

AIRCRAFT ACCIDENT INVESTIGATION

AUTHORITY: Under the provisions of Air Force Regulation (AFR) 110-14, the Ninth Air Force Commander appointed Lieutenant Colonel Stephen M. Delaney to conduct an Aircraft Accident Investigation of the F-16A (SN 83-1089) accident which occurred 19 nautical miles northwest of Homestead AFB, FL, on 15 January 1991. The investigation was conducted from 4 March 1991 to 13 March 1991. Technical advisors were Major Ben G. Brockman, Jr. (Operations), Captain James B. Ayers (Maintenance), Captain Krista J. Faltin (Legal), Major Victor Salamanca (Flight Surgeon), and Technical Sergeant Trina E. Jenkins (Administrative Support) (Tabs Y-2, Y-3).

PURPOSE: An aircraft investigation is convened under AFR 110-14 to collect and preserve all relevant evidence for possible use in claims, litigation, disciplinary actions, adverse administrative proceedings, or for any other purposes deemed appropriate by competent authority. The investigation is to obtain factual information and is not intended to determine the cause of the accident. In addition, the aircraft accident investigation board cannot draw conclusions nor make recommendations. This report is available for public dissemination under the Freedom of Information Act (5 U.S.C. 552) and AFR 12-30.

SUMMARY OF FACTS

1. History of Flight: On 15 January 1991, Captain Charles Q. Brown was scheduled to lead First Lieutenant Christopher K. Thompson, Captain Benjamin M. Bayless, and Captain Timothy O'Brien on a surface attack mission. Filed under callsign Stud 81 (wingmen Stud 82, 83, 84), the flight departed Homestead AFB, FL at 1404 EST enroute to Avon Park range (K-1, A-1). After overflying the range and determining the weather to be unsuitable for the mission, Stud 81 flight began to return to Homestead AFB. During the return flight Stud 81's aircraft lost its centerline fuel tank and developed a fuselage fire. The fire persisted and grew in intensity until the pilot ejected safely and the aircraft crashed and was destroyed (A-1, V-2, V-5). The crash site was 19 nautical miles northwest of Homestead AFB, coordinates 25 degrees 33.4 minutes north latitude, 80 degrees 42.1 minutes west longitude (A-1). The Homestead AFB Public Affairs office handled news inquiries (Z-2, Z-3).
2. Mission: The mission was scheduled and planned as mission qualification training (MQT) for Lt Thompson and Capt O'Brien (Stud 82, 84) (K-1). The planned profile included single-ship takeoffs for a trail departure, rejoin to elements of two in trail, descent to a short low-level navigation segment, a tactical attack, transition to conventional range events, then return to Homestead AFB for practice approaches and landing (V-2).
3. Briefing and Pre-flight: Capt Brown arrived for duty at 0900. The other members of the flight arrived between approximately 0730 and 0800. All had adequate rest. All members of the flight participated in mission planning prior to the briefing at 1200. Capt Brown paid particular attention to weather conditions for the mission; he planned an alternate mission and got a last minute range weather observation prior to taxi. The briefing was

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comprehensive, and all flight members reported a clear understanding of planned events and their own responsibilities (V-5, V-7, V-9). Ground operations, taxi, and pre-takeoff procedures were conducted without significant events. (V-2, V-16).

4. Flight: Stud 81 flight took off at approximately 1404 EST. They flew the Falcon 1 departure and entered instrument meteorological conditions (IMC) at approximately 10,000 feet. The flight remained in IMC during the enroute cruise portion of the flight, encountering minimal turbulence and no observed thunderstorms (V-2, V-7). The flight descended and achieved visual meteorological conditions (VMC) at approximately 5,000 feet. They performed a 360 degree turn, allowing Stud 82 to rejoin on 81, then proceeded onto the range as elements of two in trail. Stud 81 and 83 agreed that the range weather was insufficient, and the flight departed the range (V-3, V-7). They climbed back to flight level 210-230 for the return to Homestead AFB, still flying as elements in trail. The flight again experienced no significant turbulence or encounters with observed thunderstorms. At 1455 EST Stud 81 saw a generalized flash and heard a "boom". The flash was also observed by Stud 82 and from two miles in trail by Stud 84 (V-3, V-5, V-9). Stud 82 was flying on 81's left side. He observed the centerline fuel tank disappear from Stud 81's aircraft, followed shortly by red fluid streaming from the area of the centerline pylon (V-5). Stud 81 observed a FIRE light in his cockpit but no abnormal engine gauge readings. As the flight descended for emergency recovery at Homestead, Stud 81 then got OVERHEAT indications, followed by loss of System B hydraulic pressure. Stud 82 could now see flames from 81's aircraft (V-3, V-5). As the fire intensified, Stud 81 made the decision to abandon the aircraft over an unpopulated area. He called out his position and ejected at approximately 1458 EST. He landed in marshy ground and was able to use his survival radio to contact Stud 83 (V-4). Stud 83 located his position on the ground and was able to guide a Coast Guard rescue helicopter to his position for pickup.

5. Impact: The aircraft impacted in an unpopulated area of Everglades National Park approximately 19 nautical miles northwest of Homestead AFB. (P-2, P-3). The aircraft was destroyed upon impact. Aircraft heading was approximately 118 degrees. Attitude was approximately 20 degrees nose down and 30 degrees left bank. Wreckage was spread along approximately a 145 degree heading. The engine was operating at approximately 75% RPM at impact (R-4, J-6).

6. Ejection Seat: The ejection seat functioned normally (V-4).

7. Personal and Survival Equipment: All inspections of the mishap pilot's personal and survival equipment were current (U-3). The seat kit did not deploy (V-4). When examined at the crash site the kit AUTO/MANUAL selector switch was found in the MANUAL position (V-13). The red lanyards for the parachute four-line-jettison mod were not extended from the sleeves far enough for the pilot to get his fingers through. Four-line-jettison was not performed. Locator beacon and survival radio functioned normally. Pilot consumed packaged water from the kit (V-4). Other equipment not used.

8. Crash Response: Homestead Tower activated the crash net at 1457 EST. Contact was made with Coast Guard helicopter 6540 at 1458 EST (N-11). Coast Guard 6540 was able to locate Capt Brown, assisted by Stud 83, and make the pickup at 1513 EST (N-11). Capt Brown was then transported to Homestead AFB hospital. Homestead AFB crash/rescue and fire equipment initially attempted to respond to the crash site by road travel but turned back due to site inaccessibility, helicopter pickup of the pilot, and absence of fire. The site was secured at 1730 EST by personnel travelling via helicopter/foot. Colonel Rudd, 31 CSG/CC was the on-scene commander (V-17).

9. Maintenance Documentation: A thorough review of maintenance records for aircraft 83-1089 revealed no discrepancies related to the accident. There were no overdue time compliance technical order (TCTO) or time change items (TCI) on the aircraft or the engine (H-4, H-5). All scheduled inspections were satisfactorily completed with no discrepancies identified (U-2). Oil analysis records were reviewed and no abnormalities were noted (O-3). The equipment review report was reviewed with no overdue inspections noted (U-2).

10. Maintenance Personnel & Supervision: Preflight servicing of the aircraft was reviewed with no discrepancies identified (H-6). Individual training records were reviewed with no discrepancies noted (H-8).

11. Fluid Sample Analysis: A review of the aircraft's oil analysis revealed no abnormalities (O-3). Fuel and oxygen samples were not available, but results of samples from fuel and LOX tank and hydraulic cart were negative (O-4, O-5, O-6).

12. Airframe and Aircraft Systems:

a. Engine: Analysis of recovered components shows engine operating normally at approximately 75% RPM at impact (J-6). Pilot reported normal engine operation and indications prior to ejection (V-3).

b. Fire/Overheat Detection Systems: The FIRE light came on immediately after departure of the centerline (CL) fuel tank. The OVERHEAT light came on some time later (V-3). Analysis of recovered bulbs indicates the OVERHEAT light was off again at impact (J-9).

c. Hydraulic Systems: System B lost pressure some time after departure of the centerline fuel tank (V-3).

d. Flight Control System: Pilot reported no abnormal flight control operation. Analysis of recovered bulbs indicates flight control system (FLCS) caution light was on at impact (J-9). In accordance with T.O. 1F-16A-1, pg. 3-13, failure of hydraulic system B will illuminate this caution light.

e. Arresting Hook: Pilot reported HOOK caution light came on during the incident with the hook switch in the up position. Prior to ejection, the pilot placed the hook switch in the down position (V-3). Analysis of recovered bulbs indicates light was off again at impact (J-9).

f. Fuel System: Pilot reported normal operation prior to separation of the external CL tank (V-4). Separation of the tank was "traumatic" and not caused by firing of the MAU-12 jettison cartridges (V-5, V-15). At least one of the tank suspension lugs was still with the aircraft at impact (Z-6). The centerline tank was never found (V-12). The pilot reported normal fuel quantity readings prior to the incident. Analysis of the recovered fuel quantity indicator showed abnormal readings at impact (J-8).

g. General: Aircraft structures and engine components show evidence of damage from the inflight fire observed by Stud 82 (J-6, Z-7). Aircraft external skin was too badly damaged by impact to allow a thorough examination for possible lightning damage. Aircraft 83-1070 (Stud 82), which was in close proximity at the time of the incident, did show evidence of lightning damage (V-6, V-10, V-14, V-16, Z-4).

13. Operations Personnel and Supervision: The mission was conducted under the authority of the 31 TFW and the 308 TFS (K-1). The briefing was conducted by Captain Brown using the 31 TFW briefing guide and was thorough and complete (V-5, V-7).

14. Pilot Qualifications:

a. Captain Brown was current and fully qualified to conduct the mission (G-2, G-3, G-4). His flying experience follows (G-5, G-6).

<u>AIRCRAFT</u>	<u>HOURS</u>
F-16	823.5
AT-38	32.7

30/60/90/Day Summary

30 Day	4 Sorties/5.4 Hours
60 Day	19 Sorties/26.7 Hours
90 Day	41 Sorties/56.1 Hours

15. Medical: Capt Brown was medically qualified to fly (T-3, X-2). He suffered superficial injuries from the ejection, primarily bruises on shoulders and thighs (X-2). The toxicology report showed no alcohol, carbon monoxide, medications, or illegal substances (X-2, X-3).

16. Navigation Aids and Facilities: All applicable navigation aids were operational.

17. Weather: The Homestead AFB weather for the time period from takeoff until the mishap was 1500' scattered, with a 7000' broken ceiling, 7 miles visibility, and winds from the southeast at 10 knots. Airfield weather reported thunderstorms to the northwest, moving northeast (W-2). This coincided with the National Weather Service radar picture that showed numerous cells rated "very strong" or "intense" moving up a line from Everglades to

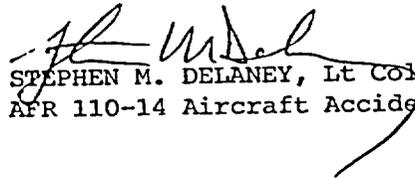
West Palm Beach (W-2). There were numerous cloud-to-ground lightning strikes northwest of Homestead AFB detected by the base weather Lightning Detection System (W-2). Stud 81 flew in essentially continuous light weather at altitude during the enroute, and return portions of the flight (V-2, V-5). Forecast freezing level was 12,300 MSL (W-14). None of the pilots thought they were ever in close proximity to a thunderstorm. A bright flash of light and loud noise occurred at the start of the mishap sequence (V-3, V-5).

18. Directives and Publications:

a. Directives and publications applicable to the mishap were:

- (1) AFR 60-16, General Flight Rules
- (2) TACM 51-50, Tactical Aircrew Training
- (3) TACR 55-116, F-16 Pilot Operational Procedures
- (4) TACR 55-116/HAFB Sup 1, Local Operational Procedures
- (5) TO 1F-16A-1, Flight Manual
- (6) TO 1F-16A-1CL-1, Flight Manual Checklist
- (7) 31 TFW Briefing Guide

b. The investigating board found no evidence of deviations from regulations.


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AFR 110-14 Aircraft Accident Investigation Officer

GLOSSARY

Note: Acronyms, jargon, and terms are explained in the context in which they appear in this report. The application of these definitions is not universal and may be limited to this report.

AB	- Afterburner
ADI	- Attitude Director Indicator
AF	- Air Force
AFB	- Air Force Base
AFISC	- Air Force Inspection Safety Center
AFR	- Air Force Regulation
AFTO	- Air Force Technical Order
AGL	- Above Ground Level
ALC	- Air Logistics Center
ALC/MMET, MMIRIA	- Air Logistics Center/Office Symbols
AMU	- Aircraft Maintenance Unit
AOA	- Angle of Attack: Angular difference between aircraft longitudinal axis of the aircraft and flight path.
Arming Area	- Waiting area next to runway, where aircraft are armed and checked.
ARRS	- Air Rescue and Recovery Squadron
ATC	- Air Traffic Control
ATIS	- Automatic Terminal Information Services: A recorded radio transmission which gives pilots information concerning airfield status and weather. Current information is insured by an alphabetical identification system
BDU	- Bomb, Dummy Unit (BDU)-33: 25lb practice bombs
BROKEN	- A cloud layer covering more than 60% of the sky
BUC	- Back Up Control

CAM - Consolidated Aircraft Maintenance

CART (RIDGE) - Explosive cartridges, electrically fired to jettison stores, drop bombs

CC - Commander

CEILING - A cloud deck broken or overcast

CENC - Convergent Exhaust Nozzle Control

CIVV - Compressor Inlet Variable Vane

DO - Deputy Commander for Operations

DME - Distance Measuring Equipment (slang use: miles from station)

EEC - Electronic Engine Control

EOD - Explosive Ordnance Disposal

ER - Exceptional Release: A signature

EST - Eastern Standard Time

FL - Flight Level: Altitude in hundreds of feet (FL200= 20,000')

FTIT - Fan Turbine Inlet Temperature

GCA - Ground Controlled Approach: A method of recovering aircraft in marginal weather condition in which the pilot is given height and direction information by a controller watching the aircraft progress on radar.

G-SUIT - Pilot's anti-gravity garment

HOOK - Aircraft Arresting Hook

HPT - High Pressure Turbine

IFE - Inflight Emergency

IFR - Instrument Flight Rules

ILS - Instrument Landing System: Designed to provide an approach path for exact alignment and descent of an aircraft on final approach to a runway.

IMC - Instrument Meteorological Conditions (generally, in clouds, fog or precipitation)

INS - Inertial Navigation System

INTEL - Intelligence

JFS - Jet Fuel Starter

KTS - Knots

JOAP (SOAP) - Joint (Spectrometric) Oil Analysis Program

LOX - Liquid Oxygen

LPU - Life Preserver Unit

MAU-12 - Miscellaneous Armanent Unit (MAU)-12: attaches stores to aircraft stations

MDR - Materiel Deficiency Report

MOA - Military Operating Area

MQT - Mission Qualification Training: Ground and flight training given to pilots to qualify them to perform the unit's mission.

MSL - Mean Sea Level

NM - Nautical Mile

NOTAMS - Notice(s) to Airmen: A notice containing information on establishment, condition, or change in an aeronautical facility, service, or procedure that may be a hazard to flight.

OVERCAST - A cloud layer covering the entire sky

PIREP - Pilot Report: A weather report from a pilot.

PSI - Pounds per square inch

RAPCON - The facility containing radar equipment and controllers.

RCVV - Rear Compressor Variable Vanes

RPM - Revolutions Per Minute

SA-ALC - San Antonio - Air Logistics Center (Texas)

SCATTERED - A cloud layer covering less than half the sky.

Atach 1-3

SFO	- Simulated Flame Out
SOF	- Supervisor of Flying: A senior wing pilot positioned in the control tower
SUU-20	- Suspension Unit Utility (SUU)-20: Practice bomb dispenser
TAC	- Tactical Air Command
TACAN	- Tactical Air Navigation
TACM	- Tactical Air Command Manual
TACR	- Tactical Air Command Regulation
TAC SUP	- Tactical Air Command Supplement
TCTO	- Time Compliance Technical Order
TFS	- Tactical Fighter Squadron
TO	- Technical Order - a manual or reference document
UFC	- Unified Fuel Control
VHF	- Very High Frequency Radio
VTR	- Video Tape Recorder

Atach 1-4