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AFR 110 - 14 USAF AIRCRAFT ACCIDENT INVESTIGATION BOARD

14 January 1992
Hill Air Force Base

F-16C AIRCRAFT

S / N 88-0470

388FW

421 FS

INVESTIGATION OFFICER

ROBERT J. LIOTTA, LT COL, USAF

58FW

LUKE AFB AZ

COPY NUMBER 7 OF 11

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS TWELFTH AIR FORCE (TAC)
BERGSTROM AIR FORCE BASE TX 78743-5002

OFFICE OF THE COMMANDER

SUBJECT Aircraft Accident Investigation: F-16C, SN 88-0470, 388 FW (421 FS), 14 Jan 92, Utah Test and Training Range

TO JA

Subject aircraft accident investigation is approved.

THOMAS A. BAKER
Lieutenant General, USAF
Commander

Readiness is our Profession

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CERTIFICATION

I certify that all copies are true and accurate copies of the originals. The original is used in every case where available. The original pilot flight and personnel records are kept at Hill AFB, Utah. The original stereo flight plan is on file with Salt Lake Center (FAA), Salt Lake City, Utah. The flight data recorder information (TAB O) is a fax of information extracted by General Dynamics, Forth Worth, Texas. The aircraft maintenance records and maintenance personnel records (where copies) are copies of originals on file at Hill AFB, Utah. The original of the low level is lost.

ROBERT J. LIOTTA, Lt Col, USAF
Investigating Officer

1. STATEMENT OF AUTHORITY AND PURPOSE:

A. AUTHORITY:

At the direction of the Commander, Headquarters Twelfth Air Force, an AFR 110-14 investigation of a major aircraft accident involving F-16C, SN 88-0470, was conducted at Hill Air Force Base, Utah. 12AF/CC, letter dated 23 January 1992, appointed the investigating officer and 12AF/CC letters, dated 3 February and 10 February 1992, appointed the technical advisors. (TABs Y-1, Y-2, Y-3, Y-4)

Investigating Officer:

Lieutenant Colonel Robert J. Liotta
58TS/DO, Luke AFB, Arizona

Technical Advisors:

Captain Raymond E. Roessler, Maintenance Advisor
34FS, Hill AFB, Utah

Captain Paul D. McIntosh, Operations Advisor
34FS, Hill AFB, Utah

Captain Thomas A. Pascuzzi, Medical Advisor
27 Medical Group, Cannon AFB, New Mexico

B. PURPOSE:

This investigation gathered facts and circumstances surrounding the crash of a United States Air Force F-16C aircraft on 14 January 1992, on Eagle Range, in the State of Utah.

2. SUMMARY OF FACTS:

A. HISTORY OF FLIGHT:

Four F-16C aircraft, callsigns Spider 1 through 4, took off from Hill AFB, Utah, at 1412 Mountain Standard Time (MST) on 14 January 1992. Ten minutes into the flight they started a low level route (TAB AB-3) through Lucin A and B Military Operating Areas (MOA). At 1436 MST, Spider flight entered Eagle Range (within the Utah Test and Training Range) under flight lead control for a first run attack (FRA). With Spiders 3 and 4 six miles behind, Spiders 1 and 2 executed a simultaneous attack on the west tactical target (TAB

AB-1) with Spider 2 flying a 20 degree high pop-up delivery. During the attack, at 1438 MST, Spider 2 successfully ejected just prior to his aircraft impacting the ground two and a half miles west of the intended target.

The pilots were: Spider 1 Capt Lex Brockington
Spider 2 1st Lt Brett Kulkarni (Mishap Pilot)
Spider 3 Capt Steve Ferris
Spider 4 Capt Ronald Graves

No news media were at the site of the accident. Inquiries were handled by the 388th FW Public Affairs Office.

B. MISSION:

The accident occurred on a Basic Surface Attack (BSA) continuation training mission. The mission objectives focused specifically on improving basic bombing skills and flying precise bombing parameters. The mission profile also included Low Level Navigation, Surface Attack Tactics (SAT), and Low Altitude Air to Air Training (LOWAT).

C. BRIEFING AND PREFLIGHT:

Mission planning for this sortie was adequate. One item that is not standard practice was that the minimum release altitude spaces on the attack cards were actually marked with the event foul altitudes. (TAB AB-1) Captain Brockington explained this to the rest of the flight during the mission briefing. (TABs V-6, V-13, AB) Crew rest was adequate for all flight members. (TABs V-13, V-14, K)

Captain Brockington used a combination of the 388th FW standard briefing guide and his own notes to cover all required briefing items. (TABs V-6, V-7, V-13, V-14, AA) The mission objectives emphasized the BSA portion of the mission. He briefed a weather backup plan for the low level route, SAT and BSA portions of the mission. (TAB V-13) All flight members left the briefing with a thorough understanding of how the mission was to be conducted. (TABs V-6, V-7, V-13, V-14)

The pilots delayed engine start ten minutes due to a Supervisor of Flying declared weather hold (for icing conditions). Captain Brockington adjusted taxi and takeoff times to ten minutes later. TAB V-13) During preflight, 1Lt Kulkarni required assistance from

maintenance for his secure voice radio. (TABs V-1, V-14) This problem was corrected before engine start. Prior to taxi, 1Lt Kulkarni consulted an engine specialist about an intermittent engine inlet icing caution light. (TABs V-1, V-14) Since no ice buildup was visual, he continued the launch, which is a normal local procedure. Spider flight departed Hill AFB on a local stereo flight plan to the Lucin MOA and the Utah Test and Training Range 11 minutes later than originally scheduled. (TAB A)

D. FLIGHT:

Takeoff through descent to the low level route occurred without incident. (TAB V-13) Enroute to steerpoint 3 at approximately 1425 MST Spider 1 decided the ceiling was getting too low to continue northwest into the mountains. (TABs AB-3, V-13) He used an air to air threat reaction to turn the flight back toward lower terrain. During the threat reaction Spider 2 lost sight of the flight and it took Spider 1 approximately one and a half minutes to get the flight back together. (TAB V-6, V-7, V-13) Spider flight reintercepted the route at steerpoint 5 at approximately 1431 MST and flew the remainder of the depicted ground track. (TAB AB-3) Due to the low ceiling, Spider 1 told the flight they would be executing the backup low altitude SAT attack on Eagle Range. (TAB V-13)

At approximately 1432 MST another 388th fighter jet, Cosmic 1, came up on Spider flight's interflight frequency. He told Spider 1 that he had just finished flying "20 degree pop-up deliveries" on Eagle Range. (TABs V-9, V-13) With that information, Spider 1 directed his flight to switch back to the original attack which included a 20 degree high pop-up delivery for Spider 2 and Spider 4. (TAB V-13) The 388th FW inflight guide lists parameters for two different types of 20 degree pop-up deliveries. (TAB AA) The delivery Cosmic 1 executed required a ceiling of 5,200 feet above ground level (AGL) and the delivery Spider 1 had planned required a ceiling of 6,400 feet AGL. Cosmic flight had been popping up four miles southwest of the target where the ceiling was at 5,300 AGL and Spider flight would be popping four miles northwest of the target where the ceiling was closer to 4,000 feet AGL. (TAB V-11, V-14) Spider 1 did not realize that his attack was different than Cosmic's or that the ceiling would be 1,300 feet lower on the part of the range he would be working. (TAB V-13)

Spider flight checked in with Eagle Range at 1434 MST, 45 seconds prior to starting their Initial Point (IP) to target run.

Fifteen radio transmissions were made during the next 63 seconds as well as a 40 degree check turn to line up with the target. Ceiling information was not received from Eagle Range and a climb to check the ceiling was not accomplished. (TABs V-13, N, VTR) The time from IP to action at the planned ingress speed at 540 knots calibrated airspeed (KCAS) was one minute, 17 seconds. During this time no radio transmissions were made.

The IP to target run for Spider 2 was flawless up to the pop point. (TABs O, V-13, VTR) During the 30 degree climb to his roll-in altitude of 5,000 feet AGL, he unexpectedly entered the weather at approximately 3,800 feet AGL. (TABs O, V-14) He then rolled inverted (to the right) and pulled 4.5 to 6 Gs until he popped out underneath the clouds. (TAB V-14) His aircraft was now 70 degree nose low inverted at 380 KCAS and 3,800 feet AGL. (TAB O) Once clear of clouds, he did a 6 G loaded (left) roll to the nearest horizon. He held a wings level maximum G (limiter) pullout until he was 30 degree nose low in full afterburner at 400 KCAS and 900 feet AGL. (TABs O, V-14) At this point, he ejected from the aircraft. The ejection occurred at 14:36:58 MST. (TABs, N, O) At the point of ejection, the aircraft was lower than the altitude required for a limiter pull dive recovery. (T.O. 1F-16CG-1)

E. IMPACT:

After ejection, the aircraft accelerated in a nose low dive and impacted the ground two seconds later at 1437 MST. At impact the aircraft parameters were 2 Gs, .85 Mach, 535 KTAS, 4.6 degrees AOA, 27 degree nose low, 3 degree left wing down, 104.5 percent RPM, 850 degree FTIT, 55,100 PPH fuel flow, 48 PSI oil pressure, and 6,400 lbs total fuel on board. (TABs J, O)

The crash site was five miles west of Eagle Range Tower and 56 miles bearing 251 degrees from Hill AFB, Utah. (TAB A) There was a single hole in the ground with debris thrown in the direction of travel. The aircraft did not skip or slide on the ground. (TABs S, R)

F. EJECTION SEATS:

(1) For aircraft 88-0470, the ejection seat (ACES II) sequence was initiated within the performance envelope of the system. (TAB O, T.O. 1F-16CG-1)

(2) A thorough review of the system indicates egress equipment functioned as designed during the escape episode. (TAB J)

G. PERSONAL & SURVIVAL EQUIPMENT:

(1) Personal and survival equipment inspections were current. (TABs AB 4-8)

(2) Twisting of the parachute suspension lines occurred, and minor damage to panel sixteen (16) was noted. Lieutenant Kulkarni's helmet, visor, mask and right glove were lost during the ejection sequence, but were recovered at the mishap site. (TAB J) No evidence was found of any equipment failures or maintenance discrepancies associated with egress and life support systems. (TAB J)

H. RESCUE:

(1) The mishap occurred at 1438 MST on 14 January 1992. (TAB A-1)

(2) The first acknowledgment of the mishap was made on UHF 351.0 (local channel 8) by the Eagle Range Tower Officer at 1438 MST. (TAB N-1) An Eagle Range response vehicle was notified at 1439 MST by the range officer. (TAB N-2) The range officer notified the supervisor of flying and the 911 Eagle Range emergency line at 1439 MST. (TABs N-2, V-10-3)

(3) Eagle Range Tower reported seeing the response vehicle with a survivor walking towards the truck at 1455 MST. (TAB N-3) Spider 1 reported seeing the rescue individual and the survivor walking back towards the truck at 1459 MST. (TAB N-3) Eagle Range Tower confirmed that the response vehicle had survivor located at 1507 MST. (TAB N-4)

I. CRASH RESPONSE:

(1) The Eagle Range Officer initiated the crash response by notifying the Hill AFB supervisor of flying, and the Eagle Range 911 Emergency line at 1438 MST. (TAB V-10-3) Romeo Control at the Oasis Complex notified

the 2849th Support Squadron, Utah Test and Training Range, Utah, at 1439 MST. (TAB-9) An officer was dispatched to Eagle Tower. Romeo Control contacted Range Fire Department, Range medic and the 2849th SPTS/CC via the 911 emergency line at 1439 MST. (TAB AB-9) Hill AFB Consolidated Command Post was notified at 1439 MST. (TAB AB-9) Range medic, range safety and range fire department personnel departed Oasis Complex for Eagle Tower at 1453 MST. (TAB AB-9)

(2) The flight surgeon's office (FSO) at Hill AFB received notification of the mishap at 1442 MST over the crash net. (TAB AB-10) A call was placed to the 6514th Air Rescue Squadron for helicopter assistance. (TABs V-12-1 and AB-10) Initially, the flight surgeon's office was told an Army helicopter would respond. (TAB V-12-1) The flight surgeon's office was informed that the CH-53s were not available. (TAB AB-10) The FSO was informed that a UH-1 was cleared to fly, and the disaster response group assembled at Building 133 at 1450 MST. (TAB AB-10) Following delays for preflight inspection and refueling, the UH-1 launched from the 6514th at 1540 MST with Dr. Albano aboard. (TAB AB-10)

(3) The Oasis response medical technician arrived at Eagle Range and met the patient at 1513 MST. (TAB AB-9) The 6514th air rescue helicopter landed at Eagle Range at 1619 MST. (TAB AB-9) The UH-1 departed Eagle Range Tower helipad at 1652 MST bound for McKay Dee Hospital Center in Ogden, Utah. (TAB AB-9) At 1731 MST the UH-1 landed at McKay Dee Hospital, and care was transferred to the McKay Dee Emergency Department.

(4) Total time from mishap to arrival at hospital was 2 hours, 53 minutes. The patient received care from a trained medical technician 35 minutes after the mishap occurred. A physician was on the scene 1 hour, 41 minutes after the mishap occurred. Delays were experienced because of the remote location of the mishap and the nonavailability of a mission ready rescue helicopter.

J. MAINTENANCE DOCUMENTATION:

(1) AFTO Form 781s and Core Automated Maintenance System (CAMS) computer records were reviewed. There were no

discrepancies which related to the mishap. (TAB V-14) A1C Greene preflighted the mishap aircraft (MA) at 0030 MST on 14 January 1992, and MSgt Voss signed the Exceptional Release prior to flight. (TAB U-1)

(2) An Automated Records Check (ARC) was compiled shortly after the mishap. The ARC details due dates/times for inspection requirements, Time Compliance Technical Orders (TCTO), and Time Change Items (TCI). There were no overdue inspections, TCTOs, or TCIs on the MA. (TAB U-2) The overdue 90-day pin protrusion check on external wing fuel tank #315 is a documentation error. Tank #315 was not loaded on the MA on the mishap date; it was installed on aircraft 88-0424. (TAB U-7) This TAB's entry for tank #315 indicates an error that has been corrected by pencil. Tank #316 was originally entered in error; tank #316 was installed on aircraft 88-0437 on 14 Jan 92. (TAB U-8) The time change requirement for the Jet Fuel Starter (JFS) listed on the ARC is also a documentation error. The data reflects information on the old JFS, which was changed on 13 January 1992. (TAB U-9)

(3) Review of the Joint Oil Analysis Program (JOAP) documentation for F110-GE-100 engine #509726 did not reveal any adverse trends or problems with excessive tolerances. (TAB U-10) Engine historical documents were in order and current.

(4) Since the last phase inspection in late November 1991, the MA had flown 28 missions, for a total of 40.0 hours prior to the mishap sortie. (TAB U-11) There was one delayed discrepancy at the time of the mishap. The discrepancy was properly entered, and a part had been placed on order. (TAB U-12)

K. MAINTENANCE PERSONNEL & SUPERVISION:

Personnel involved in the servicing and launching of the MA were qualified to perform their assigned duties. (TABs U-13 through U-32) The launch assistant ("B-man"/fireguard) was SrA Cohn. Although he had been trained, and was fully qualified to perform these duties, his training records failed to indicate his certification. (TABs U-31 and V-4) SrA Barnes' Phase II End-of-Runway certification was valid through the end of January

1992; however, since the Individual Training Required Notice was generated on 11 February 1992, the computer flagged the event as overdue. (TABs U-32 and U-33) SSgt Dahl's launch of the MA was evaluated by a Quality Assurance inspector and received an excellent rating. (TAB U-34)

L. ENGINE OIL, FUEL, LIQUID OXYGEN, AND HYDRAULIC FLUID INSPECTION ANALYSIS:

Post mishap samples were taken from servicing equipment last known to service the MA. Samples taken included: fuel from delivery truck 89L-950, operational storage tanks, and fillstands; hydraulic fluid from hydraulic test stand (mule) HS-16 (correct nomenclature); engine oil from servicing cart SC-16; and liquid oxygen from a storage tank and from two servicing carts: LC-01 and LC-09. All samples were within applicable technical order tolerances. Post crash hydraulic samples were taken from the crash site, but proved to be unreliable due to extreme contamination as a result of the impact. (TABs U-35 through U-44)

M. AIRFRAME AND AIRCRAFT SYSTEMS:

Analysis of the recovered attitude director indicator, standby attitude indicator, altimeter, tachometer, vertical velocity indicator, fan turbine inlet temperature indicator, fuel flow indicator, and oil pressure indicator by Oklahoma City Air Logistics Center revealed that these instruments and their related systems were operating normally prior to impact. (TAB J)

N. OPERATIONS PERSONNEL AND SUPERVISION:

The mission was authorized by Lieutenant Colonel James M. Corrigan (421st FS Operations Officer). (TAB K)

The briefing was conducted by Captain Lex Brockington, Spider 1, in accordance with the 388th FW Standard Briefing Guide and Captain Brockington's personal briefing guide. (TABs V-13, AA) All members of Spider flight attended; no others attended the briefing.

O. CREW QUALIFICATIONS:

A review of the flight records indicates the following:

1Lt Kulkarni was an inexperienced wingman with 199 hours in the F-16C/D. His total flying time was 418.5 hours and his primary

instrument time was 14.1 hours. He was declared mission ready 28 August 1991, four months before the mishap. He finished the night portion of his mission qualification training less than a month before the mishap. (TABs T-5, T-7, and 421st Training Folder)

1Lt Kulkarni was current and qualified in accordance with current regulations and directives to fly the mission of 14 January 1992. His last SAT mission was on 30 December 1991, and his last BSA mission was on 21 November 1991. He is a disciplined pilot with no past problems with adherence to flight regulations and training rules. (TABs V-5, V-8, V-9, V-13, 421st Training Folder, RTU Gradebook, Personnel Folder, TABs T-13, T-15)

Captain Brockington was an experienced F-16 pilot with 848 total F-16C/D hours and 1106 total flying hours. He finished his upgrade to four-ship flying lead on 27 November 1991. He was rated as qualified (Q) on all check rides. His gradebooks show no deficiencies or associated trends. Training records show that he was qualified and current for his position in the flight at the time of the accident. (TAB T) He had flown one SAT mission, two BSA missions, and eight total missions in the previous 45 days.

P. MEDICAL:

(1) First Lieutenant Kulkarni was required to wear corrective lenses while performing flying duty. (TAB T) Review of his medical record indicates a refractive error in excess of negative 2.50 dioptors in both eyes. Lieutenant Kulkarni had no waiver for excessive refractive error at the time of the mishap. (TAB T) He was otherwise qualified for flight.

On 13 January 1992, Lt Kulkarni was seen by optometry for a check of his contact lenses. He was given a new prescription for contact lenses and was instructed not to fly with his current contact lenses. (V-14) He was specifically instructed to fly with his glasses. (V-14) His vision was confirmed as 20/20 minus one character in the right eye with a correction of -3.00 sphere, -0.25 cylinder, 175 axis. His left eye was 20/20 with a correction of -2.75 sphere, -0.75 cylinder, 178 axis. A new prescription was written as -3.50 sphere right eye and -3.00 sphere, -0.5 cylinder, 175 axis left eye. Lt Kulkarni did fly with his glasses on the day of the mishap. (TAB V-14)

(2) The Armed Forces Institute of Pathology toxicology report on Lieutenant Kulkarni was positive for lidocaine in the urine by gas chromatography and confirmed by gas chromatography/mass spectometry. The blood contained 0.3 mg/L of lidocaine as quantitated by gas chromatography.

Morphine was detected in the urine by fluorescence polarization immunoassay and confirmed by gas chromatography/mass spectometry. No morphine was detected in the blood at a limit of quantitation of 0.05 mg/L.

No ethanol was detected in blood or urine.

Carboxyhemoglobin saturation in blood was 1%, with 0-3% expected for nonsmokers.

The blood sample was obtained after the patient had received lidocaine during closure of his scalp laceration. (TAB V-12-4) The urine sample was obtained after the patient had been medicated with morphine. (V-12-3)

Review of post accident medical records revealed closed head injury, 2cm laceration to left posterior scalp, minor laceration over bridge of nose, contusions to left knee and right elbow, and cerebral concussion with amnesia. Also noted was an elevated amylase level. Lieutenant Kulkarni was hospitalized for three days at McKay Dee Hospital, Ogden, Utah, for evaluation and was released on 16 January 1992. He continues to express amnesic symptoms and remains on duties not to include flying as of this report.

None of these results appear to relate to the accident.

Q. NAVAIDS AND FACILITIES:

All navigational aids and facilities used by Spider Flight were operating normally. (TABs V-13, J)

R. WEATHER:

At Hill AFB, Utah, the clouds were scattered at 1,500 feet AGL and 3,000 feet AGL with a 4,000 AGL overcast. The visibility was five miles with snow and fog. Icing conditions were present and an Ice Foreign Object Damage (FOD) Alert was in effect. (TAB K)

On the low level route, the visibility was unrestricted underneath a solid overcast. The ceiling was between 8,000 feet MSL and 9,000 feet MSL (target elevation 4,160 AGL). The ceiling was slightly higher in the southern portion than in the northern portion. (TAB K)

On the range the visibility was unrestricted. According to pilot testimony, the ceiling was approximately 3,800 feet AGL five miles north of the target and 5,200 feet AGL five miles south of the target. (TABs V-6, V-7, V-9, V-11, V-13) Prior to stepping to the jets, Spider flight received a telephone range forecast of moderate icing for 7-10,000 feet MSL, intermittent snowshowers, five miles visibility, and 3,000 feet AGL ceiling. (TABs K, V-6, V-7, V-9, V-10, V-11, V-13, V-14) The cloud tops above the range were at 11,000 feet MSL. (TAB V-15)

S. DIRECTIVES AND PUBLICATIONS:

(1) The following publications were applicable to the mission:

AFM 50-46	Weapons Ranges
AFR 60-1	Flight Management
AFR 60-16	General Flight Rules
TACM 3-3, Vol V	Mission Employment Tactics - F-16
TACR 51-50	Flying Training Tactical Fighter
TACR 51-50, Vol 6	F-16 Aircrew Training
TACR 55-79	Aircrew/Weapons Controller F-16 Aircrew Operational Procedures for Air Operations
TACR 55-116	F-16 Aircrew Operational Procedures
TACR 60-2	Aircrew Standardization/Evaluation Procedures
T.O. 1F-16CG-1	Pilot Flight Manual
T.O. 1F-16CG-34-1-1	Non-nuclear Weapons Delivery Manual

(2) TACR 55-79 requires as a minimum that the weather, or cloud base, be no less than 500 feet above the highest point of any pattern flown. The mishap pilot did not have the required weather for the attack he attempted. (TABs V-6, V-7, V-9, V-11, AB-1) The mishap pilot and his flight lead both believed that sufficient cloud clearance would be available when the attack was initiated. (TABs V-6, V-13, V-14)

ROBERT J. LIOTTA, Lt Col, USAF
Investigating Officer