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HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

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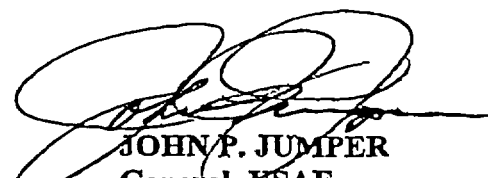
OFFICE OF THE COMMANDER
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21 SEP 2000

MEMORANDUM FOR ACC/JA

SUBJECT: AFI 51-503, Accident Investigation Board Report, F-16,
S/N 87-0357, 421st Fighter Squadron, 388th Fighter Wing, Cold Lake,
Canada (Maple Flag), 21 June 2000

I have reviewed the Accident Investigation Board Report regarding the F-16 mishap,
which occurred at Cold Lake, Canada, on 21 June 2000. The report, prepared by
Lieutenant Colonel Thomas M. Schnee, complies with the requirements of AFI 51-503.
This report is approved.


JOHN P. JUMPER
General, USAF
Commander

Attachment:
Accident Investigation Board Report

CLEAR REGULATORY COMMISSION

Docket No. _____ Official File No. 97
In the matter of PFS
Staff _____ IDENTIFIED ✓
Applicant ✓ RECEIVED ✓
Intervenor _____ REJECTED _____
Other _____ WITHDRAWN _____
DATE 5/14/02 Witness _____
Clerk [Signature]

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EXECUTIVE SUMMARY
AIRCRAFT ACCIDENT INVESTIGATION

F-16 CG S/N 87-0000357

HILL AIR FORCE BASE, UT

21 JUNE 2000

On 21 June 2000, at 1356 MDT (1956 Zulu), an F-16 CG, S/N 87-0000357, call sign Window 2, crashed on the Cold Lake Air Weapons Range (CLAWR), Alberta, Canada. The F-16 CG, assigned to the 388th Fighter Wing (388 FW), 421st Fighter Squadron (421 FS), Hill Air Force Base (AFB), Utah, was part of the large force joint training exercise Maple Flag XXXIII (MF 33) hosted by 4 Wing Cold Lake from 15 May 00 through 23 June 00.

The mishap pilot (MP), Captain Richard R. Pietrykowski, of the 388 FW, 421 FS, Hill AFB, Utah, was number two in a flight of three F-16 CGs, call sign "Widow 11" flight (mishap flight was originally a flight of four, however, Widow 13 ground aborted on takeoff roll). Shortly before the mishap, Widow 11 was targeted by a simulated surface-to-air missile (SAM) threat and performed a descending defensive maneuver. Widow 12 and 14 executed a similar defensive maneuver while maintaining visual contact with Widow 11. Widow 11 then continued his descent (below 5000 feet AGL) beneath an approaching cloud deck and directed Widow 12 and 14 to do the same. The flight leveled off at approximately 2,200 feet above the ground on an easterly heading at approximately 500 knots calibrated airspeed (KCAS)

Approximately 25 seconds after level-off, at 1956Z, Widow 12's aircraft struck a single mature American White Pelican (AWP) which penetrated the windscreen causing structural failure of the canopy and head-up-display (HUD). Debris from the canopy, HUD, and the AWP struck the MP causing confusion, disorientation and vision loss.

The MP successfully ejected from the aircraft, sustaining minor injuries. The mishap aircraft impacted in a lightly-forested muskeg area of the CLAWR and was completely destroyed.

Based on clear and convincing evidence, this accident was caused by an AWP impacting and penetrating the canopy, thus, leading to Captain Pietrykowski's decision to eject.

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.

**SUMMARY OF FACTS AND STATEMENT OF OPINION
F-16 CG AIRCRAFT ACCIDENT
21 JUNE 2000**

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COMMONLY USED ACRONYMS & ABBREVIATIONS

ACC	Air Combat Command	HVY	Heavy
ACES	Advanced Concept Ejection Seat	IM	Inter Muscular
AB	After Burner	INS	Inertial Navigation System
AEF	Aerospace Expeditionary Force	KCAS	Knots Calibrated Airspeed
AFAC	Airborne Forward Air Controller	KTAS	Knots True Airspeed
AFB	Air Force Base	KTS	Knots
AFI	Air Force Instruction	L	Local Time
AFIP	Armed Forces Institute of Pathology	LANTIRN	Low Altitude Navigation and Targeting Infrared for Night
AFOR	Attack Force	LGT	Light
AFTO	Air Force Technical Order	MA	Mishap Aircraft
AGL	Above Ground Level	MDT	Mountain Daylight Time
AIB	Accident Investigation Board	MED	Medium
ALC	Air Logistics Center	Medevac	Medical Evacuation
ASL	Above Sea Level	MET	Meteorology
ATO	Air Tasking Order	MF	Maple Flag
AWACS	Airborne Warning and Control System	MSL	Mean Sea Level
AWP	American White Pelican	MP	Mishap Pilot
BASH	Bird/Wildlife Strike Hazard	MR	Mission Ready
BIT	Built-In-Test	NATO	North Atlantic Treaty Organization
CAP	Critical Action Procedures	NOTAM	Notices to Airmen
CBU	Cluster Bomb Unit	NVIS	Night Vision Imaging System
CC	Combat Coded	OCA	Offensive Counter Air
CFB	Canadian Forces Base	OPFOR	Opposition Force
CLAWR	Cold Lake Air Weapons Range	PQDR	Product Quality Deficiency Report
CMR	Combat Mission Read	RAP	Ready Aircrew Program
CO	Commanding Officer	REGAF	Regular Air Force
COC	Command Center	RESCAP	Rescue Cap
CYOD	Canadian Forces Base, Cold Lake	RWR	Radar Warning Receiver
DBR	Destroyed Beyond Recognition	SAM	Surface-to-Air Missile
DF	Directional Finding	SAR	Search And Rescue
DoD	Department of Defense	SARTEC	Search And Rescue Technician
DSN	Defense Switch Network	SAT	Surface Attack Tactics
DTC	Data Transfer Cartridge	SDK	Signal Data Recorder
ECM	Electronic Combat Measures	SEAD	Suppression of Enemy Air Defenses
ELT	Emergency Locator Transmitter	SEPT	Situational Emergency Procedures Training
EOT	Engine Operating Time	SIB	Safety Investigation Board
ETA	Estimated Time of Arrival	S/N	Serial Number
ETO	Education and Training Office	TBD	To Be Determined
FS	Fighter Squadron	T.O.	Technical Order
FW	Fighter Wing	USAF	United States Air Force
HUD	Head Up Display	UWARS	Universal Water Activated Release System
G	Gravity	VVI	Vertical Velocity Indicator
GCA	Ground Control Approach	XPW	Combat Plans
GLIB	Defensive Surface-to-Air Missile Maneuver	Z	Zulu or Greenwich Meridian Time (GMT)
GOMER	Enemy Aircraft		
GPS	Global Positioning System		

**SUMMARY OF FACTS
F-16 ACCIDENT
21 JUNE 2000**

1. AUTHORITY, PURPOSE, CIRCUMSTANCES

A. AUTHORITY:

Under the provisions of Air Force Instruction (AFI) 51-503, on 14 July 2000, General John P. Jumper, Commander of Air Combat Command appointed Lieutenant Colonel Thomas M. Schnee to conduct an aircraft accident investigation after aircraft F-16 CG, S/N 87-00000357, crashed at Cold Lake Air Weapons Range (CLAWR), Canada (Tab A-3, B-3). The initial investigation was conducted at Canadian Forces Base (CFB) Cold Lake, Canada from 19 July 2000 through 30 July 2000, and was finalized and concluded at Hill Air Force Base (AFB), Utah (UT) on 14 August 2000. Technical advisors were Mr. James Wecker (GS-14, legal advisor), Major Paul Wilder (pilot advisor), Captain Mical Kupke (medical advisor), Captain Marsha Cervantez (contracting advisor), Second Lieutenant Benjamin Retzinger (maintenance advisor), and Staff Sergeant Michelle Vanderbunt (paralegal) (Tab Y-3, Y-4).

B. PURPOSE:

This aircraft accident investigation was convened under AFI 51-503. It was conducted primarily to gather and preserve evidence for claims, litigation, disciplinary, adverse administrative actions, and for all other purposes deemed appropriate by competent authority. In addition to setting forth factual information concerning the accident, the board president is also required to state his opinion as to the cause of the accident or the existence of factors, if any, that substantially contributed to the accident. This investigation is separate and apart from the safety investigation, which was conducted pursuant to AFI 91-204 for the purpose of mishap prevention. The report is available for public dissemination under the Freedom of Information Act (5 U.S.C. 552) and Department of Defense (DoD) Regulation 5400.7/Air Force Supplement.

C. CIRCUMSTANCES:

The accident board was convened to investigate the Class A accident involving aircraft F-16 CG, S/N 87-00000357, assigned to the 388th Fighter Wing (388 FW), 421st Fighter Squadron (421 FS), Hill AFB, UT, which crashed on 21 June 2000 at 1356 hours mountain daylight time (MDT), 1956 hours Zulu (Z) time (Tab A-3, Y-3). The crash resulted in the total destruction of aircraft S/N 87-0357. Total loss was \$25,071,848.09 (Tab A-3, M-3). There were no fatalities (Tab A-3, X-3).

2. ACCIDENT SUMMARY

On 21 June 2000, at 1356 MDT (1956 Z), aircraft F-16 CG, S/N 87-00000357, call sign Widow 12, crashed on the Cold Lake Air Weapons Range (CLAWR), Alberta, Canada. The F-16 CG, assigned to the 388 FW, 421 FS, Hill AFB, UT, was part of the large force joint training exercise Maple Flag XXXIII (MF 33) hosted by 4 Wing Cold Lake (Tab A-3, CC-11).

The mishap pilot (MP), Captain Richard R. Pietrykowski, call sign "Widow 12", of the 388 FW, 421 FS, Hill AFB, UT was number two in a flight of three F-16 CGs, call sign "Widow 11" flight (Tab B-4, K-3, N-3). Mishap flight was originally scheduled as a flight of four, however, Widow 14 moved into the number three position when the original Widow 13 ground aborted on takeoff roll (Tab B-4, V-6.3, V-6.4, AA-55, AA-56). Shortly before mishap aircraft impact, Widow 11 was targeted by a simulated surface-to-air missile (SAM) threat (Tab AA-55). Widow 11 performed a descending defensive maneuver. Widow 12 and 14 executed a similar defensive maneuver while maintaining visual contact with Widow 11 (Tab N-3, V-6.5, V-7.5, V-7.6, AA-55, AA-56). Widow 11 then continued his descent (below 5000 feet AGL) beneath an approaching cloud deck and directed Widow 12 and 14 to do the same (Tab N-3, V-6.5, AA-55). Widow 11 flight was now transitioning to a pre-briefed low altitude escort mission (Tab V-7.5, V-8.2). The flight leveled off at approximately 2,200 feet above the ground on an easterly heading at approximately 500 knots calibrated airspeed (KCAS)/570 knots true airspeed (KTAS) (Tab A-3, O-19, V-5.4, V-6.6, V-6.7, AA-56).

Approximately 25 seconds after level-off, at 1956Z, Widow 12's aircraft struck a single mature American White Pelican (AWP) which penetrated the windscreen resulting in structural failure of the canopy and head-up-display (HUD) (Tab A-3, J-7 through J-11, O-19, S-4, V-5.5, V-7.6, AA-55, AA-56). Debris from the canopy, HUD, and the AWP then struck the MP (Tab A-3, J-13 through J-15, S-6 through S-8) resulting in confusion, disorientation and loss of vision (V-1.9, V-5.8, V-7.6, V-7.7).

The MP successfully ejected from the aircraft, sustaining minor injuries that included lacerations to the neck and upper chest with subsequent air entrapment under the skin (subcutaneous emphysema), perforated ear drums, and multiple bruises (Tab A-3, V-4.1). The mishap aircraft impacted in a lightly-forested muskeg area of the CLAWR and was completely destroyed (Tab A-3, M-3 through M-5, S-3).

The CLAWR is situated entirely on Crown land (publicly owned land). The lands are owned by the Provincial governments (either Saskatchewan or Alberta) and since 1953 have been leased by the Federal government in perpetuity. No private lands or First Nations reserves are involved (Tab EE-3 through EE-7).

Initial press releases were handled by 4 Wing Public Affairs, Cold Lake, Alberta, Canada, and 388 Fighter Wing Public Affairs, Hill AFB, UT (Tab CC-17, CC-18). Media interest since 21 June 00 has been light (Tab CC-20).

3. BACKGROUND

The 388th Fighter Wing, stationed at Hill AFB, UT, is comprised of approximately 2000 people supporting the combat mission of 54 Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) capable F-16s. The LANTIRN system gives the F-16 pilot the ability to fly at low altitudes, at night and under-the-weather, to attack ground targets with precision-guided and unguided weapons. The wing's flying units include the 4th Fighter Squadron, the 34th Fighter Squadron, and the 421st Fighter Squadron (Tab CC-3). The 421st FS operates and maintains 18 F-16 LANTIRN aircraft to support day and nighttime air-to-air and air-to-ground missions. (Tab CC-5).

MAPLE FLAG (MF), based out of CFB Cold Lake, Alberta, Canada, is an international air training exercise sponsored by the 4 Wing, Royal Canadian Air Force, in conjunction with the 414th Combat Training Squadron (RED FLAG), and various North Atlantic Treaty Organization (NATO) and other participating organizations (Tab CC-11). The MF mission is to provide the most realistic training possible in a simulated war environment to all participating units using the Cold Lake Air Weapons Range (CLAWR). The exercise scenario is designed to increase aircrew capability and therefore survivability, while simultaneously developing the self-discipline, leadership, tactics and initiative necessary to win in combat. MF 33 was held 15 May through 23 Jun 00, and was attended by 10 organizations representing eight nations. (Tab CC-11, CC-12).

4. SEQUENCE OF EVENTS

A. MISSION:

Mishap aircraft was number two in a flight of three F-16 CGs, call sign "Widow 11" flight, on a large force employment surface attack tactics (SAT) mission (to include post-attack low-altitude escort mission) as part of MF 33 joint training exercise (Tab V-8.2, AA-45, AA-46). Mishap flight was originally scheduled as a flight of four; however, Widow 14 moved into the number three position when the original Widow 13 ground aborted on takeoff roll (Tab B-4, V-6.3, V-6.4, AA-55, AA-56). The mission was tasked under MF 33 Air Tasking Order Number 38P (Tab AA-45, AA-46). The commander, Red Flag (or designate), exercised Operational Control of all deployed U.S. Forces at 4 Wing Cold Lake (Tab CC-15). Mission authorization was signed by Major William A. Lyons, 421 FS Assistant Operations Officer (ADO) (Tab K-3).

B. PLANNING:

Prior to participating in MF 33, all mishap flight members attended a mass in-brief (Tab V-2.2, V-5.2, V-6.2, V-7.2). Maple Flag 33 Operations Officer gave the brief, which discussed exercise objectives, local area procedures, range airspace and restrictions, emergency procedures, and safety concerns. Specific emphasis was placed on the threat from birds, specifically large pelicans. The predominant location of these birds was identified as the northeast shore of Primrose Lake (located in the south center portion of

training airspace approximately 10 nautical miles southeast of the crash impact site). A restriction was issued for no flight below 5000 above sea level (3000 AGL) over the northern half of this lake due to the bird hazard (Tab V-2.2, V-2.3, AA-3 through AA-16). Mishap flight's mission route avoided this area, thus complying with the restriction (Tab AA-29).

Mission planning materials on the day of the mishap flight included MF line-up card, MF 33 coordination card, enroute map, target area map, attack card, and target area photographs. All mission-planning materials were complete, comprehensive, and consistent with USAF standards (Tab V-5.3, AA-23 through AA-44, BB-63 through BB-67).

A mass flight briefing was conducted at 1700Z on 21 June 00, two hours and eight minutes prior to scheduled takeoff time (Tab V-3.4, AA-13, AA-23). The Maple Flag Senior Mission Monitor was the primary briefer (Tab V-3.2). Additional briefers included representatives from weather, opposition force (OPFOR) commander, intelligence, attack force (AFOR) package commander, escort commander, and suppression of enemy air defenses (SEAD) commander (Tab V-3.5). All mishap flight members were in attendance (Tab V-5.2, V-6.2, V-7.3).

The mass briefing was thorough and included review of current and forecast weather, bird densities, Notices to Airman (NOTAMs), training rules of engagement, mission objectives, tactical game plan, and contingencies (Tab V-3.4, V-5.3, AA-17 through AA-22, AA-47 through AA-49). Note: MF Orders and Training Rules applied to all participants except where service, command, or squadron training rules were more restrictive. For any conflict, the most restrictive training rules applied (Tab CC-13).

Weather in the training airspace was forecast as scattered to broken clouds at 8,000-11,000 feet above sea level (ASL) with isolated cloud tops at 12,000-14,000 feet ASL; and visibility of 6 miles (Tab AA-18). Bird density in the training area was forecast as light (level 2-3) (Tab K-15, AA-19). The MF Senior Mission Monitor reiterated safety issues to include discussion of bird type, size, locations, and restrictions. Additionally, he testified that on this particular day, bird migration could be higher than forecasted and that aircrews should respect "level 4" (one of two medium bird density levels) flight restrictions if it looked as though there were a lot of birds (Tab V-3.3). Specific bird flight restrictions briefed for level 1-3 were; avoid excessive airspeeds at low altitudes, however, you will normally maintain tactical airspeeds; keep the landing light on (if aircraft type allowed); keep helmet visor down; avoid flight near the top or bottom of cloud layers; fly loose formations; and maintain a vigilant lookout for bird activity (Tab V-3.3, AA-20). The additional bird flight restriction issued for level 4 was to maintain at or above 1,000 AGL until final run-in to the target (Tab V-3.3, AA-20).

Prior to the mass briefing, Widow 11 (Lieutenant Colonel Eric H. Best, 421 FS Commander) conducted the individual flight briefing. This briefing was in accordance with Air Force Instruction 11-2 F16, Volume 3 (Tab BB-65 through BB-67, BB-73).

through BB-81). All briefings were thorough and fully understood by the pilots interviewed (Tab V-5.7, V-6.3, V-7.4).

C. PREFLIGHT:

All flight prerequisites were accomplished to include; signing the flight authorization log, accomplishing monthly critical action procedures (CAPs), and receiving situational emergency procedures training (SEPT) (Tab K-3, V-6.6, V-7.10, T-4 through T-6). NOTAMs in effect on the day of the mishap are located in (Tab AA-47, AA-48). All mishap flight members assembled and departed the operations building for their aircraft on time. Aircraft preflight and engine start were uneventful, with the mishap flight taxiing on time (Tab V-5.3, V-6.3, V-7.4).

D. SUMMARY OF ACCIDENT:

Mishap flight was originally scheduled as a flight of four; however, Widow 14 moved into the number three position when the original Widow 13 ground aborted on takeoff roll (Tab B-4, V-6.3, V-6.4, AA-55, AA-56). Ground operations to include engine start and taxi were uneventful (Tab V-5.3, V-6.3, V-7.4).

Takeoff was accomplished at 1908Z. Other than the ground abort, takeoff and subsequent flight enroute to the training area were uneventful. All required after takeoff checks were accomplished. Upon reaching the exercise airspace, the flight entered the fighter holding pattern located in the eastern part of the exercise area (Tab V-7.4, V-7.5, AA-23, AA-29, AA-55). The mishap flight departed holding on time (1939Z) and began a west-bound medium altitude ingress (20-24,000 feet ASL) to the target area. An E-3A Airborne Warning and Control System (AWACS) aircraft provided air traffic control and enemy aircraft position reports (Tab AA-24, AA-45, AA-55). Actual enroute and target area weather were the same as forecasted (Tab K-12, N-10, V-5.4, V-6.4, AA-18, AA-55).

Upon reaching the target area, Widow 11 executed a medium altitude 45-degree diving attack (simulated weapons release) (Tab AA-28, AA-55). Widow 12 and 14 did not attack the target due to performing threat reactions in the target area (Tab V-6.4, V-6.5, V-7.5, AA-55). The mishap flight then executed a medium altitude (20-24,000 feet ASL) egress to the east (Tab V-7.5, AA-55).

At 1955Z, approximately 31 nautical miles from the target area on an easterly heading, Widow 11 was targeted by a simulated surface-to-air missile (SAM) threat (Tab AA-55). Widow 11 performed a descending defensive maneuver. Widow 12 and 14 executed a similar defensive maneuver while maintaining visual contact with Widow 11 (Tab N-3, V-6.5, V-7.5, V-7.6, AA-55, AA-56). Widow 11 then continued his descent (below 5000 feet AGL) beneath an approaching cloud deck and directed Widow 12 and 14 to do the same (Tab N-3, V-6.5, AA-55). Widow 11 flight was now transitioning to the pre-briefed low altitude escort mission (Tab V-7.5, V-8.2). The flight leveled off at approximately 2,000 feet AGL (approximately 3,500 to 4,000 feet below the bases of the

clouds) on a heading of 075 degrees, at 500 KCAS/570 KTAS (Tab A-3, O-19, V-5.4, V-6.6, V-6.7, AA-56).

Approximately 25 seconds after level-off, at 1956Z, Widow 12's aircraft struck a single mature American White Pelican (AWP) which penetrated the windscreen resulting in structural failure of the canopy and head-up-display (HUD) (Tab A-3, J-7 through J-11, O-19, S-4, V-5.5, V-6.5, AA-56). Debris from the canopy, HUD, and the AWP struck the MP causing confusion, disorientation, and loss of vision, resulting in the MP's decision to eject from the aircraft (Tab V-1.9, V-5.8, V-7.6, V-7.7).

Widow 14 observed Widow 12 ejecting from his aircraft and relayed the information to Widow 11 (Tab N-3, V-6.6, AA-56). Shortly thereafter, Widow 11 observed the MP's aircraft impact and called for all aircraft in the exercise area to cease tactical maneuvering via a "knock-it-off" call (Tab N-3, AA-56).

Widow 11 then polled his flight, and confirmed that Widow 12 had ejected and that the MP's parachute had deployed. Widow 11 then assumed the role of on-scene-commander and began coordination for Search and Rescue (SAR) efforts at 1959Z (Tab N-3 through N-5, AA-56).

E. IMPACT:

Aircraft S/N 87-0357 impacted the terrain at approximately 1956Z on 21 June 2000 at N5509.0 W11001.0 at 2100 feet ASL (Tab A-3). Photographs show that the aircraft impacted a lightly forested muskeg area of Cold Lake Air Weapons Range approximately 45NM north of CFB Cold Lake and was completely destroyed (Tab A-3, S-3, Z-3). Wreckage was found in three distinct locations over approximately 2.6 nautical miles. The first grouping of wreckage contained the remains of a mature AWP, oxygen mask, helmet, transparency plastic, and the oxygen hose (Tab R-3, R-4, S-4, S-5). The canopy, lapbelt, ejection seat, and seat data recorder (SDR) were found and the pilot was recovered approximately .5 nautical miles east of the first grouping of wreckage (Tab R-3, R-4). The main aircraft impact site is located approximately 2 nautical miles northeast of the pilot landing zone (Tab R-3). Debris from the main aircraft impact spreads out in a conical shaped direction northeast from the main impact crater. In the cone-shaped area, larger pieces of the aircraft structure were found, including a section of wing and part of the engine stator case (Tab R-5, S-3).

F. LIFE SUPPORT EQUIPMENT, EGRESS AND SURVIVAL:

The MP initiated a successful ejection at 3800 feet MSL (approximately 2200 feet AGL) and 570 knots true airspeed (KTAS) (Tab A-3). Analysis of the ejection seat and the aircraft canopy confirmed the pilot initiated the ejection sequence. Based on indicated airspeed and altitude, the ejection seat functioned as designed in the mode II range (Tab J-6, O-11, O-37).

Flight to the crash site was approximately 25 minutes (Tab V-1.5). Rescue 415 was the lead helicopter (SARTEC Leader Sergeant Keith McKellar on board) with Rescue 417 approximately 5 minutes behind (Tab N-15, V-1.2).

At 2056Z, Rescue 415 was visual with the mishap pilot (Tab DD-7). Due to the swamp-like terrain and inability for the helicopter to land, Sergeant McKellar was forced to repel into the area (Tab V-1.5). Upon initial contact with the downed pilot, Sergeant McKellar saw him standing, and assessed him as being alert, oriented, medically stable, but in great pain with injuries requiring medical attention as soon as possible (Tab V-1.5). Based on his assessment and using SARTEC protocols (Tab X-8), Sergeant McKellar administered intravenous fluid and morphine (painkiller) (Tab V-1.5, V-1.7). Shortly thereafter, Sergeant Michael Hurtribise, SARTEC from Rescue 417, repelled into the scene to help properly immobilize the downed pilot (Tab V-1.7, X-9). The MP was placed on a stokes litter and was on board Rescue 415 at 2203Z (Tab V-1.8, DD-7).

At 2235Z, Canadian and United States Air Forces flight surgeons met Rescue 415 at CFB Cold Lake (Tab DD-7). MP was assessed by the flight surgeons and transported via ambulance to Cold Lake Health Centre (Tab V-1.8, Tab X-7).

At 0100Z, USAF medical staff requested medical evacuation (Medevac) to the University of Alberta Hospital in Edmonton, Canada. At 0212Z MP departed via Medevac for Edmonton (Tab DD-8).

H. RECOVERY OF REMAINS:

Not applicable.

5. MAINTENANCE

A. FORMS DOCUMENTATION:

Air Force Technical Order (AFTO) Form 781 documentation shows that preflight and through flight inspections were completed prior to the mishap sortie, and that the Exceptional Release was completed correctly (Tab U-3). Historical records did not indicate any recurring maintenance problems relating to the accident (Tab U-45). Pilot-documented aircraft discrepancies for the last 30 days consisted of 9 capability code two discrepancies and 2 capability code three discrepancies (Tab H-3, H-4). There were nine open discrepancies annotated in the 781As, all of which are "Informational Notes" (Tab H-4). There was one 781K (awaiting parts) delayed discrepancy (Tab H-4, U-15). There were seven outstanding Time Compliance Technical Orders, none of which were past the grounding date (Tab H-5).

B. INSPECTIONS:

The last scheduled major inspection was a number one phase inspection. This inspection was completed on 7 July 99 with 3597.8 total airframe hours on the aircraft. All maintenance actions taken during the inspection were consistent with a routine phase inspection (Tab H-5, U-45).

C. MAINTENANCE PROCEDURES:

All maintenance procedures were accomplished consistent with technical orders (Tab U-6, U-7, BB-97).

D. MAINTENANCE PERSONNEL AND SUPERVISION:

Preflight inspection and fuel servicing were performed by an Airman First Class, 5 skill level crew chief (Tab U-3, U-4, U-29). The crew chief was fully trained and qualified to perform the refueling task (Tab U-31 through U-33). However, his certification to clear "Red-X" refueling/defueling conditions, as well as "Red X" intake/exhaust inspections, was incorrectly approved at the Squadron Maintenance Superintendent level (Tab U-29, U-30). Additionally, the Air Force Form 64 showed a superseded reason/justification for waiver reference (Tab U-30). Waiver justification should have been in accordance with ACC Instruction 21-101, paragraph 23.80.1.1 (2 Oct 98), and waiver approval endorsed by the Operations Group Commander (Tab BB-93 through BB-95).

Intake inspection was performed by a different Airman First Class, also a 5 skill level crew chief (Tab U-7, U-39). This crew chief was fully trained and qualified to perform the intake inspection (Tab U-41 through U-43). However, his certification to clear "Red X" refueling/defueling conditions, as well as "Red X" intake/exhaust inspections, was also incorrectly approved at the Squadron Maintenance Superintendent level (Tab U-39, U-40). Likewise, the Air Force Form 64 showed the same superseded reason/justification for waiver reference (Tab U-40). Waiver justification should have been in accordance with ACC Instruction 21-101, paragraph 23.80.1.1 (2 Oct 98), and waiver approval endorsed by the Operations Group Commander (Tab BB-93 through BB-95).

The tire pressure check and nitrogen servicing were completed by a properly trained and qualified crew chief--no discrepancies were noted (Tab U-6, U-7, U-35 through U-37).

No other maintenance actions were completed prior to the mishap sortie (Tab U-7). The deviations noted in this section were not a factor in this mishap.

E. FUEL, HYDRAULIC AND OIL INSPECTION ANALYSES:

The aircraft was serviced with fuel truck number 84 (Tab U-5). After the mishap, the fuel in fuel truck number 84 was tested with no evidence of fuel contamination (Tab U-19).

The engine oil was serviced by cart SC07 on 15 Jun 00 (U-5). Post mishap oil crackle testing of cart SC07 revealed water contamination (U-27). Testing of the engine oil in the aircraft was not possible due to the inability to recover the aircraft (Tab M-3). While there was evidence of possible engine oil contamination, the seat data recorder did not record any engine anomalies, nor were any engine anomalies reported by the MP, prior to the ejection (Tab O-14, Tab V-7.6, V-7.7).

The exact cart that serviced the hydraulic system was not determined; therefore, all carts (two) that were deployed to Cold Lake were crackle tested and all passed (Tab U-28).

F. UNSCHEDULED MAINTENANCE:

The last thirty days of unscheduled maintenance showed no reoccurring trends inconsistent with normal operations (Tab H-3, H-4). Also, unscheduled maintenance since the last phase one inspection, 7 July 99, was evaluated with no inconsistencies found (Tab U-45). Likewise, the seat data recorder and MP indicated no aircraft malfunctions (except previous radar warning receiver discrepancy) prior to ejection (Tab O-14, Tab V-7.6, V-7.7).

6. AIRCRAFT AND AIRFRAME SYSTEMS

A. STRUCTURES AND SYSTEMS CONDITION:

Wreckage was found in three distinct locations as stated in paragraph 4E (Sequence of Events, Impact) of this summary. In addition, the canopy frame was found with the transparency shattered with pieces of the canopy covered with bird remains. The canopy had damage to the right side (Tab S-4, S-5). The ejection seat showed evidence of bird remains on the headrest and upper right side (Tab S-7). Post-mishap analysis of the canopy and recovered fragments showed that the bird impacted 22 inches aft of the leading edge along the contour and about 12 inches right of the center bodyline, with part of the bird entering the cockpit (Tab J-11). Note: This canopy is a bubble-shaped transparent enclosure designed to withstand an impact of a four pound bird (+/- 2 ounces) at approximately 350 knots (Tab J-8, BB-100).

Seat data recorder, recovered aircraft remains, and MP testimony indicate no aircraft malfunctions prior to bird impact (Tab O-14, Tab V-7.6, V-7.7).

B. TESTING:

The canopy was sent to Ogden Air Logistics Center (OO-ALC), Hill AFB, Utah, for reconstruction analysis. Reconstruction was performed on 98% of the canopy frame and approximately 40-50% of the transparency. Analysis indicated that the bird impact was hard enough to deflect the transparency, shatter the HUD combiner glass, with part of the bird entering the cockpit (Tab J-11).

The bird remains (two feet and one wing) were sent to the Smithsonian Institute Division of Birds where the remains were identified as a mature American White Pelican (AWP) with average size of 15.5 pounds (Tab J-9, S-4).

The helmet and liner, oxygen mask, survival vest, MP's parachute harness, boots, flight suit, g-suit, and T-shirt were sent to the Life Sciences Equipment Laboratory for analysis and inspection using standard optical microscopy (Tab J-13). Analysis showed the following items with significant bird remains; MP's helmet, flightsuit, torso harness, and survival vest (Tab J-14, J-18).

7. WEATHER

A. FORECAST WEATHER:

Weather in the training airspace was forecast as scattered to broken clouds at 8,000-11,000 feet ASL with isolated cloud tops at 12,000-14,000 feet ASL (Tab AA-18). Visibility was forecasted to be 6 miles (Tab AA-18). Bird density in the training area was forecast to be light; however, MF mission monitor briefed that on this particular day, bird migration could be higher than forecasted (Tab V-3.3, AA-19).

B. OBSERVED WEATHER:

Actual weather observed in flight for cloud coverage and visibility was the same as that forecasted (Tab K-12, V-5.4, V-6.4, V-7.3, AA-18). Actual bird activity was not measured; however, pilots interviewed stated that observed bird activity was slightly higher than what they would define as light (Tab V-5.9, V-6.9, V-7.13).

8. CREW QUALIFICATIONS

A. MISHAP PILOT:

Captain Pietrykowski is a Combat Mission Ready (CMR) inexperienced wingman (less than 500 hours F-16 flying time) with 147.5 hours in the F-16, 1074.4 hours in the KC-135, and a grand total of 1481.2 flying hours (Tab G-3, G-11, G-12, BB-35). He received Qualification Level 1 (Q-1) (the highest qualification level) with no discrepancies on his Initial Instrument/Qualification check ride in the F-16 on 6 July 1999, and a Q-1 with no

discrepancies on his 17 March 2000 Initial Mission check (Tab T-3). A review of his grade sheets for Mission Qualification Training shows normal to above average progression (Tab T-15).

As a CMR inexperienced pilot, Captain Pietrykowski was required by the Ready Aircrew Program (RAP) to fly 10 sorties each month and 29 in a three-month period (last day of the month) (Tab BB-4 through BB-8). A review of his recent flying and training records showed that he was current and qualified for the events being flown on the day of the mishap (Tab G-3, G-5, G-13, G-15, G-16). The mishap sortie was his thirteenth mission in last 30 days, of which 12 were Maple Flag 33 missions. His recent flight time is as follows (Tab G-3, G-5, G-13):

	Hours	Sorties
30 days	15.2	12 (does not include mishap sortie)
60 days	31.4	22
90 days	38.6	27

B. OTHER FLIGHT MEMBERS:

A review of recent flying and training records for Lieutenant Colonel Eric Best (Widow 11) and Captain Jason Queen (Widow 14) showed that each was current and qualified for the events being flown on the day of the mishap (Tab T-15).

9. MEDICAL

A. QUALIFICATIONS:

Medical and dental records were reviewed. Captain Pietrykowski was medically qualified to fly at the time of the mishap. His physical and Medical Recommendation for Flying or Special Operational Duty Form (Air Force Form 1042) were current (Tab X-4, X-5).

B. HEALTH:

Post-accident medical examination records of the MP revealed accident-related injuries (Tab V-4.1). MP sustained a laceration across the right mid neck, just missing important vital structures, with subsequent air entrapment under the skin (subcutaneous emphysema) in the immediate area. He sustained perforations of both ear drums and other minor injuries (Tab V-4.1, Tab X-7).

C. PATHOLOGY:

Toxicology report from Armed Forces Institute of Pathology (AFIP) revealed normal carbon monoxide levels and no alcohol present in the blood or urine (Tab X-6). Urine drug screening was positive for morphine, consistent with the level of morphine given in

the field by the SARTEC (Tab V-1.7, X-6). Note: Morphine was administered in the field in accordance with SARTEC protocols (Tab X-8).

D. LIFESTYLE:

There is no evidence that unusual habits, behavior, or stress on the part of the MP contributed to this mishap (Tab V-5.9, V-6.8, V-7.15).

E. CREW REST AND CREW DUTY TIME:

Crew rest and duty day requirements were in accordance with Air Force Instruction 11-202, Volume 3, Chapter 9 (Tab V-5.9, V-6.8, V-7.15, BB-86, BB-87).

The crew rest period is the non-duty period before the flight duty period begins. The purpose is to allow the aircrew member the opportunity for adequate rest before performing in-flight duties. Crew rest is free time, which includes time for meals, transportation, and rest. Rest is defined as the condition which allows an individual the opportunity to sleep. Air Force aircrews require at least 8 hours of continuous, uninterrupted rest during the 12 hours immediately prior to the beginning of the flight duty period. Crew rest is 12 hours time away from work. Crew duty time is 12 hours (10 hours for night flying) from when the pilot shows up to work that duty day until shutting down the engines (Tab BB-86, BB-87).

10. OPERATIONS AND SUPERVISION

A. OPERATIONS:

421 FS operations tempo for the nine months prior to the mishap indicated the following: - Aerospace Expeditionary Force deployment (AEF 1) 1 Oct 99 through 30 Nov 99; Weapons Instructor Course deployment 22 Feb 00 through 3 March 00; 2-ship to Chile 27 Mar 00 through 5 Apr 00; 3-ship Air Warrior deployment 2 Apr 00 through 16 Apr 00; Weapons Instructor Course deployment 17 Apr 00 through 21 Apr 00; and Exercise Maple Flag 33 deployment 29 May 00 through 24 June 00 (Tab AA-51, AA-52). Despite this active deployment schedule, operations tempo was not a factor in this mishap.

Based on 16 May 00 letter of qualifications (Letter of X's), 421 FS showed a squadron assigned pilot experience level of 44 percent. The squadron's overall (both assigned and attached pilots) experience level on the same date was 67 percent (Tab AA-53). For definition of experienced aircrew, see Tab BB-35. Pilot (aircrew) experience level had no impact on this mishap.

B. SUPERVISION:

The mission was authorized by Major William A. Lyons, 421 Fighter Squadron (FS) Assistant Operations Officer (Tab K-3). Supervisory personnel attending the mass brief

and flying in the afternoon package on 21 June 2000 included Lieutenant Colonel Randall Perterson, 388th Operations Group Deputy Commander, and Major William Lyons, 421 FS Assistant Operations Officer. Flight lead and briefing officer of the mishap flight was Lieutenant Colonel Eric Best, 421 FS Commander. Additional supervisory personnel attending the flight brief was Captain Alex Grynkeiwich, 421 FS Flight Commander (Widow 13--ground aborted) (Tab K-3). Supervision for the flight was proper.

11. HUMAN FACTORS ANALYSIS

Based on MP and SARTEC testimony, there is no evidence of loss of consciousness, G-induced or otherwise (Tab V-7.7 through V-7.9). Per witness interviews (Widow 11, 12, and 14) and in-flight tape review (Widow 11), the mishap pilot performed a rapid descent to low altitude with a level-off at approximately 2,000 feet AGL (Tab V-5.4, V-6.7, AA-55, AA-56). The MP responded to Widow 11's request for a formation position report while flying straight and level (approximately 1 to 2 degree descent) for approximately 25-30 seconds prior to mishap (Tab N-3, O-19, V-6.5, V-7.6). MP reported that while regaining formation position, he was performing normal cross checks and visual lookout (Tab V-7.6).

MP then describes hearing a "loud thunk" with things getting "really, really loud" and vision going dark, stating it felt like his eyes were closed so tightly he could see stars (MP could not tell if he had actually closed his eyes) (Tab V-7.6, V-7.8). Subsequently, MP reported experiencing confusion and disorientation (Tab V-7.6). Despite the above, MP felt he was relatively aware of his position, sensing that he was essentially in straight and level flight, and at low altitude (Tab V-7.7). However, aware of his disorientation and loss of vision, MP made a conscious decision to eject (Tab V-1.9, V-7.7). MP reported being in a good body position for ejection and pulling the ejection handle with his right hand. MP was able to recall the entire ejection sequence, from seat separation to opening parachute shock, stating that his vision returned approximately 2 minutes after landing on the ground (Tab V-7.8).

Based on the above facts, there is no evidence that human factors other than those addressed in Technical Order 1F-16CG-1, (27 May 96, Change 7 dated 15 March 2000), page 3-37, paragraph titled "Canopy Loss/Penetration In Flight" contributed to this mishap (Tab O-9, BB-91). Additionally, blacking of vision in this scenario is substantiated by comments from the Senior Scientist of Aerospace Ophthalmology Branch, Brooks AFB, Texas. He states that a wind blast of greater than approximately 435 knots could cause a forcible reflex closing of the eyelids into the protective mode (Tab X-10).

12. GOVERNING DIRECTIVES AND PUBLICATIONS

A. PILOT RELATED INSTRUCTIONS AND PLANS:

Air Force Instruction (AFI) 11-2F16, Volume 1, *F-16 Aircrew Training* (Tab U-3)

Air Force Instruction (AFI) 11-2F16, Volume 2, *F-16 Aircrew Evaluation Criteria* (Tab U-37)

Air Force Instruction (AFI) 11-2F16, Volume 3, *F-16 Operating Procedures* (Tab U-63)

Air Force Instruction (AFI) 11-202, Volume 2, *Aircrew Standardization/Evaluation Program* (Tab U-83)

Air Force Instruction (AFI) 11-202, Volume 3, *General Flight Rules* (Tab U-85)

Air Force Instruction (AFI) 11-202, Volume 3, *General Flight Rules/ Air Combat Command Supplement 1* (Tab U-89)

Technical Order (T.O.) 1F-16CG-1, *Flight Manual F-16 C/D* (Tab U-91)

B. MAINTENANCE RELATED INSTRUCTIONS:

Air Combat Command Instruction (ACCI) 21-101, *Objective Wing Aircraft Maintenance* (Tab U-93)

Technical Order (T.O.) 00-20-5, *Aerospace Vehicle/Equipment Inspection and Documentation* (Tab U-97)

C. KNOWN OR SUSPECTED DEVIATIONS:

Pilot: None

Maintenance: Air Force Form 64's were not completed in accordance with ACCI 21-101 (Reference section 6, paragraph D, this report for specifics). Maintenance was not a factor in this mishap.

13. NEWS MEDIA INVOLVEMENT

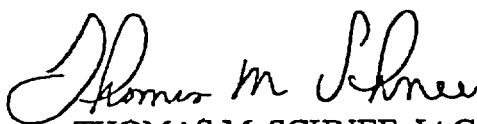
Initial news releases were sent out 21 June 00 from 4 Wing Public Affairs, Cold Lake, Alberta, and 388th Fighter Wing Public Affairs, Hill Air Force Base, Utah. Points of contact for inquiries were the 4 Wing Public Affairs Officer and the 388th Fighter Wing Public Affairs Office (Tab CC-17, CC-18). 4 Wing Public Affairs held a press conference to answer local media questions at 1600L, 21 June 00, at 4 Wing Cold Lake Headquarters. Information relayed in this conference was limited to the information in the press release of the same date (Tab CC-20). The aircraft accident was covered by

CBC TV, Edmonton and Toronto, 630 CHED Edmonton News Radio, CBC-French, A-Channel, CKSA-Lloydminster, Canada AM, CTV News-Toronto, and was sent out through Broadcast News wire service. (Tab CC-19)

14. ADDITIONAL AREAS OF CONCERN

None.

14 Aug 00



THOMAS M. SCHNEE, Lt Col, USAF
President, Accident Investigation Board

**STATEMENT OF OPINION
F-16 CG ACCIDENT
21 JUNE 2000**

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.

1. OPINION SUMMARY (See Discussion of Opinion section after the Opinion Summary section for detailed explanation):

Clear and convincing evidence shows this mishap was caused by an American White Pelican (AWP) impacting and penetrating the canopy of F-16 CG, SN87-00000357. While flying at approximately 2,200 feet above ground level (AGL), Captain Richard R. Pietrykowski's aircraft struck a single mature AWP which penetrated the windscreen and caused structural failure of the canopy and head-up-display (HUD). Debris from the canopy, HUD, and the AWP struck the mishap pilot causing confusion, disorientation, and loss of vision, forcing him to eject from the aircraft.

2. DISCUSSION OF OPINION:

After thorough review of all maintenance information, it was determined that maintenance was not a factor in this mishap. Captain Pietrykowski, a Combat Mission Ready F-16 CG wingman, was current and qualified to execute the mission. This mission was part of a large force employment package in support of Exercise MAPLE FLAG XXXXIII (MF 33). All briefings to include the MF 33 mass in-brief, the MF 33 day 8 mission and package brief, and the flight brief were thorough and complete. Bird level activity and flight restrictions were thoroughly covered by the MF mission monitor and were complied with by the mishap flight. Also, the 4 Wing Bird/Wildlife Strike Hazard (BASH) Plan (Tab O-3) was comprehensive and an integral part of all MF 33 operations. 421 FS supervisors were equally involved, having briefed squadron members to maintain increased vigilance for bird activity, regardless of briefed bird activity level, throughout all phases of the mission (Tab V-5.9). In my opinion, supervision, pilot qualifications, the mission profile, mission briefings to include bird activity level, and publications were not factors in this mishap.

Evidence from the BASH analysis (Tab J-7), canopy bird strike analysis (Tab J-11), and Life Sciences Equipment Determinations (Tab J-13) indicate that the mishap aircraft (MA) canopy collided with a single AWP at approximately 570 knots true airspeed while flying in the Cold Lake Air Weapons Range (CLAWR). This canopy is a bubble-shaped transparent enclosure designed to withstand an impact of a four pound bird (+/- 2 ounces) at approximately 350 knots (Tab J-8, BB-100).

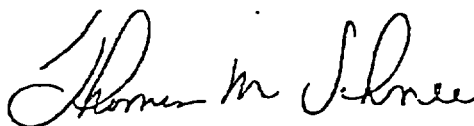
The reports at Tabs J-7, J-11, and J-13 are conclusive in that the AWP, with an average weight of 15.5 pounds, struck the canopy of the MA (Tab J-9, S-4). This impact caused the canopy to deflect and shatter the HUD combiner glass, with some of the bird ultimately penetrating the canopy and entering the cockpit (Tab J-7 through J-11). Aircraft components with significant bird remains included pieces of the canopy, canopy rails, ejection seat, parachute container assembly, and mishap pilot's (MP) helmet, flightsuit, torso harness, and survival vest (Tab J-14, J-18).

The mishap pilot's testimony indicates he was performing normal cross checks and visual lookout while regaining formation position at approximately 2,000 AGL. MP then describes hearing a "loud thunk" with things getting "really, really loud" and vision going dark. Subsequently, MP reported becoming confused and disoriented. Aware of his disorientation and loss of vision, MP made a conscious decision to immediately eject (Tab V-1.9, V-7.6 through V-7.8).

Based on the above facts, there is no evidence that human factors other than those addressed in Technical Order 1F-16CG-1, (27 May 96, Change 7 dated 15 March 2000), page 3-37, paragraph titled "Canopy Loss/Penetration In Flight" contributed to this mishap (Tab O-9, BB-91). Additionally, blacking of vision in this scenario is substantiated by comments from the Senior Scientist of Aerospace Ophthalmology Branch, Brooks AFB, Texas. He states that a wind blast of greater than approximately 435 knots could cause a forcible reflex closing of the eyelids into the protective mode (Tab X-10).

In this case, the evidence is clear and convincing that the MA was struck by a single mature AWP which penetrated the windscreen and caused structural failure of the canopy and head-up-display (HUD). Debris from the canopy, HUD, and the AWP struck the mishap pilot causing confusion, disorientation, and loss of vision, forcing him to eject from the aircraft. The MA was completely destroyed upon ground impact at approximately 1356 Mountain Daylight Time on 21 June 2000, approximately 45 nautical miles north of Canadian Forces Base (CFB) Cold Lake, Alberta, Canada.

Dated this 14th day of August, 2000.



THOMAS M. SCHNEE, Lt Col, USAF
President, Accident Investigation Board