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NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

SYSTEMS GROUP CHAIRMAN'S FACTUAL REPORT

by

John DeLisi

NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Aviation Engineering Division
Washington, D.C. 20594

August 31, 1994

SYSTEMS GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION

A. ACCIDENT : DCA-94-MA-065

Location	:	Charlotte, NC
Date	:	July 2, 1994
Time	:	1842 Eastern Daylight Time
Airplane	:	USAir flight 1016, McDonnell Douglas DC-9-31, N954VJ

B. SYSTEMS GROUP

Chairman : John W. DeLisi
Aerospace Engineer
National Transportation Safety Board
Washington, D.C.

Member : Don Gardner
Aviation Safety Inspector
Federal Aviation Administration - Flight Standards Service
Charlotte, NC

Member : Terry Kleiser
President/Flight Safety Committee
International Association of Machinists - Lodge No. 2294
Indianapolis, IN

Member : Dave Ordorica
Captain - USAir
Air Line Pilots Association
Boston, MA

Member : Walt Winkler
Manager - Airframe Engineering Systems
USAir Engineering
Pittsburgh, PA

Member : Noel Wiebracht
Hydro-Mechanical Systems Engineer
McDonnell Douglas Corporation
Long Beach, CA

C. Summary

On July 2, 1994, about 1843 eastern daylight time (EDT), a Douglas DC-9-31, N954VJ, owned by USAir, Inc., and operated as USAir flight 1016, collided with trees and a private residence while executing the missed-approach procedure for the instrument landing system (ILS) approach to runway 18R at the Charlotte/Douglas International Airport, Charlotte, North Carolina. The captain and one flight attendant received minor injuries; the first officer, two flight attendants and 18 passengers sustained serious injuries; and 37 passengers received fatal injuries. The airplane was destroyed by impact forces and a post-accident fire. Instrument meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan had been filed. Flight 1016 was being conducted under 14 Code of Federal Regulations (CFR), Part 121, as a domestic, scheduled passenger service flight from Columbia, South Carolina, to Charlotte.

The cockpit voice recording and interviews of the flightcrew revealed no mention of systems anomalies. No mechanical problems were noted during the on-scene investigation. A study performed by Honeywell indicated that the windshear warning system should have activated just prior to the accident, however, according to the CVR recording, it did not. No evidence was obtained from the wreckage to account for this discrepancy.

The systems group met at the accident site and the wreckage recovery hangar on July 3 - 6, 1994. An examination of the weather radar display unit was performed at the Allied-Signal facility in Ft. Lauderdale, Florida, on July 28, 1994, and the wreckage was re-examined in Laurinburg, North Carolina, on August 15, 1994.

D. DETAILS OF THE INVESTIGATION

1. CVR/FDR

The Flight Data Recorder was mounted in the tailcone on a shelf behind the aft pressure bulkhead emergency exit door. The door was blocked by debris so access to the recorder was obtained by cutting an entry hole in the tailcone skin. The recorder, a Fairchild Model F1000, P/N S703-1000-00, S/N 00880, appeared intact and undamaged.

The Cockpit Voice Recorder was mounted in the aft cargo hold. The door to this cargo hold was blocked. Access to the recorder was obtained by climbing through holes in the floor of the separated tailcone section. The recorder, a Fairchild Model A100A, P/N 93-A100-80, S/N 52785, had several small dents on the orange outer case.

2. Cockpit Documentation

The cockpit and left side of the forward cabin separated from the remainder of the airframe and came to rest upright on Wallace-Neal Road. The position of all cockpit switches and gage readings was documented and a complete listing of all observations is included as Appendix A.

Both the captain's and first officer's flight directors were in the off position. The first officer's HSI course setting was 181° and the captain's HSI course setting was 220°. The #1 VOR was set to 115.00MHz and the #2 VOR was set to 111.30 MHz. The automatic pilot Servos Engaged/Disengaged switch was in the Disengaged position. The ignition selector switch was in the OFF position.

While the cockpit floor remained in place, none of the airframe structure below the cockpit, including the Electrical and Equipment compartment, was intact.

3. Flight Control System

3.1 Description

The primary flight control surfaces of the DC-9 consist of the ailerons, rudder, and elevators. Conventional control wheels provide lateral control through cable connections to the aileron control tabs. Deflection of these control tabs creates aerodynamic forces to move the ailerons. The rudder is hydraulically powered; however backup manual control is available through a cable-driven control tab. Elevator control is provided by cable-driven control tabs which create aerodynamic forces to move the surfaces. A geared tab on each elevator assists the control tab by providing additional aerodynamic force.

Each aileron has a trim tab which is cable-connected to the trim knob. Rudder trim is accomplished by deflecting the rudder through hydraulic power via the trim wheel in primary mode, or by deflecting the control tab in manual mode. Longitudinal trim is provided by a movable horizontal stabilizer. The stabilizer is moved by an electric jackscrew actuator that is operated by electrical switches on the control columns, cockpit pedestal, or by cable-connected handles on the pedestal. When trimming is in progress, an audible signal is sounded once for approximately each $1/2^{0}$ of stabilizer movement.

Secondary control surfaces of the DC-9 consist of the flaps, leading-edge slats, and spoilers. Each wing has a single double-slotted flap, and a leading edge slat. The flaps are hydraulically actuated. The flap control handle has positions of UP, 0°, 5°, 15°, 25°, 40°, and 50°. The slat control handle has positions of RETRACT or EXTEND and is normally locked to the flap control handle by a spring-loaded pin so that both handles move together. Moving the flap handle from UP to 0° causes the slat handle to move from RETRACT to EXTEND. The slats remain extended for any further deflection of the flap handle. The slats retract when the flap handle detent release is depressed at the 0° gate and the interconnected handles are moved into the UP/RETRACT position. Each wing has two hydraulically powered spoilers that operate on the ground and in flight.

3.2 Results of Investigation

The control columns remained attached and interconnected in the cockpit. However, all control cables were severed at a point aft of the cockpit where separation from the rest of the fuselage occurred.

The horizontal stabilizer remained attached to the vertical fin. The right outboard portion of the stabilizer and elevator were missing. The right elevator was free-floating and the control tab was moveable and operated smoothly. The left side of the horizontal stabilizer was severely fire-damaged and the elevator was destroyed. According to diagrams in the Maintenance Manual, the horizontal stabilizer trim jackscrew "BG" dimension was 5.75 inches. According to McDonnell Douglas, this measurement corresponded to a trim setting of 3.9° aircraft nose up.

The majority of the rudder was missing and the portion which remained was severely fire-damaged. The rudder was moveable. The right aileron was attached to the right wing and moved freely. The control tab was moveable and the trim tab was locked in place as normal. The left aileron was damaged and torn.

The right wing flap was separated from the wing. The outboard flap actuator remained attached to the wing spar hinge fitting. The inboard actuator was separated from the wing and found along the wreckage path. Both moveable vanes were separated. The inboard flap track was found in the wreckage path attached to a portion of the flap. The track contained three witness marks spaced at distances consistent with the dimensions of the flap track carriage rollers. The marks along the upper edge were 11.19 and 16.38 inches from the aft end. The mark along the bottom edge was 12.5 inches from the aft end. McDonnell Douglas data indicated that a roller in this position corresponds to a flap deflection of approximately 14°.

The left wing flap remained attached; however, several feet of the inboard portion were missing. Both moveable vanes were separated. The inboard flap track was found attached to the missing portion of the inboard flap. The track also contained three witness marks at dimensions consistent with the dimensions of flap track carriage rollers. The marks along the upper edge were 11.75 and 18.0 inches from the aft end. The mark along the bottom edge appeared as a scored area centered at 14.06 inches from the aft end. McDonnell Douglas data indicated that a roller in this position corresponds to a flap deflection of approximately 16°.

The flap and slat control handles were found pinned together in the UP/RETRACT position. When tested by the group, the handles engaged all detents correctly and required normal depression of the flap handle detent release to move into the UP/RETRACT position. When the handle mechanism was visually examined by group members, damage in the form of smeared metal was seen along the forward edge of the 15° detent.

The right wing leading edge slat was separated from the wing. The slat drive mechanism was found in the wreckage. The actuator rods were extended and bent. According to McDonnell Douglas, the actuator rods are extended when the slats are extended. The left wing leading edge slats were separated from the wing with the exception of a small inboard portion which remained attached. The slat drive mechanism remained attached to the wing and the actuator rods were also extended.

All spoiler panels were in the down position.

4. Landing Gear

All three landing gear were separated from the fuselage. The left main was found under the aft fuselage in the carport of the house. Both tires were inflated and the over-center link was in the down and locked position. The right main gear was found near the left wing still attached to its trunion fitting. The inboard tire was missing and the outboard tire remained inflated. The over-center link was pulled from the side brace. The retract actuator and bungee cylinder were both fully extended. The nose gear was found along the wreckage path with one tire pulled from its rim. The retract actuator was separated.

Due to impact damage to the main instrument panel, the landing gear handle appeared to be between the DOWN and UPLATCH positions. When the handle was removed and inspected, the linkage was found to be in the DOWN position.

5. Windshear Warning System

Title 14 CFR Part 121.358 details the requirement for airplanes to be equipped with a low-altitude windshear system. According to this regulation, airplanes manufactured before 1991 are required to be equipped with an approved windshear warning system. The system must provide a warning but is not required to provide flight guidance during a windshear encounter.

To comply with this regulation, USAir installed a Honeywell Standard Windshear System into the accident airplane in 1991. The system was approved by Supplemental Type Certificate SA4817NM, issued December 1, 1989.

The Honeywell Standard Windshear System is designed to provide windshear annunciations to the flightcrew in the event of a potentially hazardous windshear condition. The windshear computer detects windshears in both the longitudinal and vertical axes. The detection algorithm in the windshear computer compares the acceleration of the aircraft relative to the air mass to its inertial acceleration. A windshear is indicated when the difference between the two accelerations exceeds a computed threshold for a computed time limit. The system installed on the DC-9 -30 series is a detection only system. No guidance is provided either through the flight director or autopilot commands to the flightcrew in a windshear encounter.

The computer detects both increasing and decreasing performance windshears. Annunciation of windshear detection is via caution and warning lights mounted on the glareshield in front of each crewmember, and an aural voice warning. Amber caution lights flash if an increasing performance windshear is detected and red warning lights flash if a decreasing performance windshear is detected. In addition, an aural "WINDSHEAR, WINDSHEAR, WINDSHEAR" warning is sounded for a decreasing performance windshear. According to USAir, the windshear aural warning has priority and will silence any Ground Proximity Warning System aural warning in the event both are triggered simultaneously.

The computer also measures temperature change with altitude during descent and performs a lapse rate calculation. This calculation is used to predict the potential for a microburst. The amber windshear caution light will be steadily illuminated if the lapse rate calculation indicates an unstable air mass.

The windshear computer receives the following input parameters from the airplane: angle-of-attack, flap position, engine N1 RPM, ram air temperature, vertical gyro output, and several configuration discretes. The computer also uses data from internal vertical and longitudinal accelerometers in the windshear detection algorithm.

The windshear warning system can be manually tested by pushing the Windshear Fail/Push to Test Switch located on the cockpit forward overhead switch panel. During the first 4 seconds of the test, the amber caution lights flash. During the last 4 seconds, the red warning lights flash and the aural warning sounds "WINDSHEAR" one time.

According to interviews with the crewmembers, neither the amber caution lights nor the red warning lights activated during the accident flight. The Cockpit Voice Recorder transcript confirmed that the aural "WINDSHEAR, WINDSHEAR, WINDSHEAR" warning did not activate.

During the initial on-scene investigation, the only portion of the windshear computer located was a 3" x 1" portion of the outer case. This small portion contained the nameplate identifying the part number as 4068048-901, and serial number as 92030308.

A study was performed by Honeywell using data from the Flight Data Recorder as an input to a ground-based windshear computer software model. The purpose of the study was to analyze the processing of the algorithm to determine if the conditions for windshear detection had been met. The study revealed that the red warning lights and voice warning should have activated just prior to the accident. Complete details of this study will be included in the Performance Group Chairman's Factual Report.

According to Honeywell, fault history is stored in non-volatile memory on the A-1 (Processor/Memory) card in the windshear computer. On August 15, 1994, the Systems Group met at the wreckage storage facility in Laurinburg, North Carolina in an attempt to locate this circuit card.

During this examination, the following components of the windshear computer were found in the wreckage and the dirt excavated from the accident site: the A-4 circuit card, the A-7 Accelerometer card, the primary circuit card (motherboard) with power filter, and the pitot and static input lines. However, the A-1 with non-volatile memory was not located.

The cockpit electrical wiring which remained intact was examined. No discrepancies were seen with the wiring to the circuit breakers, annunciator panel lights, or press-to-test switch.

6. Electrical System

The Auxiliary Power Unit master switch was in the OFF position. The left and right Generator Control Switches were ON and the Constant Speed Drive disconnect switches were in the NORMAL position. The AC BUS Cross-tie switch

was in AUTO and the Emergency Power switch was OFF. The crew reported no electrical system difficulties during the flight.

7. Weather Radar

The airplane was equipped with a Collins WXR-700X Weather Radar System and a Bendix (Allied-Signal) Color Weather Display Unit. No portion of the weather radar system was recovered in the wreckage. USAir maintenance records indicated that a P/N 622-5135-001 Flat Plate Antenna was installed.

The following settings were found on the display unit:

Range:	20nm
Gain:	AUTO
Stabilization:	ON

The position of the mode selector knob and antenna tilt control knob could not be determined due to impact damage. Therefore, an examination of the display unit was performed at the Allied-Signal facility in Ft. Lauderdale, Florida, on July 28, 1994. The mode selector switch was found to be in position 2, which is WEATHER mode. By aligning the bend in the tilt control knob stem to match photographs taken in the cockpit, it was determined that the tilt control knob was found at a position between -2.5° and -5°. The group noted, however, that the tilt control knob has no detents and the stops at -15° and +15° were broken. This allowed the knob to rotate freely through 360°.

8. Bleed Air/Anti-ice/Rain Protection

All air conditioning pack switches were in the NORMAL position and the engine anti-ice switches were OFF. The windshield wiper control was in the FAST position.

9. Caution and Warning Lights

Many of the cockpit caution and warning light bulbs were examined for filament stretching. Among the bulbs examined were the Windshear Caution lights, Windshear Warning lights, Windshear INOP annunciator panel light, Windshear Fail (Push to Test) light, Stall Warning lights, Master Caution lights, and Landing Gear position indicator lights.

None of the filaments showed evidence of stretching.

10. Thrust Reversers

The right engine thrust reverser unlock latch was found in the unlock position. The unlock cable was continuous from the cross shaft cam to the latch; however, the cross shaft cam was damaged and showed evidence of ground contact. The left reverser was stowed.

11. Stall Warning System

According to the CVR transcript, the stall warning system activated. The stall warning system provides prestall warning by causing stick shakers on both control columns to activate at approximately 10% above stall speed. Then at stall speed, the STALL lights on the glareshield illuminates and a pulsating aural warning is sounded. The system consists of two separate channels, each with a separate computer and angle-of-attack transducer. Either channel will cause the warnings to activate.

John DeLisi
Systems Group Chairman
National Transportation Safety Board

8/31/94

Figure 1. General View of the Cockpit.

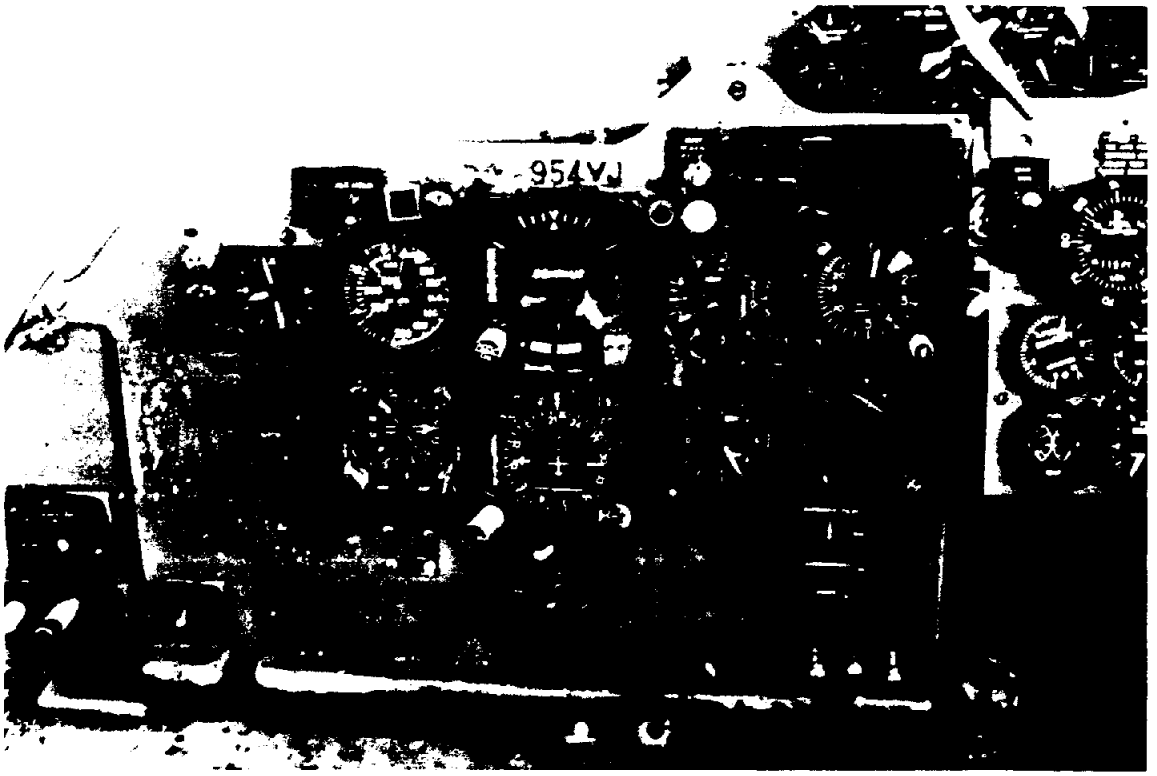

Figure 2. Captain's Main Instrument Panel

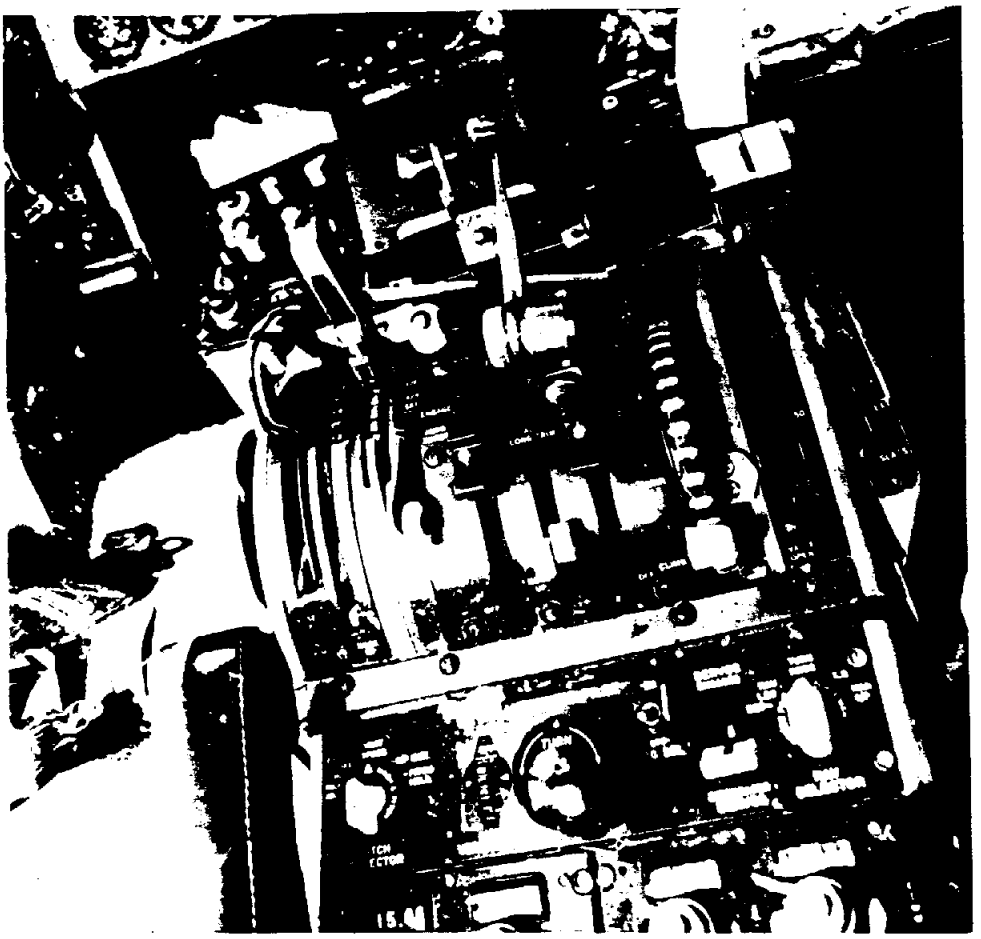

Figure 3. Throttle Quadrant.

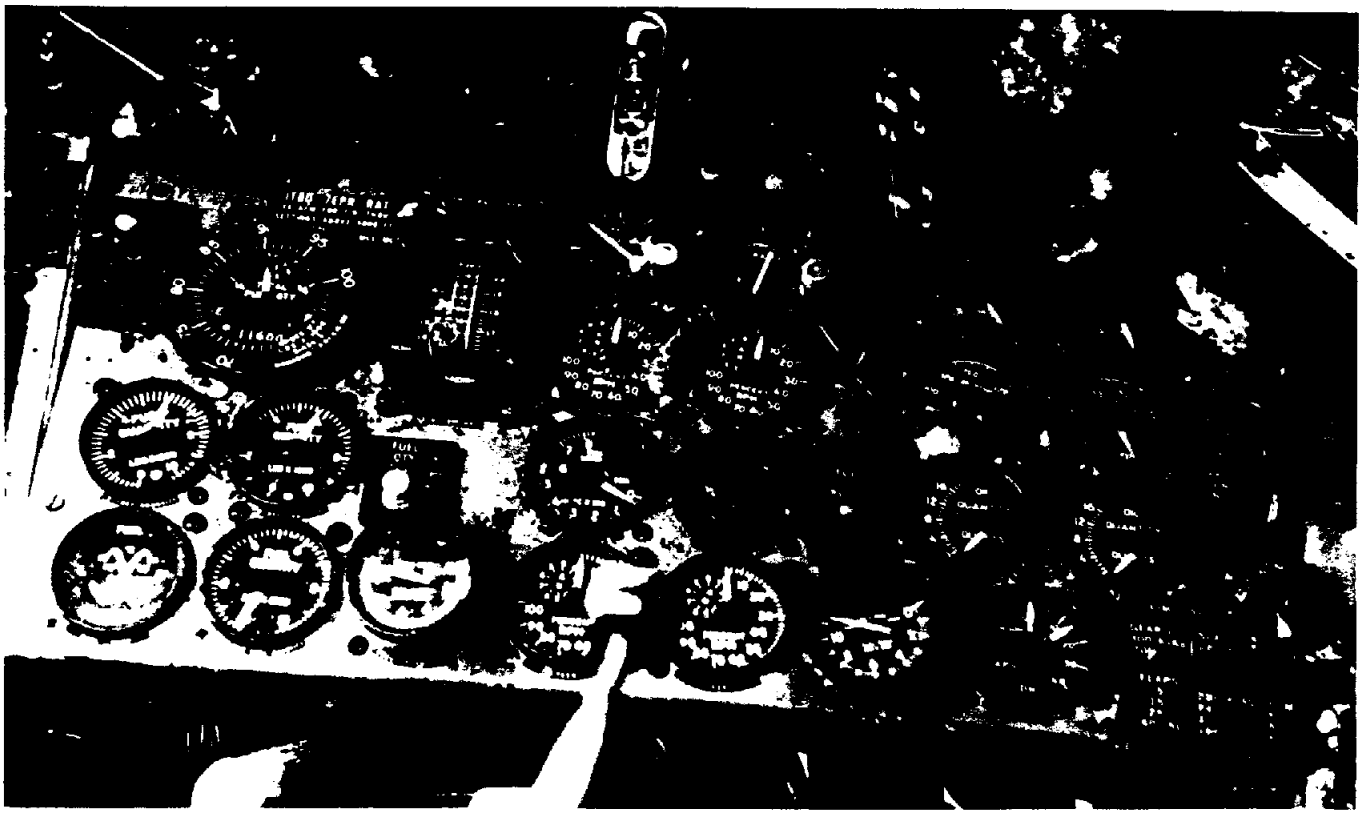

Figure 4. Center Instrument Panel.

Figure 5. Left Side View of Tail Section.

Figure 6. Aft View of Tail Section

Figure 7. Left Main Landing Gear.

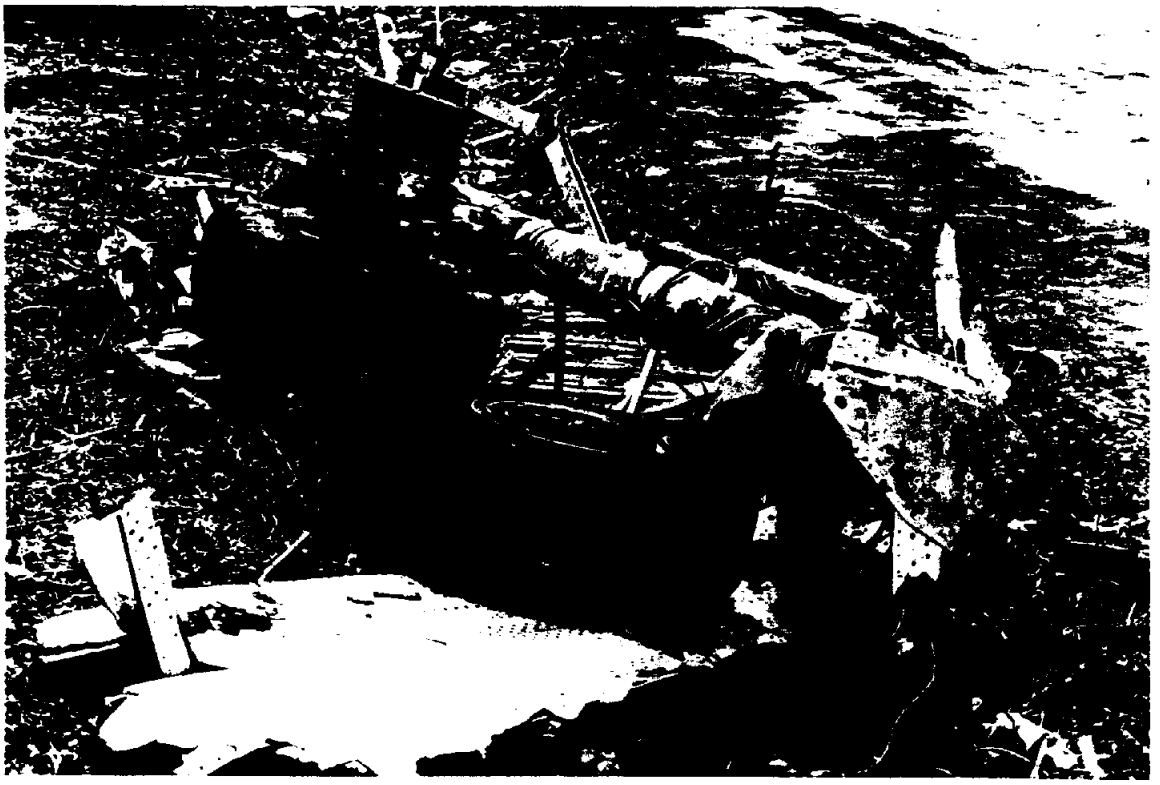

Figure 8. Right Main Landing Gear

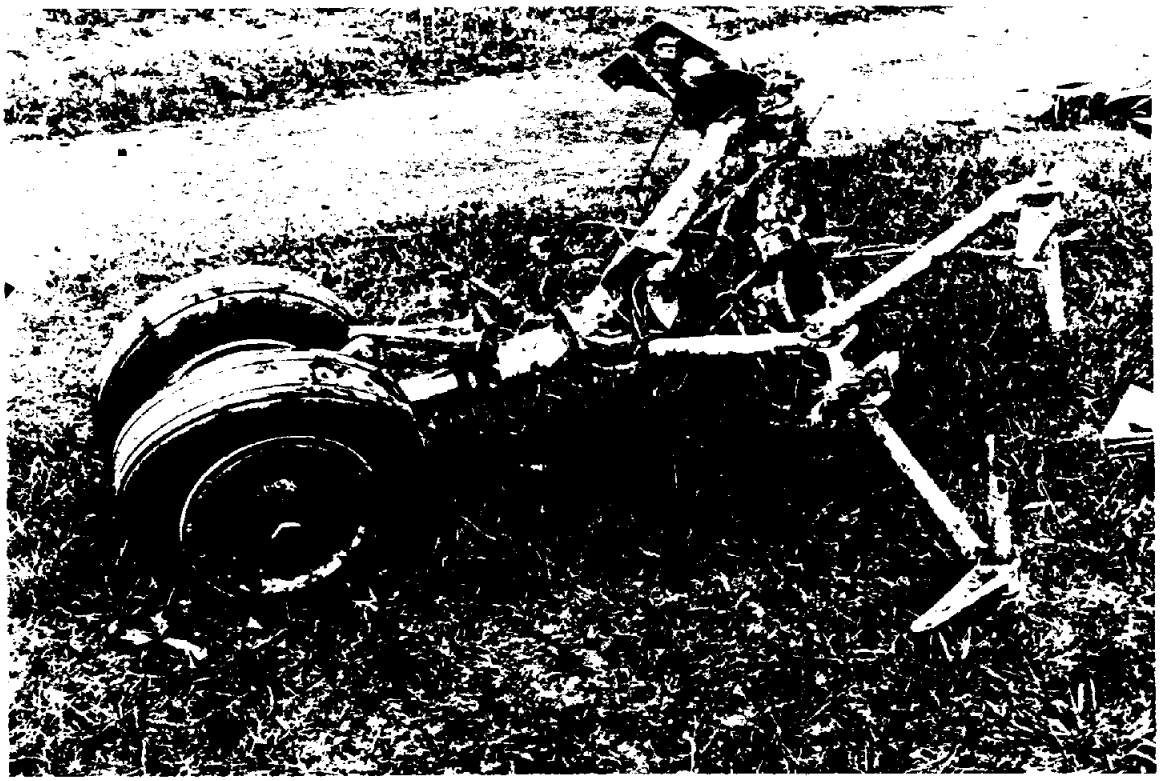

Figure 9. Nose Landing Gear.

Figure 10. Left and Right Slat Actuators
(Note: Rods are extended on both actuators)

Figure 11. Two Views of Left Inboard Flap Track.
(Note: Carriage roller witness marks on upper surface)

Figure 12. Two Views of Right Inboard Flap Track.
(Note: Carriage roller witness marks on upper surface)

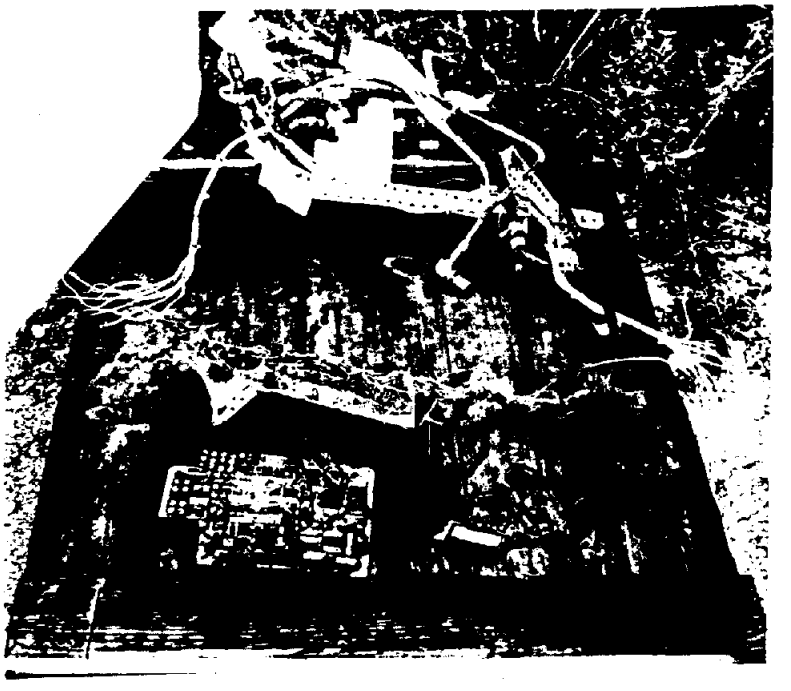

Figure 13. Components of the Windshear Computer Recovered From the Accident Site

APPENDIX A

The following is a list of cockpit indications as found:

OVERHEAD PANEL

CONSTANT SPEED DRIVE DISCONNECT SWITCHES	
LEFT	- NORMAL
RIGHT	- NORMAL
GENERATOR CONTROL SWITCHES	
LEFT	- ON
RIGHT	- ON
APU GENERATOR RESET SWITCH	- NORMAL
APU BUS SWITCHES	
LEFT	- OFF
RIGHT	- OFF
EXTERNAL POWER BUS SWITCHES	
LEFT	- OFF
RIGHT	- OFF
GALLEY POWER SWITCH	- ON
AC BUS X-TIE SWITCH	- AUTO
DC BUS X-TIE	- OPEN
INDICATOR VOLT/FREQ SELECTOR SWITCH	- BATTERY AMPS
AC VOLTMETER	- ZERO
AC FREQUENCY METER	- ZERO
DC VOLT/AMMETER	- ZERO
DC LOADMETERS	
LEFT	- ZERO
RIGHT	- ZERO
EMERGENCY POWER SWITCH	- OFF
BATTERY SWITCH	- ON

APU CONTROL PANEL

FIRE CONTROL SWITCH	- NORMAL
MASTER SWITCH	- OFF
DOORS CONTROL SWITCH	- AUTO
FIRE AGENT SWITCHES	
NO. 1	- OFF
NO. 2	- OFF
APU AIR SWITCH	- OFF

ENGINE CONTROL PANEL

START PUMP SWITCH	- OFF
IGNITION SELECTOR SWITCH	- OFF
FUEL HEAT SWITCHES	
LEFT	- OFF
RIGHT	- OFF
ENGINE START SWITCHES	
LEFT	- OFF
RIGHT	- OFF
PNEUMATIC PRESSURE INDICATOR	- 30 PSI

FUEL TANK CONTROL PANEL

AFT PUMPS	
LEFT	- ON
CENTER	- OFF
RIGHT	- ON
FORWARD PUMPS	
LEFT	- ON
CENTER	- OFF
RIGHT	- ON

CABIN LIGHT PANEL

EMERGENCY LIGHT	- ARMED
SEAT BELT SIGN	- ON
NO SMOKING	- ON

ICE PROTECTION PANEL

METER SELECT & HEAT SWITCH	- CAPTAIN
HEATER CURRENT AMMETER	- ZERO
AIRFOIL ON/OFF SWITCHES	
LEFT	- OFF
RIGHT	- OFF
WINDSHIELD SWITCHES	
ANTI-FOG	- ON
ANTI-ICE	- OFF
ENGINE ANTI-ICE SWITCHES	
LEFT	- OFF
RIGHT	- OFF

MISCELLANEOUS PANELS

WINDSHEAR TEST SWITCH	- INSTALLED
ATTENDANT CALL BUTTON	- INSTALLED
GND PROXIMITY WARNING SWITCH	- GUARD DOWN
ANTI-SKID SWITCH	- ARMED
ANTI-SKID TEST SWITCH	- OFF
STALL TEST SWITCH	- OFF
YAW DAMPER SWITCH	- ON
MACH TRIM COMP SWITCH	- NORMAL
RAM AIR SWITCH	-OFF

AIR CONDITIONING PANEL

DUCT VALVE POSITION INDICATOR	
LEFT	- NO READING
RIGHT	- NO READING
DUCT PRESSURE GAUGE	
LEFT	- NO READING
RIGHT	- NO READING
CABIN TEMP SWITCH	- 11 O'CLOCK
COCKPIT TEMP SWITCH	- 7 O'CLOCK
SUPPLY SWITCHES	
LEFT	- AUTO
RIGHT	- AUTO
CABIN TEMP GAUGE	- NO READING

PRESSURIZATION PANEL

CABIN ALTITUDE	- 700 FT
CABIN DIFF PRESSURE	- NO READING

RAIN PROTECTION PANEL

RAIN REPELLENT RESERVOIR	- PRIMARY
WINDSHIELD WIPER	- FAST

GLARESHIELD AND UPPER INSTRUMENT PANEL

BRAKE SYSTEM SELECTOR HANDLE	- RIGHT
BRAKE HYD PRESSURE GAUGES	
LEFT	- 800 PSI
RIGHT	- NO READING
FIRE SHUTOFF HANDLES	

LEFT	- BENT & DAMAGED
RIGHT	- BENT & DAMAGED

CENTER INSTRUMENT PANEL

ENGINE READINGS

	LEFT ENGINE	RIGHT ENGINE
EPR	- 2.20	- 1.60
EPR BUG SET	- 1.93	- 1.93
N1 RPM	- ZERO	- ZERO
EGT	- 50° C	- NO READING
N2 RPM	- 0	- 0
FUEL FLOW	- 11,000 PPH	- 11,000 PPH
OIL PRESS	- 0	- 0
OIL TEMP	- 0	- 0
OIL QTY	- 0	- 0

FUEL QUANTITIES	
TOTALIZER	- 11,600 LBS
LEFT	- 6,000 LBS
RIGHT	- 5,800 LBS
CENTER	- 0
FUEL TEMPERATURES	
LEFT	- 0
RIGHT	- 0
FLAP POSITION INDICATORS	
LEFT	- 15 DEGREES
RIGHT	- UP
MARKER BEACON SENSITIVITY	- LOW
RAM AIR TEMPERATURE	- NO READING
SELECTOR KNOB	- NORM - 7
LANDING GEAR HANDLE	- BETWEEN DOWN AND UPLATCH

CONTROL PEDESTAL

LIGHT PANEL

INTEGRAL LIGHTS SWITCH	- OFF
RED FILL LIGHTS SWITCH	- OFF
OVERHEAD FLOODLIGHTS	- MID

TRANSPONDER

TRANSPONDER CONTROL SWITCH	- NO. 1
ALT REPORTING SWITCH	- ADC-1
ADF	- ON - 360.0 KHz

WEATHER RADAR DISPLAY

POWER SWITCH	- ON
RANGE	- 20 NM
GAIN	- AUTO
MODE	- NO READING
STABILIZATION	- STABILIZED
TILT	- KNOB MISSING (STEM UN-READABLE)
ATTITUDE ALERT	- SET TO 7,500 FT
BARO-PRESSURE	- 29.98 IN

THROTTLE QUADRANT

LONGITUDINAL TRIM HANDLES	- NORMAL
LONGITUDINAL TRIM INDICATOR	- 13 DEG "ANU"
SPOILER/SPEEDBRAKE LEVER	- ARMED
RUDDER HYD CONTROL LEVER	- MANUAL
FUEL CONTROL LEVERS	
LEFT	- ON
RIGHT	- ON
THROTTLES / REVERSERS	
LEFT	- FULL FORWARD / STOWED
RIGHT	- IDLE / SLIGHTLY UNSTOWED
ALTERNATE LONGITUDINAL TRIM	- HANDLES TOGETHER
FUEL CROSSFEED LEVER	- OFF
FLAP/SLAT HANDLE	- UP/RET

AUTOPILOT

PITCH SELECTOR SWITCH	- VERT SPEED
VERTICAL SPEED CONTROL WHEEL	- 800 FPM (DOWN)
TURN KNOB	- NEUTRAL
HEADING SELECT SWITCH	- OFF
SERVOS ENG/DISENG SWITCH	- DISENGAGED
NAV SELECTOR SWITCH	- TURN KNOB

VHF / VOR RADIOS

#1 VOR	- 115.00 MHz
#1 VHF	- 126.40 MHz
#2VOR	- 111.30 MHz
#2 VHF	- 130.37 MHz

RADIO SELECTOR PANELS

CAPTAIN	F/O
MIC BUTTONS - ALL UP	MIC BUTTONS - ALL UP
#1 VHF - SELECTED	NO VHF SELECTED
#2 VHF - SELECTED	#1 VOR - SELECTED
#3 VHF - SELECTED	#2 VOR - SELECTED
#1 VOR - SELECTED	MKR - SELECTED
#1 DME - SELECTED	
#2 DME - SELECTED	
MKR - SELECTED	
EMERG - SELECTED	

TRIM INDICATORS

RUDDER	- 5 to 6 DEG NOSE RIGHT
AILERON	- FULL LEFT

CAPTAIN'S INSTRUMENT PANEL

AIRSPEED INDICATOR	- 0
AIRSPEED BUG	- 119 KNOTS
ATTITUDE INDICATOR	- 90 DEG PITCH UP
COMMAND BARS	- NOT VISIBLE
FLIGHT DIRECTOR MODE SWITCH	- OFF
RMI	- NO READING
HSI COURSE	- 220 DEG
HSI HEADING BUG	- 170 DEG
DME	- FLAG IN VIEW
ALTIMETER	- 740 FT
BARO SETTING	- 30.00 IN
VERTICAL SPEED INDICATOR	- 3000 FPM (DESCENT)
RADAR ALTIMETER	- 0
RADAR ALTIMETER BUG	- 0
STANDBY ATTITUDE INDICATOR	
BANK	- 30 DEG RIGHT BANK

PITCH	- 90 DEG PITCH DOWN
AUTO PILOT SERVOS	- ALL THREE - ON
AUTO PILOT TRIM INDICATION	- ALL THREE - NEUTRAL
COMPASS/VOR SELECT	- NO READING
STATIC AIR SELECT	- NO READING

FIRST OFFICER'S INSTRUMENT PANEL

AIRSPEED INDICATOR	- 0
AIRSPEED BUG	- 119 KNOTS
ATTITUDE INDICATOR	- COMMAND BARS IN VIEW
HSI COURSE	- 181 DEG
HSI HEADING BUG	- 181 DEG
ALTIMETER	- NO READING
VERTICAL SPEED INDICATOR	- NO READING
TRUE AIRSPEED INDICATOR	- 167 KNOTS
S.A.T.	- 20 DEG

HYDRAULIC SYSTEM

HYD PRESSURE INDICATORS	
LEFT	- 500 PSI
RIGHT	- 1500 PSI
HYD PUMP SWITCHES	
AUX	- OFF
LEFT	- LOW
RIGHT	- HIGH
ALTERNATE	- OFF
HYD QUANTITY	
LEFT	- 11 QTS
RIGHT	- 10 QTS

CIRCUIT BREAKER PANELS

The following circuit breakers were found popped:

AIR DATA COMPUTER - 1 AC
WINDSHEAR AC
FLIGHT DIRECTOR -1 COMPUTER
VERTICAL SPEED INDICATOR -2
GPWS AC
FIRST OFFICER'S HEADING OUTPUT
CAPTAIN'S HEADING OUTPUT
CAPTAIN'S COURSE AND HEADING DISPLAY
SUPPLY AIR H PRESS VLV (R)
GALLEY HTR AND CNTRL