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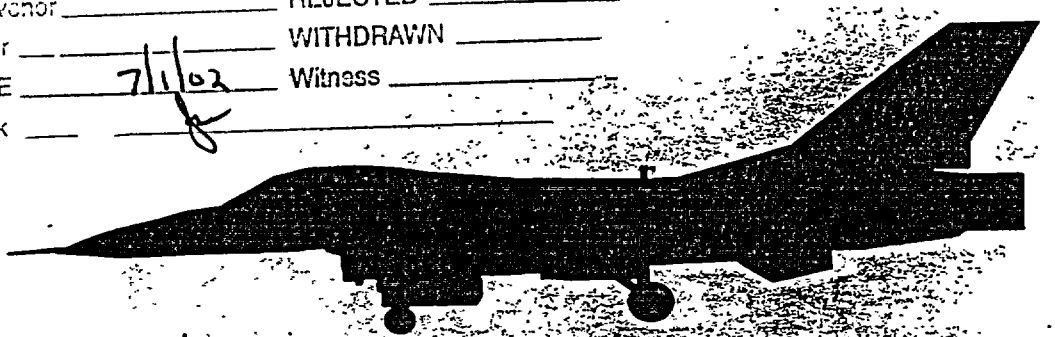
UNITED STATES AIR FORCE AIRCRAFT ACCIDENT INVESTIGATION REPORT

F-16A

80-0486

162ND FIGHTER GROUP, ARIZONA AIR NATIONAL GUARD, TUCSON INTERNATIONAL AIRPORT, ARIZONA



28 February 1994

PFS Exh. 167

LOCATION: NEAR DUNCAN, ARIZONA

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SUMMARY OF FACTS

1. HISTORY OF FLIGHT. On 28 February 1994, Thumper Flight, consisting of three F-16s, was scheduled and briefed for an Air Combat Maneuver (ACM) 2 X training mission for the student, Royal Netherlands Air Force Cadet Julian Beneker, the pilot of the mishap aircraft.(Thumper 2) (Tab A,C,K). Ground operations and departure for the training area were uneventful (Tab V-1-10,V-2-3,4). Thumper Flight departed the AZ ANG Base at Tucson International Airport (TIA) at 1335 local time (L) (Tab K) on a Northeasterly course for Morenci Military Operating Area (MOA) and training area. Upon arrival in the training area Thumper Flight performed the briefed G warm up and awareness exercise, a communications exercise and set up south of the center of the training area for the first engagement (Tab V-1-10,V-2-5,9). The first engagement was terminated early and set up again as the second engagement (Tab V-1-10). During the second engagement Thumper 2 maneuvered his aircraft through a high G vertical turn into a Split S. Thumper 2's aircraft stopped turning pointing straight down, accelerating (Tab V-2-6-9,V-3-5-7). Thumper 3 made two radio calls to "pull it up" (Tab N-1,V-2-9). There was no attempt to pull the aircraft out of its dive and there was no attempt at ejection (Tab V-2-9,V-3-7). At 1357 L, Thumper 2 impacted the side of Flat Top Mountain fatally injuring the pilot and destroying the aircraft (Tab A,C). Thumper 1 and 3 set up a rescue orbit, searched for a survivor and advised their command post and controlling agencies of the crash (Tab N-2,V-26). Thumper 1 and 3 returned to TIA landing uneventfully at 1430 L (Tab K).

The 162nd Fighter Group, AZ ANG, responded to local media inquiries which were heavy. News of the accident appeared on all local Tucson, AZ television stations with limited coverage Phoenix, AZ. The AZ ANG issued three press releases (Tab V-20).

2. MISSION. The mission was Air Combat Maneuvering (ACM) 2X from the Air National Guard Syllabus F16AOOBN, Basic Tactical Training Course for the Royal

Netherlands Air Force, dated October 1993. It's purpose was to practice element ACM employment from offensive positions. This mission was a re-fly of the ACM 2 mission flown on 25 February 1994 in which the student had difficulty maintaining sight of the other aircraft thereby failing to achieve mission objectives (Tab G-17,18). The profile planned and conducted was normal for this type of mission (Tab V-1-3,4,11,V-2-3).

3. BRIEFING AND PREFLIGHT. This was the first flight of the day for all three pilots in Thumper Flight. There was no evidence that any of the pilots experienced crew rest problems (Tab V-1-2,V-3-3). Thumper 1, the Instructor Pilot (IP), and Thumper 2 had briefed and flown this same mission on their last flight which the student had failed primarily for losing sight of the fight (Tab V-1-4). There was extra pressure on the student to do well on this mission, however that situation was fully explained to the student and witnesses state that he had a positive, yet relaxed attitude (Tab V-1-8,9). The mission briefing was tailored for the flight and was adequate (Tab V-1-3,4,9-11,V-2-3,9,N-1). G (Gravity) induced Loss Of Consciousness (GLOC) was briefed as a special Interest Item in accordance with current guidance in the Flight Crew Information File (FCIF) receiving normal emphasis, as no one in this flight had been previously identified as having a problem with GLOC or Anti-G Straining Maneuvers (AGSM) (Tab V-1-10,17-19,V-2-3,4,10,11,V-3-4,7,V-4-2,V-5-1,V-6-1,O-1-23). All student questions were fully answered (Tab V-1-7-10). Mission preparation, sign out, preflight, and ground operations were normal. Both crew chiefs associated with the mishap aircraft and the Life Support Supervisor indicate that the pilot appeared normal and all checks were in accordance with technical orders (Tab V-8-1,V-10-1,V-11-1).

4. FLIGHT ACTIVITY. Takeoff and departure were normal to the Morenci MOA and training area. The G warm-up and awareness exercise was accomplished with no difficulty (Tab V-2-9). A communications exercise was also performed without problem (Tab V-2-5). The flight to this point had no bearing on the accident. The first engagement was terminated early by Thumper 2 when he lost sight of the other members in the flight (Tab V-1-11). The second engagement was set up similar to the first with the flight in a 6000 foot echelon formation heading southerly at approximately 21,000 feet of altitude (Tab V-1-14). Thumper 3 was out in front with Thumper 1 positioned 6000 feet back at Thumper 3's right 5 O'clock in an offensive position, and Thumper 2 at Thumper 1's right 5 O'clock 6000 feet back in an offensive support position (Tab V-1-7,9,12,V-2-5). All three aircraft were flying at approximately 420 knots indicated airspeed (Tab V-1-15). The fight began with Thumper 3 initiating a right 7 G defensive break turn into Thumper 1 and Thumper 2 (Tab V-1-12,V-2-5). Thumper 1 pressed the attack on Thumper 3 while Thumper 2 maneuvered out of plane up and to the right for an entry into the fight (Tab V-1-12,15,V-2-5). As the fight passed low and to the left of Thumper 2 he made a radio call for an entry high to the outside (Tab V-1-12,13,N-1,V-2-5). Thumper 1 cleared him to engage (Tab V-1-13,N-1). At that point both Thumper 1 and Thumper 3 lost sight of Thumper 2 as their turn placed him on their blind side moving towards 6 O'clock (Tab V-1-13,14,V-2-5,V-3-5). As the flight continued to turn, Thumper 2 apparently chose not to make a fight entry at that point and continued to maneuver for a later entry (Tab V-1-13,V-3-5).

As Thumper 3 was completing 360 degrees of a nearly level defensive turn he spotted Thumper 2 still high to the southwest and outside the fight's turn circle (Tab V-2-5,12,V-3-5). Thumper 2 was pulling through North on a reciprocal heading to Thumper 3 with his nose aggressively coming back in for an entry into the fight (Tab V-2-6,V-3-5,6,11). Thumper 3 extended his flight path towards Thumper 2 as he observed Thumper 2 begin a Split S, nose down maneuver towards him (Tab V-2-6,8,V-3-11). Thumper 2 did not complete the Split S maneuver as his aircraft stopped turning pointing straight down, accelerating (Tab V-2-6-8,V-3-3-6).

Thumper 3 continued to monitor Thumper 2 thinking he was going to pull up and fly beneath the fight for an entry across the turn circle (Tab V-2-7). When Thumper 2's aircraft continued straight down approaching the training floor (minimum maneuvering altitude of 14,000 feet), Thumper 3 called on the radio for him to pull up (Tab V-2-7-9,N-1). There was no acknowledgment of this call nor was there any change in the flight path of Thumper 2's aircraft (Tab V-2-9). Thumper 3 made another "pull it up" radio call 4 seconds later. There was no attempt to pull the aircraft out of its dive and there was no observed attempt at ejection (Tab V-2-7,V-3-7).

There was no communication with flight or ground control agencies during the mishap engagement. Navigational Aids and terrain were not factors in this accident.

5. IMPACT. At 1357 L, 28 February 1994, Thumper 2's aircraft impacted a hill side in a nearly vertical dive (Tab V-2-7,V-3-7). The hillside is referred to as Flat Top Mountain, located 5.5 nautical miles Southwest of Duncan, AZ. The impact elevation was approximately 5100 feet (Tab R). Analysis revealed the aircraft flight attitude to be between 3.0 and 3.8 degrees angle of attack (AOA) (Tab J-3). This correlates to less than 1 G flight and/or a very high airspeed condition (Tab V-1-17,V-4-3). Witnesses estimate the airspeed to be supersonic or near supersonic just prior to the impact (Tab V-2-8,V-24-1). Analysis also revealed that the engine was operating in maximum afterburner at impact (Tab J-5). This correlates with testimony from Thumper 3 (Tab V-2-8). There was approximately 5000 pounds of JP-8 fuel aboard the aircraft at impact causing a small area fire in the scrub brush (Tab R).

6. EJECTION SEATS. Their was no evidence of an ejection attempt (Tab V-2-9,V-3-7). Records reviews indicate all inspections and time change items where current on the egress system in this aircraft (Tab V-21). There is no evidence to suggest there was any malfunction of the egress system.

7. PERSONAL AND SURVIVAL EQUIPMENT. No evidence was found of any equipment failure or maintenance discrepancies. Thumper 2's personal equipment was inspected that morning. He had a new anti-G suit fit adjustment 6 flights prior to the mishap flight (Tab V-8-1).

8. RESCUE. Following the crash at 1357 L, Thumper 1 and 3 immediately began coordinating a rescue effort. The initial rescue notification was made by Thumper 3 to the 162 Fighter Group (FG) Command Post at 1400 L (Tab V-26). Neither Thumper 1 or 3 witnessed any attempt at ejection and repeated passes over the impact site revealed no parachute or other indication of an ejection or a survivor (Tab V-2-9,V-3-7). The 71st Rescue Squadron (now the 305th Rescue Squadron), Davis-Monthan AFB, AZ, was alerted by the 162nd FG command post and launched an HH-60 helicopter to the crash site at 1425 L with a flight surgeon and initial recovery party aboard (Tab V-26). The rescue party located the fatality at approximately 1600 L (TabV-27).

9. CRASH RESPONSE. Due to the remote location of the crash the rescue helicopter and a US Customs helicopter which launched from Tucson International Airport at 1555L were the primary crash response. Recovery personnel arriving on the helicopter allowed the residual fire to burn out. The on-scene flight surgeon determined there was no survivor, therefore there was no rescue attempt. A recovery convoy departed for the accident site at 0300 L, 1 Mar 1994 from the 162nd FG Arizona Air National Guard Base. Local law enforcement personnel assisted the convoy in reaching the crash site and in controlling access roads. The crash site was secured by USAF Security Police arriving on the initial helicopters (Tab V-26).

10. MAINTENANCE DOCUMENTATION. A review of all aircraft and engine records was accomplished. There is no evidence of maintenance discrepancies or unaccomplished Time Compliance Technical Orders that relate to the accident. All scheduled inspections and time change requirements of the aircraft, engines and components were current. No discrepancies were found in the oil analysis records. No maintenance procedure, practice or performance appears to be related to this accident as there were no apparent maintenance malfunctions. Unscheduled maintenance had been accomplished on the aircraft and engine, however it consisted of normal and routine maintenance and inspections not related to the accident (Tab V-10-1,V-11-1,V-12-1,V-13-1,V-16-1,V-21-1).

11. MAINTENANCE PERSONNEL AND SUPERVISION. Aircraft preflight and servicing were accomplished by properly certified and experienced personnel. Review of Air Force Forms 623, On The Job Training Records, of all servicing personnel involved with this aircraft revealed they were all adequately trained, qualified and experienced for their assigned tasks. There is no evidence of improper maintenance practices or procedures (Tab V-9-1,V-17-1).

12. ENGINE, FUEL, HYDRAULIC AND OIL INSPECTION ANALYSIS. The engine inspection, fuel, hydraulic and oil test reports were normal. The post crash fire consumed all aircraft fluids making post crash analysis impossible (Tab V-14-1,V-15-1).

13. AIRFRAME AND AIRCRAFT SYSTEMS. All recovered mechanical actuator systems of the flight control surfaces at impact, two augmenter nozzle levers and the air motor portion of the Convergent Exhaust Nozzle Control were analyzed. There were no

apparent abnormalities in the flight control system. Analysis indicates an angle of attack of 3.0 to 3.8 degrees at impact (Tab J-1-3). Analysis of the engine components listed indicates the engine was operating in maximum augmentation (maximum power) at the time of impact (Tab J-4-5). There were no apparent abnormalities in the engine. No other components were recovered from the wreckage limiting post crash analysis to those listed. Anticipate no contact with any component or accessory system manufactures since there are no suspected system failures.

14. OPERATIONS PERSONNEL AND SUPERVISION. The mission was authorized in accordance with AFR 60-16 and the Air National Guard Basic Tactical Training Course for the Royal Netherlands Air Force, ANG Syllabus F16AOOBN. The briefing officer was Major Tim English using the briefing guide in Multi-Command Instruction (MCI) 11-416, 7 Mar 1993, as locally reproduced and expanded mission description guidance from the above syllabus. The briefing was thorough and adequate for the mission (Tab V-1-3,4,9-11,V-2-3,9). Anti-G Straining Maneuvers (AGSM) and G induced Loss Of Consciousness (GLOC) were briefed to the normal level of awareness (Tab V-1-6,8,10,17,19,V-2-10,11,V-3-5,O-1-23). No squadron supervisory personnel attended the briefing.

15. CREW QUALIFICATIONS. The members of the flight included the flight lead, [redacted] an F-16 Instructor Pilot (IP) with 3552.1 flying hours, 1700 in the F-16 with approximately 950 of those as IP. Number 2 was Cadet Beneker with 335.4 hours total time and 57.6 hours in the F-16. Number 3 in the flight was [redacted] with 1150.1 hours total time. 950 in the F-16 and approximately 110 of those as IP. All flight members were current and qualified to perform their assigned aviation duties.

Cadet Beneker had several past training deficiencies. In the conversion phase of training he required two extra Operational Flight Trainers (OFT) to complete his standardization Emergency Procedures Evaluation (EPE). Concern over his progress was discussed with him at that time and so documented by squadron supervision. In the Intercept phase of training he experienced a syllabus deviation which was a supervisory error and fully documented. Cadet Beneker also failed to pass one ride in the Air Combat Maneuvering (ACM) phase of training, the ride just prior to the mishap flight. This failed ride was similarly well documented. He had a meeting with the squadron commander and the Dutch Detachment Commander to discuss that failed ride the morning of the mishap (Tab G,V-4-2).

16. MEDICAL. Cadet Julian Beneker was fatally injured in this accident (Tab X). Review of his medical records revealed that Cadet Beneker was medically qualified to fly this mission. His last physical was on 6 November 1993. He had no medical defects or waivers at that time and no other chronic illnesses, medications or medical waivers were present. The Armed Forces Institute of Pathology was unable to perform post-mortem toxicology studies (Tab X).

The F-16 can impart rapid onset sustained +Gz force sufficient enough to cause GLOC. Centrifuge trained individuals wearing Anti-G suits are susceptible to GLOC if their anti-G straining maneuvers are either slow or incomplete. Cadet Beneker was a tall, thin healthy male with less than 500 hours in fighter aircraft which puts him at some increased risk to GLOC. The elapsed time from his high G vertical turn to enter the fight until the impact (approximately 10 seconds) falls within the 24 second average time of total GLOC incapacitation (Tab V-25-1,2).

17. NAVAIDS AND FACILITIES. Navigational aids and local Notices to Airmen (NOTAMS) were not a factor in this accident.

18. WEATHER. Weather was not a factor to this accident. Forecast weather during the time of this mission for Davis-Monthan AFB (5 miles East of Tucson International Airport) was 8000 feet scattered, 40 miles visibility with gusty Westerly winds and no precipitation. Forecast weather for the training airspace during this same period was 2/10ths alto cumulous from 15000 to 18000 feet and 3/10ths cirrus from 26000 to 29000 feet (Tab O-32,33). Strong winds in the training area were confirmed by witnesses (Tab V-24).

Thumper 1 and 3 indicated that the training area was clear of clouds with good visibility (Tab V-1-7).

19. DIRECTIVES AND PUBLICATIONS. The directives and publications in effect at the time of this accident are listed under Tab V-19.

There are no known or suspected direct violations of regulations or directives in this accident.

All indications are the squadron was conforming to all GLOC and Anti G Straining Maneuver guidance published via regulation, instruction or FCIF current at the time of the accident.

While the squadron/group has good, readily available weight training facilities they do not have a weight training program for increasing pilot G tolerance that the students are required to participate in. Indications are the mishap pilot did not voluntarily spend much time on physical conditioning (Tab V-7-1,V-6-1,V-4-2). This is only an observation and not a violation of any guidance as there is no such program in AETC at this time.

AFR 55-79 AETC Supplement 1, Dated 1 July 1993, Para 5-2H(1)(c) states that the minimum altitude for solo Fighter Training Unit (FTU) student training prior to becoming MR is 10,000 feet above ground level (AGL). Thumper 1 was well aware of this restriction and briefed the mission and training rules floor correctly as 14,000 feet for fighting over the flat lands, however, he allowed the mishap engagement to be flown over an area of higher terrain than he had planned reducing the AGL clearance to approximately 8,600 feet (Tab V-1-16). This was not a willful violation of guidance but

rather a lapse in situational awareness by the flight lead and, due to the nature of this accident, was not a factor.

STATEMENT OF OPINION

Under 10 U.S.C. 2254 (D) any opinion of the accident investigators as to the cause of, or the factors contributing to, the accident set forth in the accident investigation report may not be considered as evidence in any civil or criminal proceeding arising from an aircraft accident, nor may such information be considered an admission of liability by the United States or by any person referred to in those conclusions or statements.

Cadet Beneker, the mishap pilot, was a healthy, alert student making slightly below average progress in F-16 training (Tab V-1-3,V-2-2,3,V-3-2-4,V-4-1,V-6-1). He was well aware of G induced loss of consciousness (GLOC) dangers and prevention and had experienced no known GLOC problems prior to the mishap flight, in fact he had repeatedly demonstrated good G tolerance throughout his training (Tab V-1-6,V-2-11,V-3-3,4,7,8,V-5-1).

On the mishap flight he found himself under pressure to maintain sight of the fight which was a documented and recurring problem for him during the Air Combat Maneuvering phase of training. Due to this conscious effort to maintain sight, I believe Cadet Beneker flew his aircraft more aggressively during the mishap engagement than he had previously, sustaining moderate to high, fatiguing, G forces until he perceived a fight entry. At that point he applied additional G forces turning towards the fight while looking high over his right shoulder. Seeing a potential fight entry he then applied maximum G forces as he rotated his aircraft through the horizon pulling it to a deep nose low attitude (Tab V-2-11,12,V-3-6,11,12).

Although the cause of this accident cannot be precisely determined due to the extent of aircraft destruction, it is justifiable to make the case for pilot incapacitation. Possibilities include cardiac arrhythmia or sudden death, vascular compromise or stroke, or some form of seizure activity. All are unlikely in lieu of Cadet Beneker's excellent health status and qualification to fly the aircraft. After clearance to enter the engagement, Cadet Beneker's aircraft began a high G loaded vertical turn, followed by an accelerating vertical descent into the terrain. No radio communication was heard during the descent despite repeated calls to pull up. No evidence of pilot flight control input was noted.

An aware pilot does not accelerate straight down approaching, or exceeding supersonic airspeeds as this complicates his ensuing dive recovery by requiring additional altitude and time which he may not have. An aware pilot also does not willfully violate the training rules by descending below the floor of the training area. Cadet Beneker uncharacteristically failed to acknowledge radio communications made to him and to make previously normal radio communications to his IP. He also failed to make a radio call to terminate the fight when he approached or exceeded the training rules floor which was also uncharacteristic of his past behavior.

For these reasons and the witness statements in the report I believe that Cadet Beneker experienced G induced Loss Of Consciousness (GLOC) during his vertical turn and that he did not regain consciousness prior to the impact.

Loren J. Schroeder, Colonel, USAF
Investigating Officer

27. May 1994