minimum altitude. To insure this, when an approach
clearance is received, **pilots** should maintain the last
assigned altitude until established on a segment of a
published route or instrument approach procedure.
Thereafter, published altitudes apply **to** descent within

each succeeding route or approach segment. If the pilot is uncertain of his clearance he should immediately request the assistance of air traffic control. Regulatory action to make this operating practice mandatory is being expedited. QDT. Notwithstanding these expected pilot actions, controllers will continue to apply the provisions of 7110.8C DASH 1360/7110.9C DASH 776 as appropriate. (sic)

At the Safety Board's public hearing into the crash of N57V, the Director, ATS, testified that, "The GENOT was issued to inform the air traffic control population that this notice has been issued and would be followed up by a rule Also in the general notice to remind them that in spite of the change to the, and clarification of, pilot responsibilities, that they were to continue to comply with the provisions of paragraph 1360 in our manual. "

On January 9, 1975, a telephone conference (ATSCON) was conducted by the Director, ATS, with all of the Air Traffic Control division chiefs and selected members of their staffs in the 11 FAA regions. The purpose of the ATSCON was to reiterate the requirement to adhere to paragraph 1360 in the controllers' handbook. As a result of the conference, each controller and supervisor was to be briefed personally on the provisions of paragraph 1360. The tape recording of the conference indicated the following instructions: "... I'd like each Division to take the following positive action: ... after this telcon, somewhere in the course of today or tomorrow. ... somebody in the Division call each radar facility, in centers and towers, and alert them to the provisions of this paragraph by chapter and verse and insure that that facility is following those procedures. Included in that would be instructions that they will verbally, on a face-to-face basis, brief the controllers and supervisors on the provisions of the paragraph.. .. Now there's apparently some confusion in areas of what those subparagraphs in the book call for. What it fundamentally says is that when any aircraft is on a radar vector the approach clearance for the approach will be withheld.. .. or crossing altitudes issued until such time as the aircraft can go down to the final approach altitude unimpeded without any terrain problem. Now, that also includes crossing altitudes that are right on the final approach course that are higher than the final approach altitude.. .."

On January 13, 1975, the Director, ATS, sent a memorandum to follow up ATSCON briefing. The memorandum was sent to all FAA Regional Directors. Excerpts from that memorandum follow:

Attn: Chief, Air Traffic Divisions

This is to confirm the ATSCON held on January 9, 1975, at 1:45 e. s. t. ,

Handbook 7110.8D-1360c and 7110.9D-776c, Arrival Instructions, was discussed. Division Chiefs are to ensure all Facility Chiefs of radar facilities are contacted and the provisions of paragraph 1360c/776c are explained to them. In addition, Facility Chiefs are to be instructed to conduct face-to-face briefings with all supervisory and controller personnel to explain the following:

1. Handbook 7110.8D-1360c/7110.9D-776c, Arrival Instructions GENOT 1/194, Approach Clearances.
2. Handbook 7110.8D-1545, Safety Advisory and 7110.8D-1546, Altitude Deviation Information.
3. Handbook 7110.9D-810, Safety Advisory and 7110.9D-811. Altitude Deviation Information.

Explain that even though altitude management is the pilot's responsibility, facilities are being asked to add to safety by keeping a close watch on altitudes.

4. Review all approach charts paying particular attention to altitude restrictions and any other limitations or restrictions depicted.

Washington National Tower is one of the facilities in the FAA's Eastern Region. Records from the facility show that the ATC division chief and other staff members participated in the ATSCON on January 9, and that the following notes from that conference were included in a memorandum for the record. It stated, in part:

SUBJECT: Approach Clearances - Radar Facilities

In an ATSCON on January 9, 1975, AEA-500 was asked to assure that the following is accomplished immediately:

1. The facility chief, deputy chief, or operations officer (area officer at ARTCCs) conduct face-to-face verbal

briefings of all controllers and supervisors to assure understanding of 7110.8D, 1360.c/7110.9D, 776. c.

2. Controllers review instrument approach charts pertinent operations. It is imperative that they be familiar with these procedures.
3. Controllers make a concerted effort to call to the attention of pilots any questionable conditions revealed by altitude readouts. Applicable procedures are in 7110.8D, 811, 812 and 1546/7110.9D, 326 and 811.
4. Feedback in the form of problems, issues, and questions is relayed to AAT-1 via AEA-500.

The memo further stated that all facility chiefs were briefed on the items listed above. The memo showed that the Chief of the Washington Tower was briefed by telephone on January 10, 1975.

Similarly, a memorandum for the record dated January 10, 1975, and signed by the Chief, Washington Tower, indicated that he had received telephone instructions from the Division concerning controller briefings. The memorandum specifically outlined the following areas for the briefing;

- (1) Brief all controllers for thorough understanding of para. 1360(c) of 7110.8D.
- (2) Require all controllers to review all approach charts.
- (3) Brief and require all controllers to review para. 811 and 1546 of 7110.8D.
- (4) Make a concerted effort to emphasize to all controllers that they shall alert pilots regarding any questionable conditions ... this is particularly regarding altitude deviations of 300 feet (ARTS). ..."

Testimony from the Chief, Washington Tower, regarding the contents of the telephone briefing indicated that he did not construe these instructions, as transmitted in the telephone conversation, to

mean that the controllers were required to ~~issue~~ crossing altitude restrictions along with an approach clearance.

Documents provided to the Safety Board during the investigation show that **all** of the controllers involved in the approach of N57V had been briefed on, **or** before, January 14, 1975. in accordance with the Eastern Region ATC **Division** instructions.

On January 29, 1975, following the crash **of** N57V, a memorandum was issued by the Chief, Washington Tower, to "All Personnel." The subject of the memorandum was "Handbook 7110.8D, para. 1360. c, Supplemental **Guidelines**." The guidelines were to become effective immediately. The **following** is one **of** the **guidelines** set forth in the memorandum:

Approach clearance except **when** conducting PAR or ASR approach. If the pilot cannot descend unrestricted to the lowest published altitude specified in the procedures prior **to final** approach descent. which is the altitude depicted at the final approach **fix**, either defer the approach clearance until the pilot can descend unrestricted or issue all altitude restrictions' except **the** restriction at the final approach **fix**, even though they are depicted on the approach chart. Example: When restrictions are given, cross **14** mile **DME fix** at **or** above 2.500'

At the Safety Board's public hearing, the Chief,, Washington Tower, testified that on January 29, an ATC **staff** member from the FAA Eastern Region gave him guidelines by telephone. He further testified that the January 29 guidelines made **it** mandatory **to** issue crossing altitude restrictions.

1.17.2 14 CFR 91 -- Instrument Flight Rules

With regard **to** instrument approaches conducted **by** civil aircraft, 14 CFR 91 states:

91.115 ATC clearance and flight plan required.

No person may operate an aircraft in controlled airspace under **IFR unless** -

(a) He has filed **an** IFR flight plan; and

(b) He has received an appropriate ATC clearance.

91.116 Takeoff and *landing* under **IFR**: General.

(a) Instrument approaches to civil airports. Unless otherwise authorized by the Administrator (including ATC), each person operating an aircraft shall, when an instrument letdown to an airport is necessary, use a standard instrument approach procedure prescribed for that airport in Part **97** of this chapter.

2. ANALYSIS AND CONCLUSIONS

2.1 Analysis

The flight crewmembers were certificated and qualified to conduct the flight. There was no indication of any medical or physiological problem that would have affected the performance of their duties.

The aircraft was certificated and maintained in accordance with applicable requirements and regulations.

There was no evidence of any in-flight failure or malfunction of the aircraft structure, systems, or powerplants.

From the recorded ATC conversations between **N57V** and the Washington Tower Facility, it was determined that all transmissions from the aircraft were made by the copilot. From this evidence, along with testimony of a witness who saw the aircraft depart Columbus, it was concluded that the captain was flying the aircraft from the left seat throughout the flight.

Since the copilot's altimeter was not recovered, the Safety Board considered the possibility of an incorrect barometric setting on that altimeter as a possible reason for the premature descent. This possibility was heightened by the incorrect altimeter setting -- "three zero four one" -- transmitted by approach control to the preceding Piedmont flight at 205. At that time the correct altimeter setting was 29.41 inches. It was postulated that the incorrect altimeter setting may have been inserted in the copilot's altimeter, thus resulting in a presentation on that altimeter 1,000 feet higher than the actual altitude of the aircraft. It was determined, however, that an altimeter resetting based on the aforementioned transmission would have represented a gross departure from the existing

barometric setting as received by the flight on the "ATIS" frequency shortly before, and would have required an extensive resetting of the altimeter (approximately five full revolutions of the barometric setting knob) in order to achieve the 1-inch differential. Thus, the magnitude of the change in the setting, by itself, should have been enough to raise serious doubts as to the validity of the erroneous setting if, in fact, the pilots heard the transmission to the Piedmont flight and if they unquestioningly made this change.

More importantly, in order for this entire premise to be valid the captain, who was flying from the left seat, would have had to ignore completely his correctly set altimeter and rely solely on information from the copilot's altimeter located on the right side of the cockpit instrument panel.

In view of the above, the Safety Board concludes the possibility that a misset altimeter led to the premature descent is extremely remote and, therefore, it is not considered a factor in the cause of this accident.

As best it can be determined, the flight from Columbus to the Washington area was routine with no discrepancies reported en route. When in the Washington terminal area, the flight was descended and provided radar vectoring services by ATC to intercept the final approach course (333° radial of the Washington VOR) for a VOR/DME approach to runway 18. At 1205:56 when N57V was approximately 15 miles northwest of the airport, the flight was "cleared for the approach." Based on published approach procedures, from this point the flight should have intercepted and proceeded on the approach radial (153° inbound course) and crossed the 11 DME fix at or about 3,000 feet m. s. l. The approach then should have been continued as published -- descend to cross the 7 DME fix at or above 2,100 feet m. s. l., then descend to cross the 5 DME fix at or above 1,500 feet m. a. l., and then descend to cross the 3 DME fix (FAF) at or above 900 m. s. l. After crossing the FAF, descent to the MDA of 720 feet m. s. l. would be authorized.

The ARTS-III plot shows that N57V flew through the approach course radial at an altitude of 2,100 feet m. s. l. at the approximate 9 DME position. The aircraft continued on the same approximate flightpath and proceeded laterally 1 mile to the left of the centerline of the inbound course abeam of the 7 DME fix. The track then begins

a gradual correction back toward the final approach course, and ends at a point corresponding to the approximate position of the radio tower -- about one-half mile to the left of the approach course and just short of the abeam position of the **5 DME** fix.

The descent profile shows that after **N57V** crossed the approach course, it maintained an altitude of about 2,100 feet **m. s. l.** until about the **8.3 DME** position and then began to descend, averaging 1,200 feet/min., to an altitude of 1,200 feet **m. s. l.** This altitude was maintained from about the **7.2 DME** position to the **6.6 DME** position when a gradual letdown was made, first to 1,000 feet **m. s. l.** and then to 900 feet **m. s. l.** The profile shows that the aircraft maintained 900 feet until just inside the **6 DME** position and then descended to 800 feet, which was maintained until the trace ends. As can be seen on the descent profile, the aircraft was 900 feet below the authorized crossing altitude at the **7 DME** fix and was about 800 feet below the minimum approach segment altitude at the point of impact.

Since no aircraft or aircraft system discrepancies were found which might explain an altitude deviation of this magnitude, the operational aspects of the flight, particularly the nonadherence by the captain to the altitude restrictions outlined in the published approach procedure, must be examined.

The flight was cleared for the approach when the aircraft was descending through 4,800 feet **m. s. l.** and was on a heading to intercept the final approach course at a point just outside the **11 DME** approach fix. The flight was then in a good position to continue the letdown and to conduct the approach in accordance with the published approach procedure. Nevertheless, the flight, shortly after attempting to turn inbound on the approach, proceeded to deviate consistently and substantially from the published altitude restrictions until it collided with the tower at an altitude (720 feet **m. s. l.**) which was almost 800 feet below the minimum approach segment altitude at the point of impact. These deviations occurred despite the facts that the minimum altitude applicable to each segment of the approach was clearly delineated on the profile set forth on the approach plate and the tower struck by the plane was depicted, along with other obstructions, on the plan view of the chart.

It is also significant that the aircraft never became established on the inbound radial during the approach. Although the strong south-westerly upper air winds could account, in part, for an initial overshoot

of the radial, it appears that very little, if any, correction was effected until the aircraft had transgressed about 1 mile from the centerline at an approximate position 7 miles from the airport. An off-course deviation of this magnitude would reflect a full-scale deflection of the course deviation indicator (CDI). The degree of the deviation, and particularly the point at which it occurred in this stage of the approach, be unacceptable to be a professional pilot. When a correction toward the centerline finally was made, it was not enough. Even at the point of impact, which was about one-half mile to the left of the approach radial, the deviation of the CDI would be almost full scale. (The captain's CDI needle was found showing three dots to the right.)

The entire flightpath and descent profile displays a disoriented operation, which indicates a failure in the cockpit either to monitor flight instruments or to maintain safe operating practices and procedures.

With respect to the air traffic control services provided to the flight, the aircraft was being vectored to the final approach course by approach control and was, therefore, a "radar arrival" and subject to the control procedures outlined in the Controllers Terminal Air Traffic Control Handbook (7110.8L).

The flight was cleared for the approach when it was approximately 15 miles northwest of the airport and approaching the final approach course at an altitude of 4,800 feet. Paragraph 1360c of the Controller's Handbook states that: "...If terrain or traffic does not permit unrestricted descent to lowest published altitude specified in approach procedure prior to final approach descent, controller shall:

- "1. Defer issuance of approach clearance until there are no restrictions or,
2. Issue altitude restrictions with approach clearance specifying when or at what point unrestricted descent can be made. "

The final approach fix in this case was the 3.0 DME fix, which has a minimum crossing altitude of 900 feet m. s. 1. Thus, the approach controller, in accordance with 1360c, should have either withheld the approach clearance until the aircraft reached the 5.0 DME fix (which would have required withholding the clearance until the aircraft had completed more than half of the entire approach) or issued altitude restrictions

with the approach clearance as follows: "N57V cross the 11-mile DME fix at **3,000** feet, 7-mile DME fix at or above **2,100** feet, 5-mile DME fix at or above 1,500 feet, cleared for the approach."

The reason that the above procedures were not followed in this instance was assigned by **FAA** witnesses to a failure to implement **FAA** directives at the Regional level. The **Director** of the Air Traffic Service, **FAA**, testified that on January 9, 1975, he had advised **all** **FAA** Air Traffic Control Division chiefs to insure that paragraph 1360c of the Controller's Handbook was being correctly interpreted and applied. He stated that specific instructions were issued verbally **on** January 9, and that **on** January 10, a followup memorandum required that supervisors brief all terminal controllers "face-to-face" **to clarify** these instructions.

Apparently, because of a differing interpretation **of** the briefing by management personnel in the **FAA** Eastern Region in conjunction with a differing interpretation of the requirements **of** paragraph 1360c by the Chief of the Washington Tower, the directive was not **communicated** to controllers in the Washington Tower as intended. Consequently, controllers at the Washington Tower were not aware **that** they should issue **altitude** restrictions along with an approach clearance. This procedure was not implemented at Washington National Airport **until** January 29, 1975. 4 days after N57V crashed into the radio tower..

It is not possible **to** determine what effect, **if** any, the issuance" **of** crossing altitudes by the controller would have had on the pilot **of** N57V. The pilot deviated from the published procedures (the **minimum** altitudes and approach course) which are clearly delineated **on** the approach plate and which the pilot **is** required to follow by regulation.^{4/} It is apparent that the ATC **handling of** radar arrivals, insofar as terrain avoidance **is** concerned, is most critical when **an** aircraft **is** being vectored in airspace which is neither **on an** airway nor part of a published approach procedure. **In such** circumstances, altitude restrictions provided by ATC assume greater significance inasmuch as the pilot may not **know** the precise position **of** his aircraft in relation to ground obstructions. **On** the other hand, in the instant situation, the flight was not cleared for the approach **until** it had been vectored to a point at which interception with the **final** approach course, at an appropriate altitude, **was** imminent. Consequently, in these circumstances, **the** **provision** of altitude restrictions would have been more in the nature of a backup or secondary service **in** that the **pilot**, who remains primarily

^{4/} Section 91.116(a) of the FAR (14 CFR 91.116(a)).

responsible for terrain avoidance, would have been receiving information readily available from the approach plate. In any event, the absence of altitude restrictions in the clearance cannot be conceived to account for the wide deviation of the flight from the approach course.

At 1209:47 the local controller who was in contact with N57V observed the flight off course and advised: "November ~~five~~ seven victor looks slightly left of course." The flight replied, "OK, we'll check." This was the last communication received from N57V.

At 1209:47 the ARTS-III derived descent profile shows the aircraft at approximately 800 feet m. s. l., or about 1,000 feet below the prescribed minimum altitude for that segment of the approach. When asked why he did not also at this time advise the flight of its low altitude, the local controller testified that he did not observe the altitude data block on the BRITE display.

Although radio communications with N57V had been transferred from approach control to the tower, the approach controller retained responsibility for insuring adequate separation of the flight from other aircraft. A review of the background conversations found on the ATC tape showed that the approach controller first became concerned over the progress of N57V at 1209:02 when he commented, "Wonder if he's ever going to pick up that radial." This comment was followed 6 seconds later by, "I know there're some towers down there (Shouldn't be any problem)." These comments appear to be directed primarily at the aircraft's off-course position at that time. However, at 1209:32, the comment, "That guy shouldn't be that low up there should he?" then indicates a distinct concern for the low altitude of the aircraft at that point, and a safety advisory should have been issued more promptly by the approach controller to the local controller rather than some 28 seconds later. At 1210:00 he called the local controller on the intercom and advised, "Five seven victor looks pretty low up there and a little bit off the radial." After receipt of this information the local controller called the flight, "November five seven victor, I show you left of course, does that check?" There was no reply from N57V.

Again, as in the case of the failure to issue altitude restrictions with the approach clearance, it is difficult to ascertain what might have happened if a more timely safety advisory had been issued and whether the pilot of N57V might then have been alerted in sufficient time so that collision with the tower could have been averted.

The local controller testified that although he had monitored the inbound progress of N57V on the BRITE display, he had not noticed the altitude of the aircraft on the ARTS-III data block and was, therefore, unaware of the actual "low" altitude of the flight when he was called by the approach controller. He further stated that after receiving this advisory from the approach controller on the intercom at 1210:00 he had intended to advise the flight that it was low by means of a "split transmission" -- he would first await an acknowledgement to the "left of course" advisory and then transmit that the flight was low.

The term "split transmission" is not contained in any official FAA glossary nor is its usage provided for in any procedure relating to ATC services. The only explanation for this term was as described above by the local controller following the accident.

The Safety Board concludes that the local controller's decision to separate the elements of the safety advisory (low and off course) was not professional since at this point altitude was far more critical than course. Although it is not the controller's responsibility to monitor the altitude presentation except to insure that the aircraft are separated properly, the Safety Board believes that, after being told that N57V was "pretty low," the controller should have checked the altitude on the data block and should have relayed the complete safety advisory. However, even if both safety advisories had been issued in the same transmission, it probably would have been too late to prevent the accident because of the proximity of the aircraft to the towers at that time.

2.2 Conclusions

(a) Findings

1. There was no preimpact failure or malfunction of the aircraft, structure, systems, or powerplants.
2. There was no evidence that either pilot was physically incapacitated before the accident.
3. The flight was a "radar arrival" and should, therefore, have been provided altitude restrictions in the approach clearance as required by Controller's Handbook 7110.8D, paragraph 1360c.

4. The flight was cleared for a VOR/DME approach to ~~Way~~ 18 at Washington National Airport when it was approximately 15 nmi from the airport. No altitude restrictions were issued with the clearance.
5. The pilot was required by Federal Aviation Regulations to conduct an instrument approach in accordance with the applicable published approach procedure.
6. The aircraft crashed into a radio transmission tower, located approximately 5 nmi from the airport at an altitude of 720 feet m. a. l. and approximately one-half mile to the left of the approach course prescribed in the instrument approach procedure.
7. The minimum crossing altitude for the segment of the approach where the aircraft crashed is 1,500 feet m. a. l.
8. Air Traffic Control should have issued a more timely safety advisory to N57V concerning its low altitude.
9. The approach controller advised the local controller on the intercom that N57V was "pretty low and to the left of course" at 1210:00. However, the local controller transmitted to the flight only that it was left of course.

(b) Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was an unauthorized descent below the published minimum approach segment altitude during an instrument approach in instrument meteorological condition, for reasons undetermined.

While recognizing that Air Traffic Control should have issued crossing altitude restrictions with the approach clearance and should have issued a more timely safety advisory, the Board, however, is unable to conclude that the issuance of such altitude restrictions and safety advisory in these circumstances would have prevented the occurrence of the accident.

3. RECOMMENDATIONS

As a result of the Trans World Airlines Flight 514 accident at Berryville, Virginia. on December 1, 1974, a number of recommendations pertaining to the air traffic control system were submitted to the FAA. Recommendation A-75-22 concerning the issuance of Safety Advisories is relevant to the accident and is cited herein. A copy of the recommendation letter and the Administrator's response are included in Appendix C.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JOHN H. REED
Acting Chairman

/s/ LOUIS M. THAYER
Member

/s/ WILLIAM R. HALEY
Member

McADAMS and BURGESS. Members, dissented. (See page 29.)

/s/ FRANCIS H. McADAMS
Member

/s/ ISABEL A. BURGESS
Member

January 28. 1976

McADAMS and BURGESS. Members. dissenting:

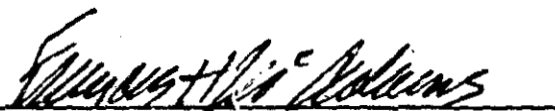
We do not agree with the probable cause as stated by the majority. Although we agree that the unauthorized descent **was** a cause of the accident, we believe that the failure **of** ATC to either defer the clearance, issue altitude restrictions. or issue a timely safety advisory was **also** a cause of the accident.

The majority **takes** the position that ATC should have either deferred clearance or issued altitude restrictions as required by paragraph 1360(c), and issued a more timely safety advisory, but does not conclude that the failure to do **so** was a causal factor. The ATC involvement is not given the weight **of** even a contributing factor despite the conclusion that ATC had a duty to **issue** altitude instructions.

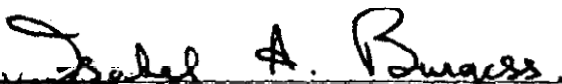
It is difficult to understand how the majority can conclude that ATC should have issued such instructions, yet, at the same time, **fail** to conclude that had such instructions been issued the accident would likely have been averted,

In our judgments, it is logical to conclude that had the pilot of N57V received either altitude restrictions or a deferred clearance and had he been given a more timely advisory, he would have responded in such a way that the accident probably would have been averted. Accordingly, if it is reasonable to assume that had the pilot **not** made an Unauthorized descent, the accident would not have occurred, it is just **as** reasonable to assume that had the controllers provided **a** proper clearance and a more timely safety advisory. this accident likewise probably would not have occurred. Ergo, the laches **of** ATC are indeed a causal factor.

Based on the foregoing. we would state the probable cause to be an unauthorized descent below the published minimum approach segment altitude during an approach in instrument meteorological conditions, and the failure of **ATC** to defer clearance, issue altitude restrictions. or issue a timely safety advisory.


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APPENDIX A

INVESTIGATION AND HEARING

1. Investigation

At 1230 e. d. t., on January 25, 1975. the National Transportation Safety Board was notified of the accident. The Safety **Board** immediately sent an **investigation** team to the scene. The team established investigative groups for **operations/air** traffic control, witnesses, weather, and **structures/maintenance** records.

Representatives **of** the Federal Aviation Administration, National **Business** Aircraft Association. and Beech Aircraft Corporation assisted the Safety Board during the investigation.

During the investigation. the Safety Board became aware that the ATC recorded communications contained background **sounds** picked up **by** speakers connected to the tape recorder in such a **manner** that they acted as microphones. The **voices** were buried in and slightly louder than the ambient tape noise **and** normal tape-machine noise. The transcript of background conversations (Appendix H) was derived **by** the investigating group as a result **of** an intensive review and evaluation. The transcript contains transmissions. intercommunications. and background utterances from the local control and the **F-1** channels. The transcript begins shortly after the aircraft was **handed** off to local control and just after it departed 2,100 **feet**. Background conversations before this time were not related **to** N57V.

2. Hearing and Depositions

Depositions were taken on March 5, 1975. in **Columbus**, Ohio, and on March 3, 1975, at Dulles International Airport, Virginia. **On** review of the transcript of these depositions, the Board decided that additional information would be needed to make a complete record of the **facts** and circumstances pertaining to this accident. Consequently, a public hearing was held. The hearing was convened on April 18, 1975. **in** Washington, D. C. The transcripts **of** those prior depositions have been made **a** part of the public record **of** the investigation.

Parties **to** the hearing included the Federal Aviation Administration, Wolfe Industries, **inc.**, the National Business Aircraft Association. the Professional Air Traffic Controllers Organiation, and the Aircraft **Owners** and Pilots Association.

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APPENDIX B

CREW INFORMATION

Captain Richard N. White

Captain White, 50, had been employed as a pilot by Wolfe Industries, Inc., since April 5, 1971. He held commercial pilot certificate No. 1091159 with multi-single engine land, flight instructor, and instrument rating. He had accumulated 9,745 flight-hours, 49.5 of which were in the Beech King Air. He completed a 5-day ground training course conducted by the Beech Aircraft Corporation in December 1974. and completed initial flight training and checkout in the King Air conducted by the Ohio Corporation on December 17, 1974.

He was issued a second-class medical certificate on June 13, 1974, with the Limitation that the "holder shall possess correcting glasses for near vision while exercising the privileges of his airman certificate. "

Pilot White had flown into Washington National Airport five times in the 12-month period before the accident, the last flight of which was conducted on July 23, 1974.

He had approximately 16 hours off-duty time before reporting for this flight.

Copilot Richard D. Hatem

Copilot Hatem, 28, was hired by Wolfe Industries, Inc., as a standby copilot on July 15, 1974. He held commercial pilot certificate No. 1801953 with multi-engine land, single-engine land and sea. and flight instructor ratings. He had accumulated 1,963 flight-hours. 39 of which were in the Beech King Air.

Copilot Hatem had approximately 16 hours off-duty time before reporting for this flight.

APPENDIX C

AIRCRAFT INFORMATION

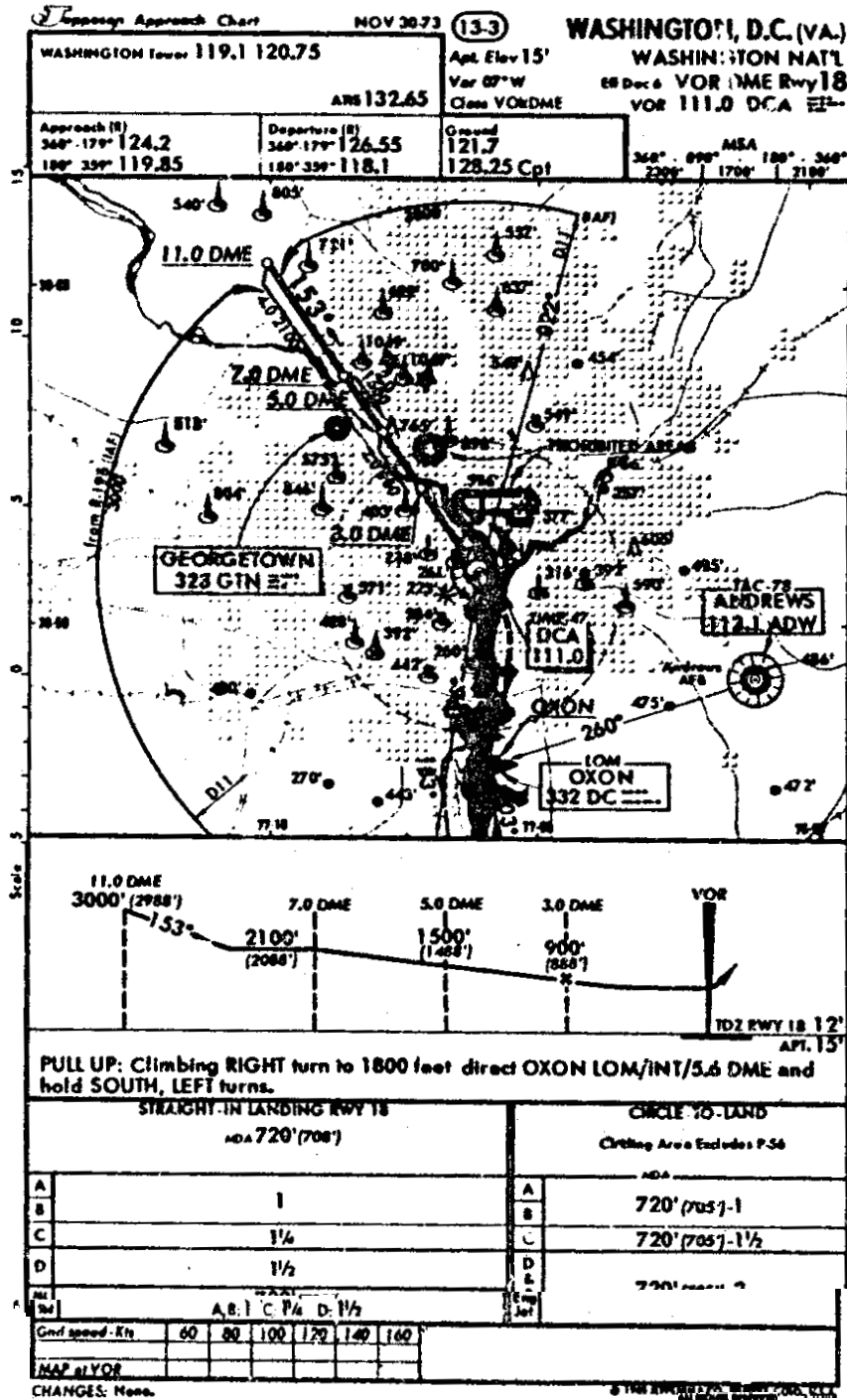
Aircraft N57V, a Beech 65-A90 King Air, serial No. L5268, was manufactured on April 4, 1967, and was purchased by the Marathon Oil Company, Findley, Ohio, on May 3, 1967. The aircraft was purchased jointly by the Ohio Company, The Dispatch Printing Company, WNSB-TV, Inc., Radi Ohio, Inc., (Wolfe Industries, Inc.) on December 13, 1974.

The aircraft had accumulated a total of 4337.19 operating-hours since the date of manufacture. The last progressive maintenance inspection on the aircraft was conducted on January 20, 1975.

N57V was equipped with two Pratt and Whitney PT-6 A-20 engines and two Hartzell Model HCB3TN-33 propellers.

A review of the maintenance records of the aircraft showed that it had been maintained in accordance with FAA requirements and approved company procedures. There were no outstanding maintenance discrepancies on the aircraft when it departed on the flight.

APPENDIX D



"ILLUSTRATION ONLY - NOT TO BE USED FOR NAVIGATIONAL PURPOSES"

APPENDIX E

WASHINGTON NATIONAL TOWER

TRANSCRIPT

The attached transcript concerns the accident involving **N57V**, BE-90, near Washington National Airport on January 25, 1975, at 1710 GMT.

Transcription Period: From 1653 GMT to 1715 GMT **on** frequencies 119.85, 124.7, and **119.1 MHz**.

Transmissions by:

- AR** - Wash. Approach Arrival West Controller
- DR-1** - Wash. Approach Departure West Controller
- DR-2** - Wash. Approach Departure East Controller
- LC** - Wash. Tower Local Controller
- ALC** - Wash. Tower Asst. Local Controller
- F1** - Wash. Approach Final West Controller
- F2** - Wash. Approach Final East Controller
- ZDC** - Wash. Center Aldie Sector
- V727** - Military Aircraft (Navy)
- P602** - Priority Air Transport Flight **602** (Army)
- PI942** - Piedmont Airlines Flight 942
- V486** - Military Aircraft (Navy)
- UA318** - United Airlines Flight **318**
- PI910** - Piedmont Airlines Flight 910
- N57V** - **N57V** BE-90, King-Air
- HNA24** - Henson Air Taxi Flight 24
- PI921** - Piedmont Airlines Flight **921**
- AL819** - Allegheny Airlines Flight 819
- EA1450** - Eastern Airlines Flight 1450
- AA275** - American Airlines Flight 275
- DL325** - Delta Airlines Flight 325
- TW427** - Trans World Airlines Flight 427
- NA468** - National Airlines Flight **468**

NOTE: This transcript is timed in 1-minute intervals except on transmissions to, from or regarding **N57V**. The second that these transmissions began is indicated **to the left of** the transmitted matter. e. g., (30) thirty seconds after the preceding minute.

APPENDIX E

1653 GMT AR Piedmont nine forty two turn left heading three two zero descend and maintain five thousand

AR Pat **six** zero forty **two** rather **six** oh **two** descend and maintain three thousand

P602 Pat **six** zero **two** is out of five for

AR Piedmont nine forty two contact approach one **two** four point seven

PI942 Twenty four seven **so** long

AR **So** long

AR Pat **six** oh **two** continue descent to now and ~~main~~ **main** one thousand five hundred the Davison weather four hundred scattered measured ceiling five hundred broken eight hundred overcast visibility seven wind one eight zero degrees at five the altimeter three zero four **two** -- correction that's not the correct altimeter I'll have the altimeter for you in a moment

P602 **Six** zero **two** roger and also say again descent altitude

V486 Approach **ah** four eight **six** level at three

AR That's ah navy four eight **six** level at three the uh altitude for pat **six** oh **two** **is** one thousand five hundred

P602 ¹
Six oh **two** roger

1654 UA318 Ah Wash approach United three eighteen **is** with you descending to eight

AR Navy four eight **six** contact approach on three one **six** point ~~seven~~ now

V486 Roger three one **six** point seven

APPENDIX E

AR United three **eighteen** ident maintain eight thousand
depart Aldie heading one zero zero **for** vectors to
the final approach course landing south operation
do you have the **ATIS**

UA318 Yes **sir** we have uh quebec

AR Roger

AR (Intercom to **DR**)
That Fat **I** may take a right box around back an
to the final

P602 Wash center Pat **six** oh **two** departing Ironside
zero four zero

AR Pat zero **six two** roger and uh (Center calling on
overhead speaker -- "Ironside Piedmont nine **ten**--"
garbled) your altitude is a little bit high **for** turn
in for final **I'll** have a short box pattern around to
the right **for** you in a while

P602 **Six** zero **two**

UA318 And approach three eighteen **you** might advise
quebec still shows landing north

AR Yes sir the weather remains **the** same **as** far as
I **know** and uh it'll **be** uh VOR DME **runway** one
eight for the approach **the** uh altimeter **two** nine
four uh **two**

UA318 All right **two** nine four **two** VOR **DME** one eight

AR Pat **six** oh two the Washington altimeter two nine
four two

P602 Pat **six** oh **two two** nine four **two**

PI910 Washington approach Piedmont nine ten descending
to **six** with quebec

PI910 'Washington **Wash** approach Piedmont nine ten

AR **Say** again

PI910 Piedmont nine ten we're descending to **six**

1655

APPENDIX E

1656

AR Piedmont nine ten ident maintain six thousand
depart Ironside heading zero one zero for vectors
to the uh final approach course it'll be uh VOR
DME runway one eight approach over

PI910 Okay Piedmont nine ten ten degrees at Ironsides
and understand you got a south operation

AR Navy three seven seven two seven turn right
heading zero eight zero

V727 Roger coming right zero eight zero five thousand

AR Pat six oh two turn right one five zero

P602 Six oh two is right one five zero

AR Pat six oh two affirmative and the Davison
altimeter two niner four two

P602 Two niner four two

AR United three eighteen and Piedmont nine ten here's
the latest weather it's uh measured ceiling seven
hundred overcast visibility more than twenty miles
altimeter two niner four one United three eighteen
okay

UA318 (garbled) we just got it it's romeo now

AR Roger and Piedmont nine ten copy

PI910 Nine ten firm we got romeo

AR United three eighteen descend and maintain seven
thousand

1657

UA318 Uh three eighteen down to five

AR United three eighteen descend and maintain seven
thousand

APPENDIX E

UA318 Down to seven United three eighteen

AR United three eighteen contact approach one two four point seven now

UA318 Good day sir

AR Piedmont nine ten you copy that latest weather

PI910 That's affirm

AR Okay

AR Navy seven two seven turn right heading one two zero

V727 Roger coming right one two

1658 ZDC Five seven victor is a King-Air eight thousand

AR Pat six oh two turn right heading two four zero

P602 Six oh two is right two four zero

(20) N57V Ah Washington approach King-Air fifty seven victor is with you eight thousand

(23) AR King-Air five seven victor Wash approach ident maintain eight thousand depart Aldie heading one zero zero for vectors to the final approach course and you had the ATIS information

(31) N57V Yes we do and after Aldie we'll go to one zero zero fifty seven victor

AR Navy seven two seven descend and maintain three thousand

1659 V727 Rog roger leaving five for three

AR Pat six oh two the Davison altimeter now two niner four zero

APPENDIX E

P602 Two niner four zero we're level one thousand five hundred

AR Pat *six* oh **two** roger

AR Navy seven two ~~seven~~ turn right heading one three zero

V727 One three (garbled)

1700 AR Pat *six* oh **two** turn right heading three zero zero cleared ~~ILS~~ approach runway three **two** at Davison you're four and a half miles from ~~the~~ outer marker

P602 *Six* oh **two** roger

AR And Pat ah *six* oh **two** in case I didn't explain it good enough you are on the north side of localizer at **this** time **that** box pattern was on the north side

P602 **Six** zero **two** roger

AR Piedmont nine ten turn left heading three two zero

PI910 Three **two** zero Piedmont nine ten

1701 AR Navy seven **two** seven contact Washington approach on three eight nine **point** eight

AR Piedmont nine ten descend and mainbin five thousand contact approach one **two** four point seven now

PI910 Nine ten twenty four seven out of **six** for five

AR Pat *six* oh **two** contact ~~Davison~~ tower one **two six** point three or **two** two niner point four now over

P602 *Six* zero two roger

1702 AR Navy seven two seven Washington

APPENDIX E

1703

V727 Hey Washington **this is** Navy three seven seven
two seven no **joy** three eight nine eight over

AR Navy ~~seven~~ **two** seven roger

AR **Stand by** one

AR Navy seven **two** seven contact approach **on** three
oh one point five in the event **of** lost communications
intercept the localizer execute **ILS to one nine right**
and contact Andrews **any** frequency

V727 Roger say again frequency please

AR Three **oh** one point five

V727 Roger three eight one five **shifting**

AR Three zero one point five

1704

VI27 Roger copy

(20) AR November five seven victor descend **and** maintain
five thousand

(23) N57V We're out **of** eight **for** (garbled) for five thousand
fifty seven **vic**

(27) AR November five seven victor contact approach one
two four point seven now over

(30) N57V Okay **fifty** seven victor (garbled)

F1 Piedmont nine ten turn right heading one **two zero**
eight northwest cleared VOR **DME** runway one
eight approach

PI910 Piedmont nine ten **is** cleared for one eight **DME**
VOR approach

(46) N57V Washington approach King-Air fifty seven victor
is with **you out** of seven point five **for** five thousand

APPENDIX E

(51) F1 King-Air five seven victor Waskington approach control descend **and maintain** three thousand **fly** heading **one two** zero

1705 (58) N57V Okay one **two** zero and we're **down** to three thousand we're out **of** seven point **two** now

F1 Piedmont nine ~~ten~~ contact tower one one ~~niner~~ point one

PI910 Nine ten one **out to ah** get **us** a **new** altimeter before **we** leave

F1 **Ah** three zero **four one**

PI910 'kay

1706 (56) F1 **King-Air** five ~~aeven~~ victor fifteen northwest cleared VOR **DME** runway one eight approach

(02) N57V Okay we're cleared for the **approach** **fifty** seven **victor**

(12) F1 Two five seven victor like **for** you **to** keep your airspeed up as much **as ah** you can on final

(16) N57V **Okay**

(Intrafacility conversation muffled and garbled)

(57) **ALC** What type **is** five seven **victor**

1707 (59) F1 Five seven victor is a King-Air

ALC **L B**

(44) F1 November five seven **victor** contact tower one one ~~niner~~ point one

(48) N57V **Good** day

(54) N57V National tower King-Air fifty seven **victor is** with you

APPENDIX E

- (57) LC Navy fifty seven victor roger
- LC Piedmont nine twenty one cleared for takeoff traffic three out for runway one eight
- PI910 Nine twenty one rolling
- LC Henson ~~number~~ twenty four ~~taxi into~~ position ~~and~~ hold traffic landing ~~runway~~ one eight
- HNA~~24~~ Twenty ~~four~~
- (Unknown) Seven ~~five~~ sierra
- LC Allegheny eight nineteen ~~tax~~ ~~contact~~ departure control
- AL819 'ger no long
- LC See ya
- DR-1 All right (garbled) -- J L (overriding DR-1 position)
- LC Piedmont nine ~~twenty~~ one
- DR-1 Roger -- Piedmont nine ~~oh seven~~ turn left heading
- LC Piedmont nine twenty one proceed southbound ~~anti~~ contact departure control
- PI710 Good day you all
- LC Good night
- LC Eastern fourteen fifty taxi ~~into~~ position ~~and~~ hold traffic will depart runway one five first
- EA~~1450~~ **Position** and hold Eastern fourteen fifty
- LC Henson twenty four after departure maintain runway heading cleared for takeoff

APPENDIX E

HNA24 Twenty four **ic** rolling

LC Henson twenty four runway heading **of** one five

DR-1 All right Piedmont nine twenty one **is** off too huh

LC Yeah I just gave that one didn't **you** get it

DR-1 Ahead or behind **Allegheny**

LC Behind **of** course

DR-1 Thank **you**

LC Piedmont nine ten **turn** right and **taxi** clear
contact ground control **point** seven

PI910 **Okay**

(47) **LC** **November five seven victor looks slightly left
of course**

(51) N57V **Okay** we'll check

LC **Henson** twenty four contact departure control

HNA24 Twenty **four so** long

LC Good day

1710 FI Five seven victor looks pretty low up **there and**
a little bit **off** the radial

(03) **LC** Yeah

(05) **LC** November five seven victor I show **you ah** left
of course does that check

(11) **LC** November five seven victor **ah** tower

LC **Henson** twenty four contact departure

LC Eastern fourteen **fifty** cleared for takeoff

EA1450 Fourteen **fifty** rolling

LC American two Seventy five taxi **into** position and hold

AA275 American **two** seventy five position **and** hold

(27) LC November five seven victor **if** you read ident over

(34) LC **I don't** get the five seven ~~vic~~ **anymore** **he** called me ~~once~~ though

(38) (Unknown) Uh oh

(40) FI Five seven victor ~~Washington~~ tower

(45) LC November five seven victor Washington

DL325 Wash tower ~~Delta~~ three twenty five

1711 LC Delta three twenty five Washington tower roger

LC American **two** seventy five cleared for takeoff

AA275 American ~~taro~~ seventy five **is** rolling

(09) FI Are **you** ~~talking~~ **to** five seven victor

(11) LC Negative

TW427 TWA four two seven ready **in** sequence

LC Roger hold short

LC Eastern fourteen **fifty**

DR-2 **J T**

LC Eastern fourteen fifty contact departure control

EA1450 Roger

APPENDIX E

F2 Ask Delta **if** he sees anything up there

LC Okay

LC Delta three twenty five ah **--** what are your flight conditions (override **unknown** source: **"we anticipate"**)

DL325 We're in the soup **six --** at fifteen hundred feet

LC **All** right thank you

NA468 Four **sixty** eight's ready

LC Thank you hold short

(44) **LC** November five seven victor this **is** Washington tower if you read ah you're cleared to land over

(51) **F1** Do you have five seven victor yet

(53) **LC** Negative

LC (~~Overriding DR-1~~ position)
~~"Twenty five direct~~ Brooke contact center ~~on~~ fre
~~uh~~ correction it's Eastern one seventy seven direct
 Brooke contact (override source **unknown**: 'radar
 contact') center one two three paint nine"

LC American **two** seventy five

DR-1 Direct Brooke we'll **see** ya

DR-1 Okay

LC All right wait wait a minute will ya one person

LC American **two** seventy five contact departure control

AA275 **So** long

APPENDIX E

F2 Ask Delta what **his** flight conditione are now

LC Delta three twenty five are you still **in** the soup

DL325 **Yes** sir at thirteen hundred

LC **Okay** sir ah climb and maintain three thousand
Delta three ~~twenty~~ five present heading

DL325 Okay

F2 Still **in** the soup **with** that **guy** **I**

LC **I'm going to pull** Delta **off** and ah give **him** to
departure

F2 All right turn him right to two forty right now
(garbled)

LC Two forty

F2 Yeah two forty **and** climb **to** three thousand

LC **All** right coming to you

LC Delta three **twenty** five climb and maintain **ah**
three thousand **and** ah turn right heading **two**
four zero

DL325 **Two** four zero heading three thousand

LC All right there's **a ah** aircraft ahead of you we
can't seem to find that's the reason for this

F2 I'm taking Eastern off **to** ah **I** don't know what's
going on

LC **Okay**

LC **Delta** three twenty five **go** to frequency one one
eight point **three** one one eight three

APPENDIX E

DL325 Eighteen three

(unknown) Do you say **you** gat **on**e out **there** **lost**

LC **Ah** we can't see him we lost **him on** the radar
we're still looking

1714

LC He **is** down

€2 He he's **down** where

F2 At the airport

LC Not at the **airport** American University

F2 Roger

LC National ~~four~~ **sixty** eight cleared **for** takeoff

(Unknown) (garbled) on the delay sir

LC National four **sixty** eight cleared for takeoff

NA648 That ~~wasn't~~ long was it

1715



NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

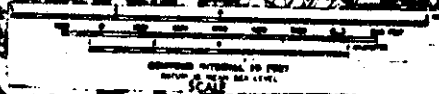
FLIGHT TRACK
(ARTS III DERIVED)

BEECH 90 KING AIR N57V

WOLF INDUSTRIES, INC.

AMERICAN UNIVERSITY CAMPUS
WASHINGTON, D.C.

JANUARY 25, 1975



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best available copy.

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

DESCENT PROFILE

(ARTS III DERIVED)

BEECH 90 KING AIR N57V

WOLF INDUSTRIES, INC.

AMERICAN UNIVERSITY CAMPUS

WASHINGTON, D.C.

JANUARY 25, 1975

NOTE:

Conversations shown are those extracted from Exhibit 3-A-1

Altitude shown is that transmitted by encoding altimeter and is therefore resolved to nearest 100 ft. level

LEGEND

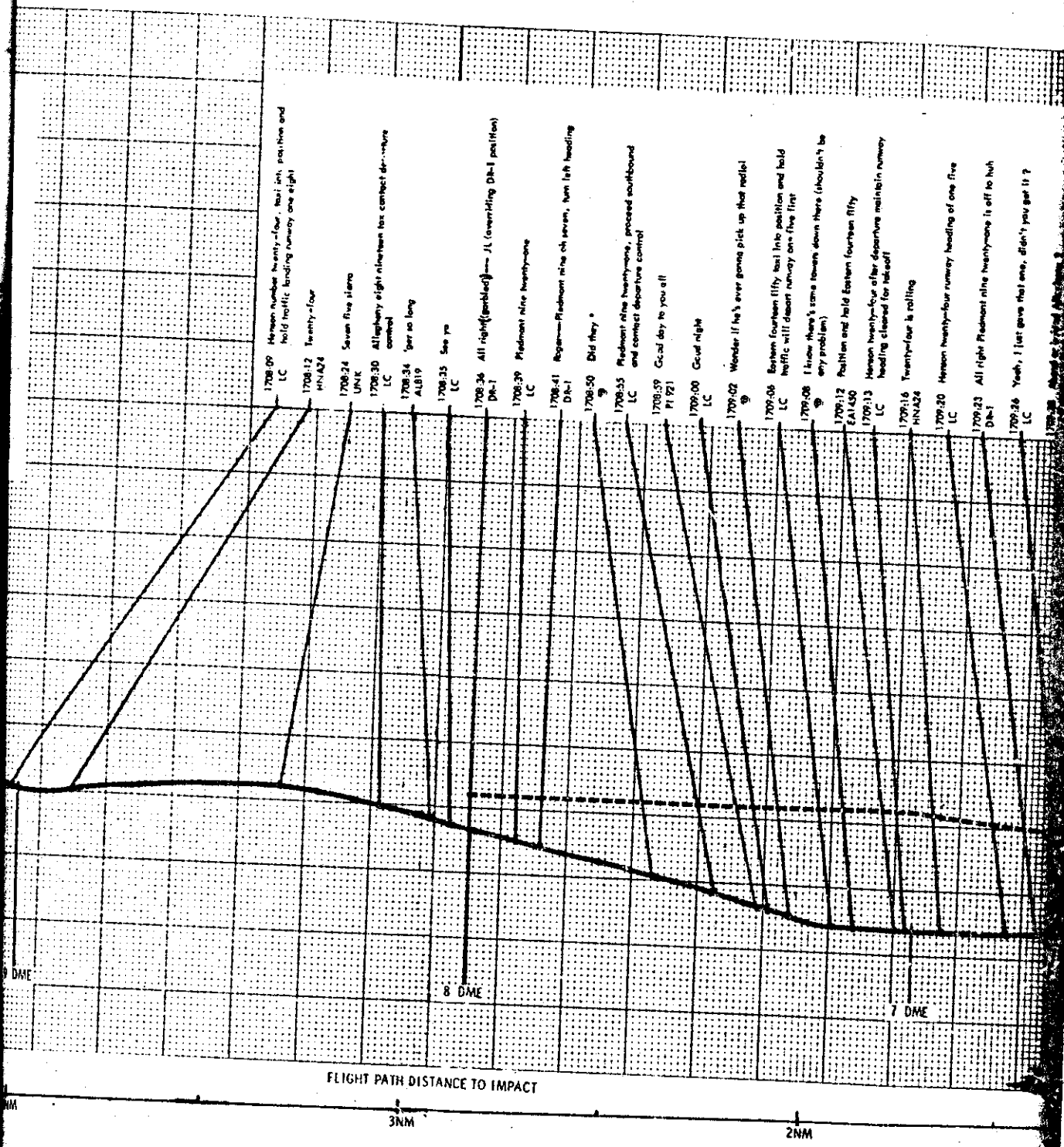
F-1	Final West Controller Position
LC	Local Control
DR-1	Departure West Controller Position
HNA24	Henson Air Taxi Flight 24
ALB19	Allegheny Flight 819
PR21	Piedmont Flight 921
EA 1450	Eastern Airlines Flight 1450
N57V	Beech 90 King Air
UNK	Unknown
.	Unintelligible Word
()	Questionable Text
(())	Editorial Insertion
---	Pause
⊗	Background Conversation
----	Descent Profile depicted on DCA VOR DME Avy 18 approach plate

9 DME

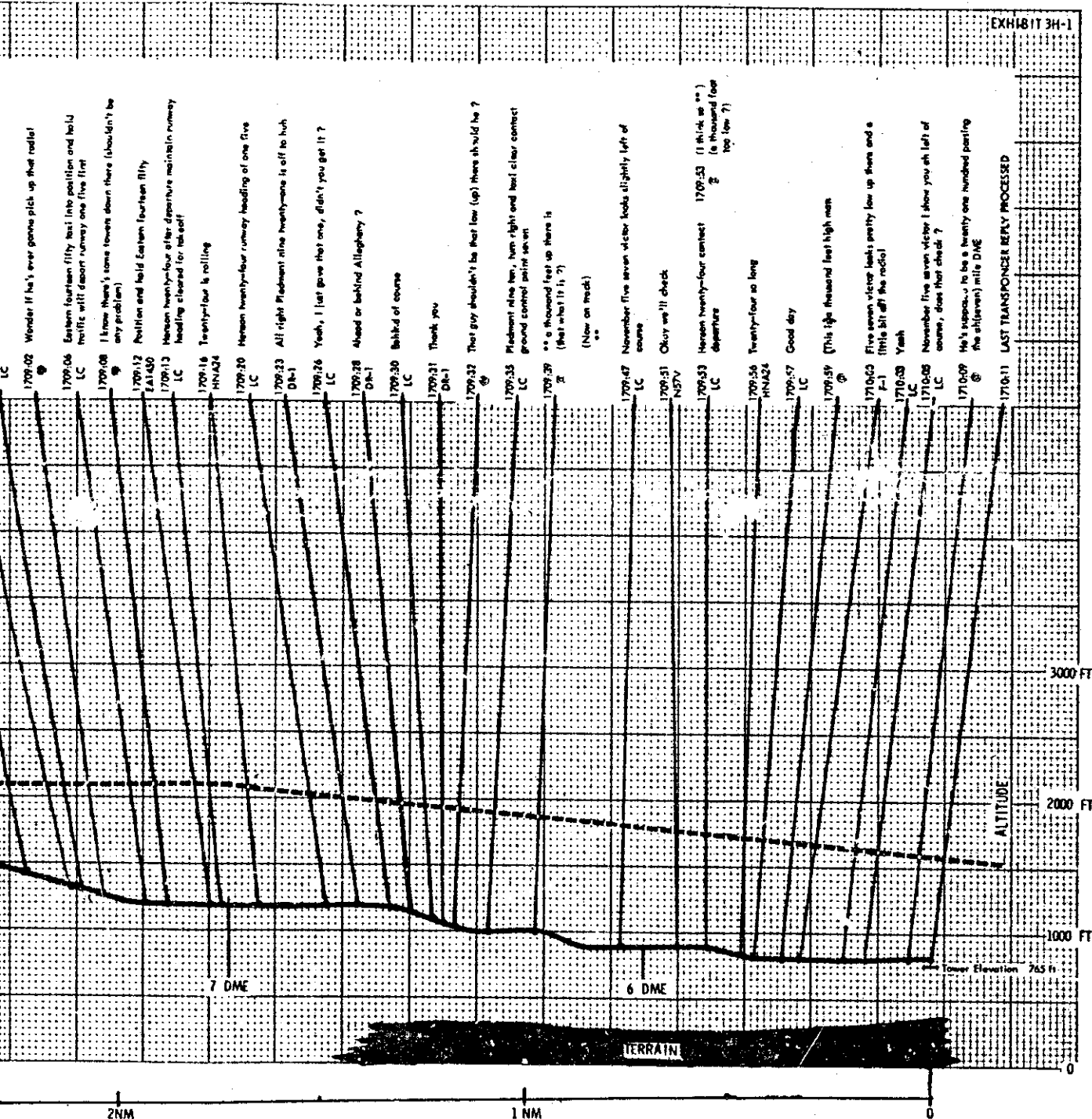
5NM

4NM

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1708-09 Hansen number twenty-four, tail into position and
 LC hold traffic landing runway one eight
 1708-12 Twenty-four
 HN1A24
 1708-24 Seven five zero
 UNK
 1708-30 All right eight nineteen to contact de-secure
 LC control
 1708-34 per so long
 ALB19
 1708-35 See ya
 LC
 1708-36 All right (garbled) -- J1 (overriding DME-I position)
 DME-I
 1708-39 Piedmont nine twenty-one
 LC
 1708-41 Roger--Piedmont nine oh seven, turn left heading
 DME-I
 1708-50 Did they?
 1708-53 Piedmont nine twenty-one, proceed southbound
 LC and contact departure control
 1708-59 Good day to you all
 PI 921
 1709-00 Good night
 LC
 1709-02 Wonder if he's ever gonna pick up that radial
 1709-06 Eastern fourteen fifty tail into position and hold
 LC traffic will depart runway one five first
 1709-08 I know there's some towers down there (shouldn't be
 any problem)
 1709-12 Position and hold Eastern fourteen fifty
 CA1450
 1709-13 Hansen twenty-five after departure maintain runway
 LC heading cleared for takeoff
 1709-16 Twenty-four is rolling
 HN1A24
 1709-20 Hansen twenty-four runway heading of one five
 LC
 1709-23 All right Piedmont nine twenty-one is off to huh
 DME-I
 1709-26 Yeah, I just gave that one, didn't you get it?
 LC
 1709-30



**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.**

APPENDIX G

CORRECTED COPY - DESTROY PREVIOUS ISSUE, •

ISSUED: June 12, 1975

Forwarded to:

Honorable James E. Dow
Acting Administrator
Federal Aviation Administration
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-75-52

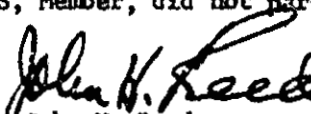
The National Transportation Safety Board's investigations of an accident involving Trans World Airlines Flight 514 on December 1, 1971, and an accident involving N57V, a Beech BE-90, on January 25, 1975, indicate that the controllers possessed safety advisory information which was not issued to the pilots. Both pilots were flying at excessively low altitudes. The issuance of such essential information is currently not mandatory since a safety advisory is an "additional service" and the controller has complete discretion for determining if this service is to be provided.

The categorization of a safety advisory as an additional service in paragraph 1545 of FAA Handbook 7110.8D and paragraph 810 of FAA Handbook 7110.9D is inconsistent with the apparent intent of paragraph 1800 of FAA Handbook 7110.8D and paragraph 907 of FAA Handbook 7110.9D. There is a lack of definitive guidelines to enable controllers to distinguish between a situation which is "likely to affect the safety of an aircraft" and a situation involving an imminent emergency. We believe both situations should be treated as emergencies.

On the basis of the above conclusion, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Revise FAA Handbook 7110.W and FAA Handbook 7110.9D to make the issuance of a safety advisory mandatory. (Class II)

REED, Chairman, THAYER, BURGESS, and HALEY, Members, concurred in the above recommendation. McADAMS, Member, did not participate.

By: 
John H. Reed
Chairman

* Underscored portion
denotes change.

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1517B

APPENDIX H

SPECIALIST'S FACTUAL REPORT OF INVESTIGATION OF BACKGROUND NOISES HEARD ON AN ATC TAPE

A. ACCIDENT

Location: Washington, DC
Date : January 25, 1975
Aircraft: Beechcraft 90, N57V
Operator: Private
NTSB No.: IAD 75-A-1044

B. GROUP

Paul C. Turner, National Transportation Safety Board, Chairman
Lloyd C. LaGrange, National Transportation Safety Board, Member
John Ferguson, National Transportation Safety Board, Member
Noel E. Keane, Professional Air Traffic Association, Member
Roger R. Rothermel, Federal Aviation Administration, Member
Frank M. McDermott, Frank M. McDermott, Ltd., Member

C. SUMMARY

The FAA-recorded communications contained background sounds which were identified as coming from speakers attached in such a manner that they acted as microphones connected to the tape recorder inputs through a 50 db pad. The voices were buried in and slightly louder than the ambient noise and normal tape machine noise. The transcript of background conversation was made individually and collectively by the group members. Although the details of what was being said varied among individuals, the gist of what was being said was consistent.

D. DETAILS OF THE INVESTIGATION

An investigator listening to a copy of Final One (F-1) position recording heard background conversation just above the noise level. Compression as a result of re-recording probably made the signals audible. The speakers were attached to the recorder summing amplifier through a -50 to -60 db pad, which was considered adequate to reduce signal feed-through due to the speaker acting as a microphone. This should normally be adequate to prevent interference; however, the automatic gain control (AGC) in combination with a strong signal from the speaker can result in an audible recording and that is apparently what happened in this case.

D. DETAILS OF THE INVESTIGATION (Cont'd)

Barely audible signals, both understandable and not understandable can be made out in the background at an estimated 50 db below normal signal levels before compression. The six persons who made up the group to listen to the record found it difficult to decipher enough of the conversation to make sense. In some cases, the suggestion of a word was enough to enable some of the group to hear it and then the suggestion of a different word would make it bearable as well.

Two tapes were taken to the FBI radio engineering Labs where some of the correlated noise was removed in a re-recording. This attempt to enhance the tapes' audibility was enough to change its sound and cause further difficulties with the transcription.

Following the group effort, the audio lab engineer listened while varying filters and repeating passages a number of times. This resulted in a more complete, understandable transcript. However, attempts to confirm what was heard were frustrating, in that the power of suggestion frequently enabled others to hear an utterance which later proved to be different.

The master tape was recorded on a 20-channel Magnasync/Moviola recorder and was played back on the same type machine. Recordings were made with the Magnasync amplifier driving a Bogen amplifier into an Ampex recorder. Other copies were made directly from the tape head into a battery-operated preamplifier and then into a professional Crown amplifier/preamplifier and recorder to see if electronic noise could be eliminated.

The clearest recording was made feeding the Magnasync output into an amplifier and then into the Ampex recording system. A Voiceprint machine was used to repeat sections of the tape and a Lexicon variable speed, variable pitch machine was used to vary the speed and pitch. Signal conditioning other than simple/high low filtering to restrict the signal to the barest audio range tended to distort the already weak signal and increase the difficulty in transcribing the tape.

All 20 channels from each of two recorders were listened to and six were filtered and copied at the FBI lab. The tapes were listened to from the time N57V went to tower and departed 2,100 feet at approximately 1707:54, until 1713:00.

The tapes from the FBI lab were examined and only two were found to contain usable data. Only F-1 contained information relative enough to the accident to be studied.

APPENDIX H

Specialist's ATC Report

D. DETAILS OF THE INVESTIGATION (Cont'd)

Local north, (which becomes) clearance delivery (in a south operation is located in the tower cab and) contained the following at approximately 1711:50.

We don't know

* * *

Looks like the # # is down at Memorial Bridge

* * *

Don't say **anything**. Don't say too much on that thing (Vic)

1712:00 Thank you (John)

Gotta climb him

Climb him

Climb Delta man

Is the pilot • • *

This is followed by nonpertinent procedural type conversation relative to existing traffic. Delta 325's approach was broken off and he was directed out of the landing pattern with minimal explanation.

The attached transcript, which contains transmissions and intercommunications and background utterances was derived from two tape recordings--the local control channel and the F-1 channel. The transcript begins shortly after the aircraft was handed off to local control and just after it departed 2,100 feet. Background conversation occurring immediately prior to this time appears totally unrelated to 57-Victor and concerns differentiating between two items by the use of blue lights and clearing a runway for a possible change of landing direction.

The first entry at 1708:50 is unintelligible. The first clear comment which apparently concerns 57-Victor is at 1709:02, "I wonder if he's ever gonna pick up that radial." This and all subsequent conversation was discussed with the controllers involved who remembered no specifics. However, they did explain that some bits of post-accident conversation following the discussion of the aircraft altitude could have been related to the police helicopter, the marking of the scope where the target disappeared, and the recording of the scope control settings at the time of changeover to another controller.

Specialist's ATC Report

APPENDIX H

D. DETAILS OF THE INVESTIGATION (Cont'd)

At 1710:46, when the F-1 controller called Tony, his supervisor, to inform him of the possible accident, the position became the center of attention as the watch supervisor went to the position. Several different voices were evidently being recorded. However, the low level of the recording precluded positive speaker identification.


Paul C. Turner
Aerospace Engineer

Attachment

APPENDIX H

TRANSCRIPTION OF VOICES HEARD IN THE BACKGROUND OF THE
WASHINGTON TOWER IFR ROOM RECORDING OF TRANSMISSIONS CONCERNING
N5TV, A BEECH 90, WHICH CRASHED ON APPROACH TO WASHINGTON
NATIONAL AIRPORT ON JANUARY 25, 1975, AT 1710 GMT

LEGEND

F-2	Final East Controller
F-1	Final West Controller Position
LC	Local Control
DR-1	Departure West Controller Position
DR-2	Departure East Controller Position
FAC	Final West Controller
HNA	Henson Air Taxi Flight 24
AL 919	Allegheny Flight 919
PI 921	Piedmont Flight 921
EA 1450	Eastern Airlines Flight 1450
N5TV	Beech 90 KingAire
AA 275	American Airlines Flight 275
DEL 325	Delta Flight 325
TW 427	Trans World Airline Flight 427
NA 468	National Airlines Flight 460
UNK	Unknown
*	Unintelligible word
#	Nonpertinent word
%	Break in continuity
()	Questionable text
(())	Editorial insertion

TRANSMISSIONS AND INTERCOM COMMUNICATIONSBACKGROUND UTTERANCES
(F-1 Position Recording)

<u>TIME k</u> <u>SOURCE</u>	<u>CONTENT</u>
1708:09 LC	Henson number twenty-four, taxi into position and hold traffic landing runway one eight
1708:12 HNA 24	Twenty-four
1708:24 UNK	Seven five sierra
1708:30 LC	Allegheny eight nineteen tax contact departure control
1708:34 AL 819	'ger so long
1708:35 LC	See ya
1708:36 DR-1	All right ((garbled)) --- J L (overriding DR-1 position)
1708:39 LC	Piedmont nine twenty-one
1708:41 DR-1	Roger --- Piedmont nine oh seven, turn left heading
1708:55 LC	Piedmont nine twenty-one proceed southbound and contact departure control

TIME &
SOURCECONTENT

(See text of report)

1708:50
(?)

Did they •

TRANSMISSION AND INTERCOM COMMUNICATIONS

<u>TIME & SOURCE</u>	<u>CONTENT</u>
1708:55 LC	Piedmont nine twenty-one, proceed southbound and contact departure control
1708:59 PI 921	Good day you all
1709:00 LC	Good night
1709:06 LC	Eastern fourteen fifty taxi into position and hold traffic will depart runway one five first
1709:12 EA 1450	Position and hold Eastern fourteen fifty
1709:13 LC	Henson twenty-four after departure maintain runway heading cleared for takeoff
1709:16 HNA	Twenty-four is rolling
1709:20 LC	Henson twenty-four runway heading of one five
1709:23 DR-1	All right Piedmont nine twenty-one is off to huh

BACKGROUND UTTERANCES

<u>TIME & SOURCE</u>	<u>CONTENT</u>
1709:02 (?)	Wonder if he's ever gonna pick up that radial
1709:08 (?)	I know there's some towers down there (shouldn't be any problem)

TRANSMISSIONS AND INTERCOM COMMUNICATIONSTIME &
SOURCECONTENT

1709:26

LC

Yeah, I Just gave ~~that~~ one, didn't
you get it?

1709:28

DR-1

Ahead or behind Allegheny

1709:30

LC

Behind of course

1709:31

DR-1

Thank you

1709:35

LC

Piedmont nine ten, ~~turn~~ right and ~~taxi~~
clear con-act ground control point seven

1709:39

PI 910

Okay

1709:47

LC

November five seven victor locks slightly
left of course

1709:51

N57V

Okay we'll check

1709:53

LC

Henson twenty-four contact departure control

((Impact estimated between 1709:52 and
1709:55))

BACKGROUND UTTERANCESTIME &
SOURCECONTENT

1709:32

(?)

That ~~guy~~ shouldn't be ~~that~~ low up
there should he?

1709:39

(?)

• • a thousand feet up there is
(that ~~what~~ it is?)

(Now on track)

* *

1709:53

(?)

(I think so • •)

(A thousand foot too low?)

61 -

APPENDIX X

TRANSMISSIONS AND INTERCOM COMMUNICATIONS

<u>TIME & SOURCE</u>	<u>CONTENT</u>
1709:56 HNA 24	Twenty-four so long
1709:57 IC	Good day
1710:00 F-1	Yeah
1710:05 IC	November five seven victor I show you ah left of course, does that check?
1710:12 IC	November five seven victor ah tower
1710:15 IC	Henson twenty-four contact departure
1710:18 IC	Eastern fourteen fifty cleared for takeoff
1710:21 EA 1450	Fourteen fifty rolling
1710:23 LC	American two seventy-five taxi into position and hold

BACKGROUND UTTERANCES

<u>TIME & SOURCE</u>	<u>CONTENT</u>
1709:59	(This is) a thousand feet high man ((This statement made by the arrival one controller, and according to him was in reference to some antennas which are marked on the scope and were missed by 5TV))
1710:09 (?)	He's supposed to be at twenty-one hundred passing the ah (seven) pile DME
1710:20 (?)	(I think so)

TRANSMISSIONS AND INTERCOM COMMUNICATIONS

<u>TIME & SOURCE</u>	<u>CONTENT</u>
1710:25 AA 275	American two seventy-five, position and hold
1710:28 LC	November five seven victor if you read, ident over
1710:34 LC	I don't get the five seven vic any more he called me once though
1710:38 UNK	Uh oh
1710:40 F-1	Five seven victor Washington tower
1710:45 LC	November five seven victor Washington
1710:54 DL 325	Wash tower Delta three twenty-five
1710:59 LC	Delta three twenty-five Washington tower roger

BACKGROUND UTTERANCES

<u>TIME & SOURCE</u>	<u>CONTENT</u>
1710:26 (?)	(They) sure as # should(n't) be. A thousand feet (going in by the antenna)
1710:45 (?)	He's gone baby
1710:46 FWC	Hey Tony five seven victor was on my scope, he was very low (pretty near the radial) left of course. The tower's not talking to him any more (I'm not talking to him any more) he went into coast
1710:59 ((End of words))	And disappeared off the scope

TRANSMISSIONS AND INTERCOM COMMUNICATIONSTIME &
SOURCECONTENT

1711:02

LC

American two aeventy-five cleared for
takeoff

1711:05

AA 275

. American two aeventy-five is rolling

1711:10

F-1

Are you talking to five aeven victor?

1711:11

LC

Negative

1711:13

TW 427

TWA four two seven ready in sequence

1711:15

LC

Roger hold short

1711:18

LC

Eastern fourteen fifty

1711:20

DR-2

J T

1711:23

LC

Eastern fourteen fifty contact departure
controlBACKGROUND UTTERANCESTIME &
SOURCECONTENT

1711:06

FWC

No sir

1711:09

(?)

(They called him)

1711:11

(?)

(* • that frequency)

1711:14

(?)

They're not talking to him

1711:18

FWC

I think he pranged it
(I believe it)

1711:20

FWC

He went into coast three times and
disappeared

1711:22

(?)

(I really) think he (busted it)
(or)
(i'm worried)

APPENDIX H

TRANSMISSIONS AND INTERCOM COMMUNICATIONS

<u>TIME & SOURCE</u>	<u>CONTENT</u>
1711:25 FA 1450	Roger
1711:26 F-2	Ask Delta if he sees anything up there
1711:28 IC	Okay
1711:29 LC	Delta three twenty-five ah ... what are your flight conditions (override unknown source: "we anticipate")
1711:34 DL 325	We're in the soup six "" at fifteen hundred feet
1711:35 LC	All right thank you
1711:40 NA 468	Four sixty eight's ready
1711:41 LC	Thank you hold short
1711:44 LC	November five seven victor this is Washington tower if you read ah you're cleared to land over

BACKGROUND UTTERANCES

<u>TIME & SOURCE</u>	<u>CONTENT</u>
1711:27 FWC	• * King Aire
1711:47 (?)	(He's a police man)

TRANSMISSIONS AND INTERCOM COMMUNICATIONSTIME &
SOURCECONTENT

1711:51
F-1 Do you have five seven victor yet?

1711:53
LC Negative

1711:59
LC (Overriding DP-1 position) "Twenty-five
direct Brooke contact center on fre--
uh correction, it's Eastern one seventy
seven direct Brooke contact (override source
unknown: 'radar contact') center one two
three point nine"

1712:07
LC American two seventy-five

1712:08
DR-1 Direct Brooke we'll see ya

1712:09
DR-1 Okay

1712:11
LC All right wait, wait a minute will ya
one person

1712:13
LC American two seventy-five contact
departure control

1712:16
AA 275 So long

BACKGROUND UTTERANCESTIME &
SOURCECONTENT

1711:54
(?)

They don't have him, he's not there,
he's (disappeared) ((or)) (gone clear)
off the scope

*
Nothing
(That's it)

He's gone

(You don't do it with your finger)

#

(?)

Yes

APPENDIX H

TRANSMISSIONS AND INTERCOM COMMUNICATIONS

TIME &
SOURCE

CONTENT

1712:17
F-2 Ask Delta ~~what~~ his flight conditions are now

1712:18
LC Delta three twenty-five are **you** still in the soup

1712:20
DL 325 Yes sir at thirteen hundred

1712:23
LC Okay sir ah climb and maintain three thousand Delta three twenty-five present heading

1712:28
DL 325 Okay

1712:30
F-2 Still in the soup with ~~that~~ guy I

1712:31
LC I'm going to pull Delta off and ah give him to departure

1712:35
F-2 All right turn him right to two forty right now

((Garbled))

1712:36
LC Two forty

BACKGROUND UTTERANCES

TIME &
SOURCE

CONTENT

(Who picked this **t.ace** here)

(He picked it out)

(You mark it • • •)

1712:24
FWC He was very low and I saw him • • • •
he was extremely low

(What time you say • • •)

*
(Where do I set my • • •)
*

*

A
P
E
N
D
I
X
H

TRANSMISSIONS AND INTERCOM COMMUNICATIONS

<u>TIME & SOURCE</u>	<u>CONTENT</u>
1712:37 F-2	Yeah two forty and climb to three thousand
1712:39 LC	All right caning to you
1712:41 LC	Delta three twenty-five climb and maintain ah three thousand and ah turn right heading two four zero
1712:47 DL 325	Two four rem heading three thousand
1712:49 LC	All right there's ah aircraft ahead of you ve can't seem to find that's the reason for this
F-2	I'm taking Eastern off to ah I don't know what's goin on
1713:06 LC	Okay
1713:10 LC	Delta three twenty-five go to frequency one one eight point three one one eight three
1713:14 DL 325	Eighteen three
1713:27 UNK	Do you say you got one out there lost

BACKGROUND UTTERANCES

<u>TIME & SOURCE</u>	<u>CONTENT</u>
1712:40 (?)	* *

APPENDIX H

TRANSMISSIONS AND INTERCOM COMMUNICATIONSTIME &
SOURCECONTENT

1713:30

LC

Ah we can't see him we lost him on the
radar we're still looking

1714:32

LC

He is down

BACKGROUND UTTERANCESTIME &
SOURCECONTENT

1713:29

(?)

Ask him if they ever talked to him
((followed by several short undecipherable
phrases))NTSB
AAR
76-4
c.1
1/28/76
Wolfe Industries,
Beech 65-A90