RAS 5370 72-22-ISFSI — Applicant Exhibit 157 - Rec'd 7/1/02

AFR 110-14 USAF AIRCRAFT ACCIDENT INVESTIGATION BOARD

27 AUGUST 1993
BURLINGTON IAP, VT

F-16A
SN 82-0990

158 FG
134 FS

INVESTIGATING OFFICER

COL ROBERT F. GRAY
NATIONAL GUARD BUREAU (ACC)
1ST AIR FORCE

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PFS Exh. 157 COPY NUMBER 3 OF 12

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SECY-02

NUCLEAR REGULATORY COMMISSION

Docket No. _____ Official Exh. No. 15

In the matter of PFS

Staff	IDENTIFIED ✓
Applicant ✓	RECEIVED
Intervenor	REJECTED
Other	WITHDRAWN
DATE 7/11/02	Witness
Clerk	

SUMMARY OF FACTS

1. History of Flight: On 27 August 1993, [redacted] (MP) was scheduled as flight lead of a two-ship cross country flight from Burlington IAP, VT to Langley AFB, VA. The flight was to include air-to-air refueling followed by Dissimilar Air Combat Tactics (DACT) with F-15 Eagles and landing at the unit's Alert Detachment Base. The flight departed Burlington IAP, VT at 0858L EDT with the callsign of Maple 91. Refueling with a KC-135 Tanker and DACT with F-15's in W-105 was as scheduled. During the recovery to Langley AFB, VA, a descent was accomplished from FL 410 to FL 310. Upon leveling at FL 310 and advancing the throttle the Mishap Pilot (MP) experienced a compressor stall. The MP turned west toward land and accomplished a Unified Fuel Control (UFC) airstart which was successful and gave him idle thrust at 20,000 ft. When the MP again moved the throttle, a second stall occurred passing 17,000 ft. Another UFC airstart was accomplished giving [redacted] idle thrust. The MP concentrated on flying a Simulated Flameout Approach (SFO) into Cape May County Airport, NJ. The SFO was flown with touchdown at 200 KIAS, 500 feet from the approach end of runway 01. The total length of the runway is 4998 feet and the MP was unable to stop the aircraft and initiated a successful ejection prior to the aircraft leaving the paved surface. The aircraft continued straight ahead, proceeded across a road and came to rest in an abandoned landfill approximately 950 feet from the departure end of the runway. The aircraft was destroyed by breakup and post crash fire.

2. Mission: The mission was scheduled and planned as a two-ship cross country from Burlington IAP, VT with recovery at Langley AFB, VA. The planned profile was Mil Power Formation takeoff, inflight refueling, DACT with F-15

Eagles, and recovery via SFO approaches with joinup on downwind for a formation full stop landing.

3. Briefing & Preflight: Both members of the flight reported for duty at approximately 0700 EDT (V-5, V-21). Both reported being well rested. The flight briefing began at 0730, and both pilots reported that the briefing was comprehensive and that they had a clear understanding of the planned events and their responsibilities. Ground operations, taxi and pre-takeoff procedures were conducted without significant events. After start, the crew chief checked the main fuel shutoff valve (MFSOV) and reported to the MP that all six boost pump lights were on (V-34).

4. Flight: Maple 91 flight of two took off at 0858 EDT. The takeoff was a Mil Power Formation. Air-to-air refueling with Pack 44 (KC-135) tanker with an offload of JP-4 of 2500 lbs. was accomplished in W-105. DACT with Flash 01 & 02 two F-15 Eagles included two engagements with the first beyond visual range (BVR) and the second a visual engagement (VID) which was terminated when Maple 92 reached bingo fuel. The weather was good throughout the flight. All engine instruments and performance were normal and included several selections of augmentor (AB) power (V-12). The recovery phase began with a climb to FL 410 and the speed was set by the MP for maximum range. The 19 preset UHF radio frequency changes for the detachment base were first accomplished by Maple 92. Maple 91 was given a descent from FL 410 to FL 310 at pilot's discretion, and [redacted] gave Maple 92 the responsibility of the UHF radio with the Air Traffic Control Center while the MP changed [redacted] frequency. As Maple 91 was leveling at FL 310, the MP pushed the throttle up to mid range and a very loud bang (compressor stall) occurred and the aircraft piched sharply to the right (V-7). The wingman saw smoke briefly from the mishap pilot's aircraft but was unable to relay this as Maple 91 was not on [redacted] frequency (V-23). Maple 91 turned west towards land and performed a UFC airstart which started normally. Total fuel was 3000 lbs and OPS checks had been normal. The MP checked [redacted] engine instruments ans saw normal idle indications. Upon advancing the throttle, [redacted] experienced another compressor stall with a short amount of throttle movement while passing 17,000 feet (V-8). The MP again moved the throttle to off and performed another UFC airstart while trying to improve [redacted] situational awareness of the distance to the nearest suitable airfield. The UFC airstart again was normal, and the MP was reluctant to move the throttle out of idle due to the previous compressor stalls. The MP concentrated on flying a simulated flameout approach (SFO) into Cape May County Airport, NJ which was visible to [redacted] at [redacted] left (11 o'clock) (V-8,0-43,44,45). The JFS had been turned on and then EPU had been activated. Neither was turned off during the approach. The MP asked the wingman to check [redacted] normal landing gear extension and flew the SFO to runway 01 which was 4998 feet long. The wind was calm. The MP touched down 500 feet from the approach end at 200 KIAS (V-9). Maple 92 had been able to communicate on VHF guard with the Cape May Fire Department and had been told that the emergency aircraft was 'Clear to Land'. The MP opened full speed brakes and tried normal wheel brakes but realized the aircraft was not going to stop on the runway. As the end of the runway came up, the MP assumed the ejection position and ejected from the aircraft (V-9).

. Impact: The aircraft exited the runway straight ahead, proceeded across a ıaved road and came to rest in an abandoned landfill approximately 950 feet 'rom the departure end of runway 01. The aircraft was destroyed by breakup ınd post crash fire and was damaged beyond economical repair (A-1).

Ejection Seat: The ejection seat functioned normally. The seat was ɔbserved by the rescue personnel and can be seen in TV video. However, it was ıemoved from the scene by some unauthorized person and has not been available 'or post crash analysis.

Personal and Survival Equipment: All inspections of the mishap pilot's ɔersonal and survival equipment were current (V-39). The seat kit deployed ıormally. Four line jettison was not performed. The ELT transmitted for ıpproximately 15 seconds (V-26), and the survival radio was not used as crash ınd rescue crews were immediately on the scene (V-18).

Crash Response: The firechief and one fireman were standing outside and ɔbserved Maple 91 land, roll to the end of runway 01 and the MP eject. The 'irechief responded with the one primary firefighting vehicle, and the fireman ırove the utility truck. The main F-16 fire was under control within 10 ıinutes. However small brush fires in the abandoned landfill required several ıours to extinguish. An additional airport fireman was cutting grass with a ɔractor and rushed to the aid of the MP within one minute of his parachute .anding (V-40). The pilot was transported to Cape May County Burdett Tomlin Hospital, then to the Coast Guard Station Cap May for x-rays and toxology ɔesting. The hydrazine team arrived on scene at 1400 and at 1445 reported no .eak of hydrazine. Testimony from the on scene military officers applauded ɔhe response and cooperation of the Cape May County Airport firefighters and local rescue squads.

). Maintenance Documentation: A thorough review of maintenance records for ıircraft 82-0990 revealed no open discrepancies related to the accident. A 200 hour phase inspection had been completed on subject aircraft on 08 Aug 93 (U-17). During this inspection, the engine had been removed for a 1000 hour ıydraulic line inspection on the aircraft. On 08 Aug, engine serial # 705089 ıas installed in the mishap aircraft (U 2). Details pertaining to maintenance ɔerformed on the engine during its most recent shop visit are contained in ɔaragraphs a & b below. Subject aircraft flew a successful FCF on 10 Aug 93 ıith no discrepancies noted (U-3&4). This aircraft also flew 7 subsequent flights prior to the mishap flight with no indication of engine or fuel ıelivery problems.

a. A review of subject engine maintenance records revealed that during its most recent shop visit, the unified fuel control had been replaced due to time change requirements. UFC installed at this time was serial # FJA2363. This fuel control had been recently received from depot.

b. Subject fuel control had been removed from service and shipped to ıepot for 'excessive compressor stalls'. Depot had been unable to duplicate

or identify the cause of this problem (U-5). Subject engine was trimmed on AGETS following installation of the UFC on 29 Jul 93. There were no indications of any problems with the engine systems or components during this engine test cell trim (U-6).

10. Maintenance Personnel and Supervision: According to maintenance documentation, aircraft SN 82-0990 was properly serviced, inspected and prepared for flight by qualified personnel (U-7). There is no evidence of maintenance malpractice associated with this aircraft accident. Training records have been reviewed and all maintenance personnel involved with the preflight and launch were qualified to perform these tasks.

11. Engine Fuel and Oil Inspection Analysis: Engine oil samples from aircraft 82-0990 prior to the mishap flight showed no abnormal wearmetal indication (U-16). Likewise, no significant findings resulted from JOAP samples taken from the engine following the mishap (J-9, para. 22). Other aircraft fueled with the same load of fuel (JP-4) from Pack 44 (KC-135) reported no problems related to fuel quality and fuel sampled taken from the mishap engine were found to be within established limits (J-9, para. 22).

12. Airframe and Aircraft Systems:

a. Flight controls and related systems: There is no evidence to indicate that flight control problems were a contributing factor to this accident. The pilot reported no problems with flight controls or related systems in his testimony.

b. Avionics, hydraulic, instrument and electrical systems all appeared to be functioning normally at the time of the mishap.

c. Fuel System: There are no indications of problems with the aircraft fuel system with the exception of the position of the main fuel shutoff valve. This valve was found to be approximately 36 degrees from the fully closed position. Investigation did not identify any failures to explain the positioning of the MFSOV as it was found in the wreckage (J-2, J-3).

d. Engine: The engine was examined by an aerospace engineer from San Antonio Air Logistics Center (SAALC). His report is contained at tabs J-4 through J-10. This examination revealed no evidence of a failure or other anomaly which would have caused the reported problem.

13. Operations Personnel and Supervisors: The mission was conducted under the authority of the 158FG and the 134FS (K-2). The briefing was conducted by Major Scott using the 158FG briefing guide and was thorough and comprehensive (V-5, V-22).

14. Pilot Qualifications: [redacted] was current and fully qualified to conduct the mission. [redacted] flying experience follows:

AIRCRAFT	HOURS
F-16	1,132.3
F-4	1,273.0
AT-38	746.3

30/60/90 DAY SUMMARY

Last 30 Days:	6 Sorties /	7.8 Hours
Last 60 Days:	16 Sorties /	22.6 Hours
Last 90 Days:	24 Sorties /	36.8 Hours

15. Medical: [redacted] was medically qualified to fly (T-3). [redacted] suffered no injuries related to the ejection. Toxicology specimens contained no alcohol, elevated carbon monoxide levels, or illegal substances.

16. NAVAIDS and Facilities: All applicable NAVAIDS were operational and presented no problem for the flight.

17. Weather: The enroute weather was clear and presented no problem for the flight (W-2, W-3).

18. Directives and Publications:

Directives and Publications applicable to the mishap were:

TACR 55-116, F-16 Pilot Operational Procedures
TACR 55-116, Local Ch.8, Local Operating Procedures
AFR 55-79, Aircrew and Weapons Director Procedures for Air Operations
T.O. 1F-16A-1, Flight Manual
T.O. 1F-16A-1CL-1, Flight Crew Checklist
T.O. 1F-16-1-30CL-1, Air Refueling Procedures

There are no indications of deviation from directives.

19. SFO Landing Distance:

F-16A	17,000 lbs
Internal Fuel	2,800 lbs
1 AIM-9M	195 lbs
2 Launchers	144 lbs
1 Center Line Tank	383 lbs
1 Center Line Pylon	172 lbs
Total	20,694 lbs

RCR = 23
Temp = 80 F
No Wind

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Referencing T.O. 1F-16A-1, Flight Manual, page 3-87, at optimum SFO pproach speed (200 knots), the aircraft can float 3000-4000 feet from the oint the flare is begun under no wind conditions. Mishap Aircraft (MA) ouchdown speed was approximately 200 KIAS (V-17). At 200 KIAS touchdown peed aerodynamic or wheel braking is insignificant. MA uses approximately ,500 feet before reaching a normal touchdown speed. (137 KIAS-13 degrees AOA)

Landing distance for a F-16A with a gross weight of 20,694 lbs is 3,200 eet.

Considering these two distances, the MA required between 6,500 and 7,000 eet to stop under the touchdown conditions on 27 Aug 93.

9. Opinion as to the Cause of the Accident: Under 10 U.S.C. 2254(D), any pinion of the accident investigator as to the cause of, or the factors contributing to, the accident set forth in the accident investigation report may ot be considered as evidence in any civil or criminal proceedings arising rom an aircraft accident, nor may such information be considered an admission f liability by the United States or by any person referred to in those onclusions or statements.

lased upon evidence which was available to me, it is my opinion as investiating officer that the cause of this accident was an engine stall from an ndetermined source. Substantially contributing were the main fuel shutoff alve which was found in a position other than that requested by the pilot, nd the unified fuel control which had a history of excessive engine ompressor stalls. The pilot chose to land from a simulated flameout approach n a runway that appeared adequate but was in fact too short for [redacted] touchdown peed.

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AFR 110-14 Aircraft Accident Investigation Officer

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