UNITED STATES AIR FORCE
AIRCRAFT ACCIDENT INVESTIGATION BOARD REPORT

F-16C, T/N 90-0760

310TH FIGHTER SQUADRON
56TH FIGHTER WING
LUKE AIR FORCE BASE, ARIZONA

LOCATION: LAKE HAVASU CITY AIRPORT, ARIZONA

DATE OF ACCIDENT: 24 APRIL 2018

BOARD PRESIDENT: COLONEL LEE G. GENTILE, JR.

Conducted IAW Air Force Instruction 51-503

EXECUTIVE SUMMARY
UNITED STATES AIR FORCE
AIRCRAFT ACCIDENT INVESTIGATION

F-16C, T/N 90-0760
LAKE HAVASU AIRPORT, ARIZONA
24 APRIL 2018

On 24 April 2018, at 10:27:25 hours local (L), an F-16C, Tail Number (T/N) 90-0760, overran the north end of Runway 32 during an emergency landing at Lake Havasu City Airport, Arizona and crashed, destroying the aircraft. The mishap pilot (MP) safely ejected from the mishap aircraft (MA) as it departed the runway at 93 knots. The MP was the sole pilot of the MA. The mishap flight (MF) was a two-ship consisting of the MA and the mishap instructor pilot (MIP) in an F-16D, T/N 88-0163. The MA and MIP's aircraft were equipped with a centerline external fuel tank, one training missile and an air combat maneuvering instrumentation pod. Both the MP and MIP were assigned to the 310th Fighter Squadron, Luke Air Force Base, Arizona. The MP was an USAF First Lieutenant with 218.8 total flying hours, 11.1 F-16 hours. The MIP was an USAF Captain with 1150 total flying hours, 888.6 F-16 hours and 115.5 instructor pilot hours. The MP was a student pilot in the F-16C/D Initial Qualification Course, flying a day, offensive basic fighter maneuver (BFM) training sortie led by the MIP. The MF was the third offensive flight in the BFM syllabus.

After the second BFM engagement, the MP wrongly assessed an engine failure and subsequently shut down the engine while executing the Airstart Critical Action Procedures (CAPs). Despite successfully restarting the engine, the MP continued to misperceive an engine malfunction, which eroded his confidence in the engine's abilities. During a simulated flameout (SFO) landing pattern to Lake Havasu City Airport, the MP failed to control his energy level, causing the MA to land long and fast. After the MP ejected, the MA departed the runway and travelled approximately 1,600 feet through the desert before crashing into the airport's perimeter fence. The mishap resulted in a complete loss of the MA and significant damage to additional Air Force property items with total loss valued at approximately $25,543,960.

The Accident Investigation Board President found, by a preponderance of the evidence, that the cause of the mishap was pilot error. The MP misinterpreted the MA's engine instrument readings and sounds in the cockpit while in the cold mic setting and subsequently shutdown an engine that was operating within normal parameters. Despite successfully restarting the engine, the MP continued to misinterpret engine instrument readings and sounds as a persistent engine malfunction, but the MP failed to communicate his mistrust to the MIP. Further, the MP failed to use the MA's navigation system to monitor his position in relation to Lake Havasu City Airport and failed to abort an unsafe landing. Finally, the MIP's failure to monitor the MA's performance and provide timely and accurate instruction substantially contributed to the mishap.

SUMMARY OF FACTS AND STATEMENT OF OPINION
F-16C, T/N 90-0760
24 April 2018

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ACRONYMS AND ABBREVIATIONS

310 AMU	310th Aircraft Maintenance Unit
310 FS	310th Fighter Squadron
56 WG	56th Fighter Wing
AB	Afterburner
ACMI	Air Combat Maneuvering Instrumentation
AETC	Air Education and Training Command
ADC	Area Defense Counsel
AF	Air Force
AFB	Air Force Base
AFE	Air Flight Equipment
AFI	Air Force Instruction
AFTTP	Air Force Tactics Techniques and Procedures
AFTO	Air Force Technical Order
AGL	Above Ground Level
AIB	Accident Investigation Board
AOA	Angle of Attack
AZ	Arizona
BD	Battle Damage
CAP	Critical Action Procedure
Capt	Captain
Col	Colonel
DNIF	Duty Not To Include Flying
DoD	Department of Defense
ECS	Environmental Control System
EOS	Emergency Oxygen System
EP	Emergency Procedures
EPS	Emergency Power System
FL	Flight Lead
FLCS	Flight Control System
FPM	Feet Per Minute
FRC	Fault Reporting Codes
FS	Fighter Squadron
ft	Feet
FTIT	Fan Turbine Inlet Temperature
FTU	Formal Training Unit
G	Gravitational Force
HUD	Heads-Up Display
IAW	In Accordance With
IP	Instructor Pilot
IPUG	Instructor Pilot Upgrade
K	Thousand
KCAS	Knots Calibrated Airspeed
KHII	Lake Havasu City Airport
KTAS	Knots True Airspeed
kts	Knots
L	Local Time
LM-Aero	Lockheed Martin Aeronautics Company
Lt Col	Lieutenant Colonel
LWD	Left Wing Down
M	Mach
MA	Mishap Aircraft
Maj	Major
MAJCOM	Major Command
MF	Mishap Flight
MIP	Mishap Instructor Pilot
MOA	Military Operating Area
MP	Mishap Pilot
ND	Nose Down
NM	Nautical Miles
NOTAMs	Notices to Airmen
OG	Operations Group
Ops Tempo	Operations Tempo
ORM	Operational Risk Management
OSS	Operation Support Squadron
P&W	Pratt and Whitney
PHA	Physical Health Assessment
PSI	Pounds Per Square Inch
QA	Quality Assurance
RPM	Rotations Per Minute
SOF	Supervisor of Flying
SFO	Simulated Flame Out
TCTO	Technical Order
T/N	Tail Number
TOD	Tech Order Data
Z	Zulu

The above list was compiled from the Summary of Facts, the Statement of Opinion, the Index of Tabs, and Witness Testimony (Tabs R and Tab V).

SUMMARY OF FACTS

1. AUTHORITY AND PURPOSE

a. Authority

On 24 May 2018, Major General Mark E. Weatherington, Deputy Commander of the United States Air Force (USAF) Air Education and Training Command (AETC), convened an accident investigation board (AIB) under the provisions of Air Force Instruction (AFI) 51-503 to inquire into all the facts and circumstances surrounding the Air Force aerospace accident that occurred on 24 April 2018, involving an F-16C aircraft, Tail Number (T/N) 90-0760, at the Lake Havasu City Airport near Luke Air Force Base (AFB), Arizona (AZ) (Tab Y-3). On 14 June 2018, Colonel Lee G. Gentile Jr., Vice Commander, 71st Flying Training Wing, at Vance AFB, Oklahoma was appointed to lead this investigation (Tab Y-5). Other USAF personnel appointed to this AIB include a Lieutenant Colonel Medical Member, Captain Legal Advisor, Captain Pilot Member, Technical Sergeant Recorder, Senior Airman Maintenance Member, a Technical Sergeant Subject Matter Expert (SME), and a Staff Sergeant SME (Tabs Y-8 to Y-15). The investigation took place at Luke AFB, AZ from 25 August 2018 through 3 October 2018 Tabs Y-3 to Y-4).

b. Purpose

In accordance with AFI 51-503, *Aerospace and Ground Accident Investigations*, this accident investigation board conducted a legal investigation to inquire into all the facts and circumstances surrounding this Air Force ground accident, prepare a publicly releasable report, and obtain and preserve all available evidence for use in litigation, claims, disciplinary actions, and adverse administrative actions.

2. ACCIDENT SUMMARY

On 24 April 2018, at 10:27:25 hours local time (L), the mishap pilot (MP) ejected from the mishap aircraft (MA) during an emergency landing at Lake Havasu City Airport, AZ (Tab CC-8). The MP safely ejected as the MA departed the runway (Tabs J-11 and CC-8). The MA continued for approximately 1,600 feet past the departure end of the runway before crashing into the airport perimeter fence line (Tab J-24). The MP, MA, and mishap instructor pilot (MIP) were assigned to the 310th Fighter Squadron (310 FS), 56th Fighter Wing (56 FW), Luke Air Force Base, AZ (Tabs G-2, G-9, and U-4). The mishap resulted in the complete loss of the MA and significant damage to additional Air Force property with total loss valued at $25,543,960 (Tab Q-9).

3. BACKGROUND

a. Air Education and Training Command (AETC)

AETC's primary mission is to recruit, train and educate Airmen to deliver Airpower for America (Tab CC-11). AETC, with headquarters at JBSA-Randolph was established and activated in January 1942, making it the second oldest major command in the Air Force (Tab CC-11). AETC includes the Air Force Recruiting Service, two numbered air forces and Air University (Tab CC-11). AETC has more than 29,000 active-duty members, 6,000 Air National Guard and Air Force Reserve personnel, 15,000 civilian personnel, and more than 11,000 contractors assigned (Tab CC-11). AETC flies approximately 1,300 aircraft at 12 major installations and supports tenant units on numerous bases across the globe, encompassing 16 active-duty and 7 Reserve wings (Tab CC-11).

b. 19th Air Force (19 AF)

The 19 AF's mission is to train and educate the world's finest Airmen to deliver Airpower for America (Tab CC-12). The 19 AF is responsible for training more than 30,000 U.S. and allied nation students annually in numerous specialties ranging from aircrews, remotely piloted aircraft crews, air battle managers, weapons directors, Air Force Academy Airmanship programs, and survival, escape, resistance, and evasion Specialists (Tab CC-12). The 19 AF executes operational-level command and control of all formal aircrew flying training missions within AETC and provides a 5th generation, cross-domain warrior mindset to the Combat Air Forces, Mobility Air Forces, and Special Operations Air Forces to sustain the combat capability of the United States Air Force (Tab CC-12).

c. 56th Fighter Wing (56 FW)

The 56 FW's mission is to train the world's greatest Fighter Pilots and combat ready Airmen. (Tab CC-16). The 56 FW is currently the largest FW in the world and the Air Force's only active-duty F-16 and F-35 training wing (Tab CC-16). As part of AETC and home to 23 squadrons, the 56 FW trains more than 400 F-16 and F-35 pilots annually (Tab CC-16).

d. 56th Operations Group (56 OG)

The 56 OG's mission is to train the world's greatest fighter pilots and combat ready airmen (Tab CC-19). The 56 OG is the flying component of the 56 FW and was re-activated at Luke AFB, AZ on 1 April 1994 (Tab CC-19). The 56 OG executes an extensive flying hour program that trains an average of 450 students per year, averaging more than 17,000 sorties and 24,000 hours each fiscal year (Tab CC-19).

e. 310th Fighter Squadron (310 FS)

The 310 FS "TopHats" train initial F-16 pilots during a 7 month Basic course that creates new wingmen for the Combat Air Forces (Tab CC-21). The TopHats are the USAF's largest producer of fighter pilots and graduate over 105 students annually (Tab CC-21). Students are taught how to fly and employ the F-16 in Air-to-Air, Air-to-Surface and Night missions (Tab CC-21). Each student accomplishes a minimum of 50 sorties, 174 Academic Events, 52 simulators and employs a vast array of unguided and precision air-to-surface munitions as well as simulated air-to-air ordnance (Tab CC-21). Graduates of the Basic course have the skills and proficiency to quickly deploy in support of wartime contingency operations (Tab CC-21). The 310 FS also accomplishes transition/requalification training as well as Instructor upgrades (Tab CC-21).

f. F-16C Fighting Falcon

The F-16C Fighting Falcon is a compact, multi-role fighter aircraft (Tabs CC-22 to CC-23). It is highly maneuverable and proven in both air-to-air combat and air-to-surface attack (Tabs CC-22 to CC-23). It provides a relatively low-cost, high performance weapons system for the United States (US) and allied nations (Tabs CC-22 to CC-23). In an air combat role, the F-16's maneuverability and combat radius (distance it can fly to enter air combat, stay, fight and return) exceed that of all potential threat fighter aircraft (Tabs CC-22 to CC-23). It can locate targets in all weather conditions and detect low flying aircraft in radar ground clutter (Tabs CC-22 to CC-23). In an air-to-surface role, the F-16 can fly more than 500 miles (860 kilometers), deliver its weapons with superior accuracy, defend itself against enemy aircraft, and return to its starting point (Tabs CC-22 to CC-23). An all-weather capability allows for accurate delivery of ordnance during non-visual bombing conditions (Tabs CC-22 to CC-23).

4. SEQUENCE OF EVENTS

a. Mission

On Tuesday, 24 April 2018, the 310 FS scheduled and authorized the MP's mission as part of its F-16 Initial Qualification Course (Tab K-3). The MP flew an Offensive Basic Fighter Maneuver (OBFM) flight (Tab K-3). The F-16C/D Initial Qualification Course syllabus shows this flight is accomplished during the day as a two-ship and is the third and final OBFM flight (Tab BB-6).

b. Planning

Prior to 07:30:00 hours L, both the MIP and MP reported to the 310 FS to prepare for their flight (Tab BB-4). The brief started at 07:45:00 for Gouge flight, the mishap flight (MF) (Tab K-3). The MIP (Gouge 1) briefed the MP (Gouge 2) (Tab K-3). Both the MIP and MP filled out an operational risk management (ORM) form, which is used to rate the level of risk for the flight (Tabs BB-8 to BB-9). The form takes into account the mission complexity, experience level,

weather and environment, human factors, and multiple other factors (Tabs BB-8 to BB-9). The ORM form totals the points for each pilot and designates a risk category of low, moderate, high, or severe (Tab BB-8). Both the MP and MIP rated as low risk on 24 April 2018 (Tab AA-5).

c. Preflight

The MP and MIP reviewed and briefed all applicable Notices to Airman (NOTAMs) and weather conditions during their allotted brief time (Tabs F-4, AA-4 to AA-5, and AA-7). Throughout the planning and preflight portion of the MF, there were no abnormalities documented (Tab AA-5). The squadron supervisor ensured the MIP and MP were prepared and ready for the flight (Tabs K-4 and AA-5). The MIP and MP stepped to their respective aircrafts at approximately 09:10:00 and started their engines at 09:30:00 (Tab BB-4). The MIP was in a two seat F-16D, and the MP was in a single seat F-16C (Tab K-3). Both aircrafts were configured with a centerline external fuel tank, one training missile, and an air combat maneuvering instrumentation pod (Tab K-3).

d. Summary of Accident

During taxi, the MP's intercom microphone (mic) switch changed from hot mic to cold mic and remained in cold mic for the duration of the flight (Tab CC-3). As discussed in the Air Force Tactics, Techniques, and Procedures (AFTTP) 3-3.F-16, in cold mic, the audio recording device only records radio calls and does not record any noise in the cockpit such as sounds coming from the aircraft, breathing or communications internal to the aircraft (Tab CC-3). AFTTP 3-3.F-16 requires that the tactical portion of all missions be flown in hot mic (Tab CC-3). At 09:59:13, the MF departed Luke AFB, executing a formation takeoff (Tab BB-6). The MF departed to the north and entered Bagdad V Military Operating Area (MOA) (Tabs K-3 and M-4). The MF executed their gravitational force exercise as they entered the airspace (Tab M-4). The first two BFM sets were uneventful, and the second BFM set terminated at 10:17:46 (Tab CC-6).

At 10:17:46, the MP selected military power, the maximum power the engine can generate without using afterburner (Tab U-8). The parameters of the MA when the MP selected military power were 17,200 feet above ground level (AGL), 200 knots (kts) on a 094 heading at 18 degrees nose high (Tab CC-6). In these parameters, the MA lost airspeed at a rapid rate due to the nose-high attitude (Tab CC-6). At 10:17:52, the MP moved the throttle to the idle power position and subsequently perceived that his fully functioning engine had shut off (Tab U-8). At 10:17:53, the MP placed the throttle into the maximum afterburner position for approximately one second before retarding the throttle to the idle power position (Tab U-8).

At 10:17:55, the MP executed the Airstart CAPs by moving the throttle from the idle position to the cutoff position (Tab U-8). At 10:17:58, the MP called "Gouge 2 knock it off, Engine Out" (Tab CC-7). At the time of the radio call, the MP was at 17,530 feet AGL, 173 kts, on a 090 heading at 4 degrees nose-low (Tab CC-6). At 10:18:02, the MIP called "One's flowing chase, execute the CAPS" (Tab CC-9). The MP then moved the throttle out of cutoff to the idle position at 10:18:04 (Tab U-9). The MIP maneuvered to the chase formation position, which would allow him to provide altitude awareness calls, checklist assistance and advise the MP of any unusual events according to the AFTTP 3-3.F-16 (Tabs BB-10 and CC-9).

At 10:18:30, the MP restarted the engine (Tab U-9). After confirming the MA's engine was operating, the MIP gave the MP a reference heading to the closest suitable airfield at the time of the emergency, Lake Havasu City Airport (Tabs CC-5 and CC-7). The MA began climbing with a normally operating engine (Tab CC-7 and U-9). At 19:19:21, the MP radioed "Can I get a heading, not a heading, a steer point for Lake Havasu" (Tab CC-7). Evidence indicates the MIP did not hear the steer point request because he received another radio call at the same time that obscured that portion of the MP's request (Tab CC-9). The MIP responded to the MP with "Heading to Lake Havasu, heading two seven zero" (Tab CC-7). For the remainder of the flight and unbeknownst to the MIP, the MP did not know his direction or distance to Lake Havasu City Airport (Tab CC-7).

At 10:23:13, the MIP radioed "Two I've got you on a one to one now" (Tab CC-8). One to one describes a glide ratio where the aircraft travels 1 mile across the ground for every 1,000 feet the aircraft descends (Tab CC-9). At the time of the radio call, the MA was in a 2-degree climb at 28,000 feet AGL, 22 miles from Lake Havasu City Airport at 365 kts (Tab CC-8). The MP did not begin to descend until approximately 30 seconds later when he visually acquired Lake Havasu City Airport (Tab CC-8). When the MP began the descent, the MA was level at 28,000 feet AGL, 17 miles from Lake Havasu City Airport at 345 kts (Tab CC-8).

At 10:24:38, the MA was 10-degrees nose low at 23,000 feet AGL and 12 miles from Lake Havasu City Airport at 267 kts (Tab CC-8). The MIP informed the MP "Two I'm showing you high on energy right now" (Tab CC-8). Pilot testimony defined energy as a term used to describe a combination of the aircraft's altitude and airspeed (Tab V-30.9). In response, the MP lowered the MA's landing gear (Tab CC-8).

At 10:25:31, the MA was 22-degrees nose low at 15,500 feet AGL, 8 miles from Lake Havasu City Airport at 250 kts (Tab CC-8). The MIP radioed to the MP "Alright two, I show you still high on energy" (Tab CC-8). In response, the MP stated, "Two's got full speed brakes" (Tab CC-8). The MIP responded with "If you can get to an 11 to 17 degree nose low, that's good" and "Remember you've got a working engine, if you need to go around, do that" (Tab CC-8). The MP replied back "Two," acknowledging he heard what the MIP said (Tab CC-8). The MIP then radioed "8,000 feet of runway, no cable," to which the MP replied, "Two copies" (Tab CC-8).

At the time the MP opened his speed brakes, the MIP did not have his landing gear extended (Tab CC-10). The MIP had to raise his aircraft's nose in order to slow down below 300 kts, the maximum airspeed at which landing gear can be lowered (Tab CC-10). As the MIP slowed to lower his landing gear, the MP continued toward the airfield (Tab CC-10). Evidence indicates the MIP was no longer in chase formation IAW AFTTP 3-3.F-16 to properly monitor the MA's flight parameters throughout the approach and landing sequence (Tabs BB-10 and CC-10).

Approximately four miles from the runway, the MP executed multiple turns to dissipate excess energy (Tab CC-8). The MA crossed the approach end of the runway at 242 kts, which was almost 30 kts above the calculated optimal approach airspeed (Tabs BB-10 and CC-8). At that time, the MIP was approximately 4,000 feet directly above the MP and radioed "Two, looking good" (Tab CC-8). The MIP was approximately 3,500 feet above the MP at this time and radioed "Max AOA, Max braking" and "Do your aerobrake 13 degrees" though the MA had not yet touched down on the runway (Tab CC-10). Regardless, the MP testified that he did not hear the

MIP's directives (Tab V-34.12). The MA's excess airspeed resulted in it touching down approximately 4,400 feet down the 8,000 feet runway at 180 kts (Tabs CC-8 and J-11). The MP attempted to increase the angle of attack (AOA) on the MA to decelerate faster; however, when the MP pulled back on the control stick to raise the nose of the MA, the excess airspeed caused the MA to lift off the ground (Tab CC-8).

The MA touched down a second time approximately 5,300 feet down the runway with 2,700 feet remaining at 165 kts (Tab CC-8 and J-22). The MIP radioed "Max braking…max braking" (Tab CC-10). The MP used maximum aerodynamic and mechanical braking but did not have enough runway remaining to stop the MA (Tab CC-8). Approximately 100 feet from the end of the runway, the MIP radioed "Eject, eject, eject" (Tab CC-8). The MP ejected from the MA as it overran the end of the runway at 93 kts (Tab CC-8).

Figure 1: MA Tire Tracks Departing Runway (Tab Z-3)

e. Impact

After departing the runway, the MA traveled approximately 1,000 feet on relatively flat terrain before continuing up a 10-degree incline for approximately 300 feet (Tab J-11). Based on the absence of tire tracks, the MA became airborne at the top of the incline and traveled another approximately 300 feet through the air before impacting the perimeter fence (Tab J-22). Subsequently, the MA hit the ground, shearing off the nose of the MA, the nose landing gear and the right main landing gear (Tab J-22). At 10:27:33, the MA collided with another section of the fence and spun clockwise approximately 130 degrees where it came to rest (Tab J-22). After impacting the ground, dirt and rocks were ingested by the intake causing the engine to shut down (Tabs J-22 and U-10).

Figure 2: MA Wreckage (Tab J-10)

f. Egress and Aircrew Flight Equipment (AFE)

The MP ejected successfully and sustained only a minor abrasion on the right elbow (Tabs CC-33 and X-1 to X-2). The ejection seat has three modes of operations, and the MA met operation Mode I at the time of ejection (Tab CC-33). Mode I operation is for ejection with speeds less than 250 +/- 25 kts equivalent air speed at sea level and for altitudes from 0 to 15,000 feet mean sea level (Tab CC-33). An Air Force Life Cycle Management Center comprehensive evaluation of all components of the ejection sequence showed that the ejection event was fully successful with only minor issues identified (Tab CC-33). According to the report, the minor issues did not affect the MP's ejection sequence (Tab CC-33).

g. Search and Rescue

At 10:24:05, the MIP alerted Lake Havasu City Fire Department Station 6, located at Lake Havasu City Airport, of the incoming emergency (Tabs CC-27 and V-21.10). The Fire Department's Aircraft Rescue and Fire Fighting crew monitored the airport's radio frequency and observed the MA's approach, landing and ejection (Tab V-22.4). At 10:27:25 L, the MP ejected from the MA (Tab CC-8). Post ejection, the MP landed just off the departure end of Runway 32 at Lake Havasu City Airport (Tab V-20.5). Emergency responders reached the MP immediately after ejection (Tabs V-21.4 to V-21.5). The MP told the emergency responders that he had an activated Emergency Power Unit, and there was potential for a hydrazine leak (Tab V-22.4). At that time, emergency responders set up a perimeter around the MA (Tabs V-21.11 and V-22.4).

h. Recovery of Remains

Not Applicable.

5. MAINTENANCE

a. Forms Documentation

Collectively, Air Force Technical Order (AFTO) 781 series forms document maintenance actions, inspections, servicing, configuration, status, and flight activities for an aircraft (Tab U-3). The Integrated Maintenance Data System (IMDS) is an electronic database used to track maintenance actions, flight activity, and schedule future maintenance (Tabs U-3 to U-4).

Review of the active AFTO 781 forms and IMDS revealed no overdue inspections or open Time Compliance Technical Order (TO) that would ground the MA from daily flight operations (Tab U-4). There is no evidence to suggest that forms documentation was a factor in the mishap (Tab U-4). A review of the IMDS data for the MA covering a 90-day period prior to the mishap revealed maintenance documentation complied with applicable maintenance directives (Tabs U-3 to U-4). A review of the maintenance records revealed no relevant recurring maintenance problems (Tab U-4).

The 310th Aircraft Maintenance Unit (AMU) documented the completion of all required maintenance actions IAW AFTO 00-20-1 *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures* (Tabs U-3 to U-4).

b. Inspections

The 310 AMU satisfactorily completed and appropriately documented all scheduled inspections IAW applicable TOs (Tabs U-3 to U-4). On 24 April 2018, the 310 AMU completed the Walk-Around or Pre-Flight Launch Inspections prior to launch IAW the applicable TOs (Tab U-4). The following scheduled preflight inspections took place on 23 April 2018 IAW 1F-16CG-6WC-1: *Combined Pre-flight/Post-flight, End-of-Runway, Thru-flight, Launch and Recovery, Alert Inspections, Quick Turnaround, Basic Post-flight, and Walk-around Before First Flight of Day Inspection Work-cards,* card numbers 1-001 thru 1-079 (Tab U-4):

(1) A qualified crew chief completed the Basic Post Flight/Pre-Flight Inspection with no discrepancies noted (Tab U-4).

(2) A qualified weapons technician completed the weapons Post-Load Inspection with no discrepancies noted (Tab U-4).

(3) A qualified ground crew completed pre-flight nitrogen servicing, tire pressure, and aircraft power-on checks with no discrepancies noted (Tab U-4).

(4) A 310 AMU team conducted a 72-month landing gear time change between 2 April 2018 and 9 April 2018 (Tab U-4). The team completed the landing gear time change IAW the applicable TO, and all individuals who participated in the maintenance were qualified and current on training (Tab U-4).

(5) A 310 AMU team conducted a 36-month weight and balance on 10 April 2018 IAW the applicable TO, and all personnel involved with the inspection were qualified and current on training (Tab U-4).

(6) At the end of the flying day on 20 April 2018, a 310 AMU crew chief, qualified on the task, conducted the 50-hour throttle quadrant inspection and the accompanying mini force check with no discrepancies noted (Tab U-4). A Quality Assurance (QA) inspector then verified the inspection results (Tab U-4). Review of the 50-hour Throttle Quadrant Inspection and the following QA inspection documentation revealed no discrepancies, confirming the inspection was completed IAW the applicable technical standards (Tab U-4).

c. Maintenance Procedures

There is no evidence to indicate that maintenance procedures were a factor in the mishap (Tab U-4).

d. Maintenance Personnel and Supervision

There is no evidence to indicate that maintenance personnel or supervision contributed to the mishap (Tab U-4).

e. Fuel, Hydraulic, Oil, and Oxygen Inspection Analyses

A review of the fuel, hydraulic, oil and oxygen inspection analysis from the MA before and after the mishap revealed no abnormalities (Tab U-4).

f. Unscheduled Maintenance

A review of both active and historical data showed no unscheduled maintenance problems relevant to the mishap (Tab U-4).

6. AIRFRAME, MISSILE, OR SPACE VEHICLE SYSTEMS

a. Structures and Systems

(1) MA condition

The MA received extensive damage upon impact with the perimeter fence (Tabs J-17 to J-22). The forward portion of the aircraft at the forward manufacturing breaking point and fuselage station 189 separated in line with the engine inlet (Tabs J-17 to J-22). The left and right wings, to include all flight control surfaces on the wings, landing gear and stabilizers all received extensive damage during impact (Tabs J-17 to J-22). Additionally, the engine exhaust nozzle and the centerline external fuel tank located on station 5 incurred severe damage. Post impact analysis deemed the MA a total loss (Tabs J-17 to J-22).

Figure 3: Labeled F-16 Diagram (Tab Z-5)

(2) Engine

The MA was equipped with one Pratt and Whitney F100-PW-220 turbofan engine identified with the serial number PW0E704125 (Tabs U-3 to U-4). The engine had an engine flight time of 5113.1 hours and was 75.9 hours out from its next 100 HR inspection (Tab U-4).

(3) Cold Mic

The hot mic switch is located on the AUDIO 2 Panel on the left side of the cockpit (Tabs U-4 and U-8). The hot mic switch is a 3-position switch with the two main settings being hot and off (Tabs U-4 and U-8). When the switch is positioned in hot mic, communications are transmitted from the pilot's mask mic at a constant rate, and no other switch activation is required to transmit internal audio (Tab U-3). Once placed into the off position, this constant audio feed is cut off and becomes stagnant until the mic switch on the throttle grip is activated (Tab U-3). In the off or "cold mic" position, the pilot cannot hear ambient cockpit noise or his own breathing in the headset (Tab U-3).

Figure 4: Audio 2 Panel Diagram (Tab Z-6)

(4) Environmental Control System (ECS)

The Environmental Digital Control/Sensor Controller (EDC/SC) provides ECS cutback mode when extreme operating temperatures within the ECS are reached (Tab U-3). During these conditions, the EDC closes the high stage, bleed air valve, which reduces airflow in the cockpit (Tab U-3). Pilot interviews revealed that ECS cutbacks are commonly detected as a sudden loss

of ambient noise and a change in cockpit pressure (Tabs U-3, V-25, and V-29). Further, testimony revealed that pilots have mistaken ECS cutbacks for engine failure (Tabs V-11.1 and V-15.1). ECS cutback mode generally occurs at altitudes above 40,000 feet Mean Sea Level; however, ECS cutbacks can occur at lower altitudes and airspeeds (Tabs U-8, V-25, and V-29).

(5) Throttle

The F-16C throttle is mounted in the left console of the cockpit (Tab U-3). The throttle has a fixed idle stop and an adjustable military power stop (Tab U-3). The throttle is connected to the main fuel control by a continuous push-pull linkage (Tab U-3). The throttle grip must be rotated upward and outward in order to allow movement out of the cut-off setting in order to advance past military power (Tab U-3). The operator must actuate a cutoff permission release, using a pinky trigger at the base of the throttle grip in addition to outward rotation, in order to pull the throttle past the idle stop and into cut off (Tab U-3).

b. Evaluation and Analysis

(1) Engine

Analysis of data downloaded from the MA's Digital Electronic Engine Control indicated that the MA's engine performance was normal prior to and following Airstart CAPs (Tabs U-6 and U-8 to U-10).

(2) Cold Mic

Based upon review of the MP's HUD tape, the MA's intercom mic switch changed from hot to cold during taxi and remained in cold mic for the duration of the flight (Tab CC-3).

(3) Environmental Control System (ECS) Cutback

There is not enough evidence to determine if the MP experienced an ECS cutback (Tabs U-5 and V-34.3 to V-34.7).

(4) Throttle

The Materials Integrity Branch of the Air Force Research Laboratory (AFRL) completed an independent analysis of the MA's throttle quadrant (Tab U-5). The AFRL determined that various component contaminants were present on the throttle (Tab U-5). However, based upon review of the MA engine data, MP HUD tape, and MP and 310 AMU crew interviews, the contaminants present did not affect throttle functionality, and the throttle was not a factor in the mishap (Tabs CC-8, U-5, V-1, and V-2 to V-5).

7. WEATHER

a. Forecast Weather

The 56 FW Weather Flight provided the mission execution forecast for Luke AFB and Range Bagdad (Tab F-3). The Luke AFB forecasted weather for takeoff and landing was winds from the southwest at 9 kts, 7 statute miles or greater visibility, and few clouds at 25,000 feet (Tab F-2). The forecasted weather for Range Bagdad during the flight was winds out of the southwest at 9 kts, 7 statute miles or greater visibility, and few clouds from 25,000 through 28,000 feet (Tab F-2). Potential moderate turbulence was forecast for Range Bagdad from 27,000 through 39,000 feet (Tab F-2).

b. Observed Weather

The observed weather for Luke AFB at the time of takeoff was wind calm, 10 statute miles visibility and clear skies (Tab F-2).

The observed weather for Lake Havasu City Airport 10 minutes prior to the mishap was winds out of the west at 4 kts, 10 statute miles visibility and clear skies (Tab F-2). The observed weather 10 minutes following the mishap was winds out of the west at 6 kts, 10 statute miles visibility and clear skies (Tab F-2).

c. Space Environment

Not applicable.

d. Operations

No evidence suggested that the MA was operating outside its prescribed operational limits with respect to weather (Tab CC-4).

8. CREW QUALIFICATIONS

a. MP

The MP's first flight in the F-16 took place on 21 Mar 2018 (Tab G-22). The MP had 11.1 hours flying the F-16 prior to the mishap (Tab G-4). The MP completed Undergraduate Pilot Training and the Introduction to Fighter Fundamentals course prior to starting the F-16C/D Initial Qualification Course (Tabs T-3 to T-4). According to his Commander at the time of the mishap, the MP was an average student (Tab V-30.5).

MP recent flight time is as follows (Tab G-6):

MP	Hours	Sorties
30 days	9.6	9
60 days	11.1	10
90 days	11.1	10

b. MIP

The MIP was a current and qualified instructor pilot in the F-16 at the time of the mishap (Tab G-20). The MIP had a total of 888.6 hours in the F-16 and 115.5 hours as an instructor pilot prior to the mishap (Tabs G-10 and G-29). The MIP obtained his initial mission qualification in the F-16 on 20 June 2014 and his initial instructor pilot qualification on 19 April 2017 (Tab G-20). The MIP had a current Form 8 instrument flying evaluation, dated 5 April 2017, and a current Form 8 mission qualification evaluation, dated 19 April 2017 (Tab G-20).

MIP Recent flight time is as follows (Tabs G-27 to G-29):

MIP	Hours	Sorties
30 days	14.7	12
60 days	31.2	23
90 days	50.4	37

9. MEDICAL

a. Qualifications

The MP's medical records show he was medically qualified for flying duties at the time of the mishap (Tab X-4). He completed his Periodic Health Assessment (PHA) on 15 June 2017 (Tab X-4). A comprehensive review of his medical records identified that he has an indefinite waiver, approved by HQ AETC on 2 September 2018, for a condition that was not a contributing factor to the mishap (Tabs X-4 to X-5). A search of the Aeromedical Information Management Waiver Tracking System database revealed no additional waivers (Tab X-4).

The MIP's medical records show he was medically qualified for flying duties at the time of the mishap (Tab X-4). He completed his PHA on 12 September 2017 (Tab X-4). A comprehensive review of his medical records identified that he had an active waiver, approved by HQ ACC on 16 November 2015, with an expiration date of 31 August 2018 (Tabs X-4 to X-5). The waiver condition was not a contributing factor in the mishap (Tab X-4). A search of the Aeromedical Information Management Waiver Tracking System database revealed no additional waivers (Tab X-4).

b. Health

The MP successfully ejected from the MA while landing at Lake Havasu City Airport and suffered a minor, superficial injury to the right elbow as a result (Tabs J-11 and X-3). The post-mishap, medical examination determined that the MP was in good health with no duty-limiting condition (Tabs X-3 to X-4). A review of the AIB created 72-hour and 7-day history revealed no evidence indicating that the personal health or lifestyle of the MP was a factor in the mishap (Tab X-4).

The MIP suffered no injuries during the mishap (Tab X-4). The flight surgeon who examined him post-mishap found no duty-limiting condition and determined the MIP was in good overall

health (Tab X-4). A review of the AIB created 72-hour and 7-day history revealed no evidence indicating that the personal health or lifestyle of the MIP was a factor in the mishap (Tab X-4).

There was no evidence indicating that the personal health of the maintainers was a factor in the mishap based upon a review of the 72-hour and 7-day maintainer crew histories (Tab X-4).

c. Pathology

The Defense Health Agency tested blood and urine samples for the MP, MIP, and aircraft maintainers for carbon monoxide, alcohol, and toxicology (Tab X-4). Results from the MP and MIP were negative (Tab X-4). One maintainer's urine drug screen was positive for a prescription medication related to a documented medical condition; however, neither the medication nor the medical condition contributed to the mishap (Tab X-4). All other maintainer toxicology reports were negative (Tab X-4).

e. Crew Rest and Crew Duty Time

AFI 11-202, Volume 3, *General Flight Rules*, dated 10 August 2016, requires aircrew members to have at least 12 non-duty hours before a Flight Duty Period and an opportunity for at least 8-hours of uninterrupted sleep (Tab X-4). The MP and MIP had no scheduled training or duty during the 12-hours prior to arriving at the squadron on the day of the mishap (Tab X-4).

AFI 21-101, *Aircraft and Equipment Maintenance Management*, dated 21 May 2015, limits maintenance members to no more than 12-hours of continuous duty with the opportunity for 8-hours of uninterrupted sleep in a 24-hour period (Tab X-4). A review of the 72-hour and 7-day histories for the maintainer crew found no violations of rest or duty limitations (Tab X-4).

10. OPERATIONS AND SUPERVISION

a. Operations

There is no evidence that operations tempo or other operational factors contributed to this mishap.

b. Supervision

On the day of the mishap, records show the MIP was current and qualified to conduct the assigned mission (Tabs G-20 and K-4). The MIP instructed and led the MP's offensive BFM sortie (Tab K-3).

The Supervisor of Flying (SOF) oversaw flying operations, air-traffic control operations, and established emergency advisories as required (Tab V-31.2). The 56 FW SOF was qualified at the time of the mishap according to records (Tab T-5). The 310 FS SOF was qualified to supervise squadron operations at the time of the mishap as documented in records for the day (Tab T-5).

There is no evidence to suggest that the supervisory practices or supervision contributed to the mishap.

11. HUMAN FACTORS ANALYSIS

a. Introduction

The Department of Defense Human Factors Analysis and Classification System Version 7.0 (DoD HFACS), defines potential human factors for assessment during a mishap investigation (Tab BB-11). The DoD HFACS is divided into four main categories: acts, preconditions, supervision, and organizational influences (Tab BB-15). The DoD HFACS lists sources of data for potential human factors such as witness testimony, medical records, toxicology results, video and audio recordings, and flight reconstructions (Tab BB-11).

b. AE206 Wrong Choice of Action During an Operation

This human factor occurs when an individual, through faulty logic or erroneous expectations, selects the wrong course of action (Tab BB-12).

Testimony from the MP indicated he heard a loud, unfamiliar sound when he advanced the throttle (Tabs V-34.3 and V-34.5). The MA's intercom switch was in the cold mic position, which according to TO 1F-16CG-6WC-1 and AFTTP 3-3.F-16, creates an auditory condition that amplifies normal aircraft systems' noises inside the cockpit (Tabs CC-3 and U-3).

After hearing an unfamiliar sound when advancing the throttle, MA engine data shows that the MP rapidly moved the throttle from the military to idle power setting before quickly moving the throttle to the maximum afterburner setting (Tabs U-8 and V-34.3 to V-34.4). The MA's instruments reflected a reduction in engine speed and temperature as well as a delay in engine response due to rapid throttle movements (Tabs U-8 and V-34.4). MP testimony revealed the audio and instrumentation misinterpretations caused the MP to believe the engine failed (Tabs V-34.3 to V-34.4). The MP testified that despite successfully restarting his engine, he did not trust his engine and did not believe it could support a go-around (Tab V-34.4).

c. PC103 Task Over-Saturation

This factor occurs when the quantity of information an individual must process exceeds their mental resources in the amount of time available to process the information (Tab BB-13).

The MP described himself as feeling rushed and so focused on landing that he was unable to communicate with the MIP (Tabs V-16.1 and V-34.11).

d. PP105 Lack of Assertiveness

This factor occurs when an individual fails to state critical information or solutions with appropriate persistence and/or confidence (Tab BB-14).

The MIP failed to direct that the MP correct the MA's energy state during the simulated flameout approach and landing (Tab CC-10). Upon arrival at the proper descent point for the approach, the MIP informed the MP that the MA was on a 1:1 glide ratio but did not direct the MP to descend

(Tab CC-10). Twice during the approach, the MIP identified the MA's high energy state to the MP instead of directing the MP to correct the energy state (Tab CC-10).

e. PP106 Critical Information Not Communicated

This factor occurs when known critical information is not provided to appropriate individuals in an accurate or timely manner (Tab BB-14).

Communication broke down between the MP and MIP regarding the MP's mistrust of the engine, his lack of navigation capability, his difficulties managing energy, and his perceived inability to go-around (Tabs V-34.10 to V-34.13). En route to the Lake Havasu City Airport, the MP did not communicate his continued mistrust of the MA's engine and belief the engine could not support a go-around to the MIP (Tab CC-7). Rather, the MP only communicated that he had a positive engine restart (Tab CC-7). Further, the MP did not communicate his inability to navigate to the MIP (Tabs CC-7 and V-34.11). The MP did not ask for a steer point again after only receiving a heading from the MIP, and he did not communicate that he was not utilizing the MA's navigational system (Tab CC-7). Accordingly, the MP testified he was uncertain of his distance from Lake Havasu City Airport, and his inability to determine the distance to the airfield delayed his descent from high altitude (Tabs CC-7 and V-34.10). Without the necessary navigation information, evidence showed that the MP did not adjust his energy state during the approach to Lake Havasu City Airport except when he received inputs from the MIP (Tabs CC-7 and V-34.10 to V-34.11).

12. GOVERNING DIRECTIVES AND PUBLICATIONS

a. Publically Available Directives and Publications Relevant to the Mishap

1. AFI 51-503, Aerospace and Ground Accident Investigations, dated 14 April 2015.
2. AFI 91-204, Safety Investigations and Hazard Reporting, dated 27 April 2018.
3. AFI 48-123, Medical Examinations and Standards, dated 5 November 2013.
4. Air Force Technical Order 00-20-1, Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures, dated 1 April 2016.
5. AFI 11-2F-16, Volume 1, F-16 Pilot Training, dated 20 April 2015.
6. AFI 11-2F-16, Volume 1, Air Education and Training Command Supplement, F-16-Pilot Training, dated 8 January 2016
7. AFI 11-2F-16, Volume 3, F-16 Operations Procedures, dated 13 July 2016, Incorporating Change 1, dated 26 May 2017.
8. AFI 11-202, Volume 3, General Flight Rules, dated 10 August 2016.
9. AFI 11-202. Volume 3, Air Education and Training Command Supplement, General Flight Rules, dated 20 January 2017.
10. AFI 11-214, Air Operations Rules and Procedures, dated 14 August 2012, Incorporating Change 1, dated 23 March 2016.
11. AFI 91-204, Safety Investigations and Hazard Reporting, Chapter 6, Human Factors Analysis and Classification System (HFACS) Version 7.0, dated 27 April 2018.

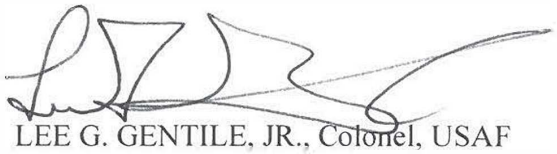
NOTICE: All directives and publications listed above are available digitally on the Air Force Departmental Publishing Office website at: http://www.e-publishing.af.mil.

b. Other Directives and Publications Relevant to the Mishap

1. F-16 Pilot Training Course Lesson Guide, SFO Procedures - L-183, dated 17 July 2015.
2. F-16 Pilot Training Course Lesson Guide, ECS Introduction Subsystems and Emergency Procedures - L-160, dated 25 September 2017.
3. TO 1F-16CM-1
4. TO 1F-16CM-1-1
5. Air Force Tactics, Techniques, and Procedures 3-3.F.F-16, Combat Aircraft Fundamentals F-16, dated 6 October 2017.
6. TO 1F-16CG-6WC-1, Combined Preflight/Post-flight, End-of-Runway, Thru-flight, Launch and Recovery, Alert Inspections, Quick Turnaround, Basic Post-flight, and Walk around Before First Flight of Day Inspection Work cards, dated 1 November 2013.
7. United States Air Force School of Aerospace Medicine Waiver Guide, dated 06 September 2018.

c. Known or Suspected Deviations from Directives or Publications

1. The MP failed to remain in hot mic for the duration of the flight IAW AFTTP 3-3.F-16.
2. The MIP failed to remain in a chase formation position IAW AFTTP 3-3.F-16 during the MP's approach and landing.



18 January 2019

LEE G. GENTILE, JR., Colonel, USAF
President, Accident Investigation Board

STATEMENT OF OPINION

F-16C, T/N 90-0760
LAKE HAVASU CITY AIRPORT, ARIZONA
24 APRIL 2018

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

1. OPINION SUMMARY

This Accident Investigation Board was conducted IAW Air Force Instruction 51-503.

On 24 April 2018, at 10:27:25 hours local (L), an F-16C, Tail Number (T/N) 90-0760, overran the north end of Runway 32 during an emergency landing at Lake Havasu City Airport, Arizona and crashed, destroying the aircraft. The mishap pilot (MP) was the sole pilot of the mishap aircraft (MA). The mishap flight (MF) was a two-ship consisting of the MA and the mishap instructor pilot (MIP) in an F-16D, T/N 88-0163. The MP and MIP were assigned to the 310th Fighter Squadron, Luke Air Force Base, Arizona. The MP was a student pilot in the F-16C/D Initial Qualification Course, flying a day, offensive basic fighter maneuver (BFM) training sortie led by the MIP. The MF was the third offensive flight in the BFM syllabus.

After the second BFM engagement, the MP wrongly assessed an engine failure and subsequently shut down the engine while executing the Airstart Critical Action Procedures (CAPs). Despite successfully restarting the engine, the MP continued to misperceive an engine malfunction, which eroded his confidence in the engine's abilities. During a simulated flameout (SFO) landing pattern to Lake Havasu City Airport, the MP failed to control his energy level, causing the MA to land long and fast. The MP then failed to abort the unsafe landing and execute a go around. The MP safely ejected from the MA as it departed the runway at a high rate of speed. After ejection, the MA travelled approximately 1,600 feet through the desert before crashing into the airport's perimeter fence. The mishap resulted in a complete loss of the MA and significant damage to additional Air Force property items with total loss valued at approximately $25,543,960.

Both the MA and MIP's aircraft were equipped with a centerline external fuel tank, one training missile and an air combat maneuvering instrumentation pod. The MP was an USAF First Lieutenant with 218.8 total flying hours, 11.1 F-16 hours. The MIP was an USAF Captain with 1150 total flying hours, 888.6 F-16 hours and 115.5 instructor pilot hours.

I find, by a preponderance of the evidence, that the cause of the mishap was pilot error. The pilot error is attributable to the human factor Wrong Choice of Action During an Operation. The MP

misinterpreted the MA's engine instruments and sounds in the cockpit, and subsequently, the MP shut down an engine that was operating within normal T.O. 1F-16CM-1 parameters. Despite successfully restarting the engine, the MP continued to misinterpret the MA's engine instruments and sounds in the cockpit. This misperception led the MP to believe that the engine was unreliable and could fail at any time. Additionally, the MP failed to use the MA's navigation system to monitor and adjust his energy level throughout the SFO approach to Lake Havasu City Airport, which caused a long and fast touchdown. The MP failed to recognize the unsafe landing condition and initiate a go around.

I find, by a preponderance of the evidence, several factors substantially contributed to the accident. First, the MA's intercom switch was in the "cold mic" position. This created an environment that accentuated normal cockpit auditory cues that led the MP to misperceive that the engine ceased functioning. Second, the MP failed to inform the MIP about his continued mistrust of the MA's engine or his inability to navigate. This lack of information prevented the MIP from fully understanding the situation and assisting the MP during the approach to Lake Havasu City Airport. Lastly, the MIP failed to cross-monitor the MP's performance and failed to provide timely and accurate instruction to the MP. Finally, I find, by a preponderance of the evidence, that the human factors that substantially contributed to the mishap were Critical Information Not Communicated, Task Over-Saturation, and Lack of Assertiveness.

I developed my opinion by analyzing flight data, witness testimony, animated simulations, expert analysis, video and audio recordings, and Air Force Instructions, Directives and Technical Orders.

2. CAUSE

While setting up for the third BFM engagement, the MP heard a loud noise in the cockpit and checked the engine instruments. The MP misinterpreted the noise and changes in the MA's engine instruments as an engine failure and executed the Airstart CAPs. The MP shutdown an engine that was operating within normal T.O. 1F-16CM-1 parameters. After successfully restarting the engine, the MP continued to misinterpret the MA's engine instruments and sounds in the cockpit. These misinterpretations led the MP to believe that the engine was unreliable and could fail at any time.

The MP failed to use the MA's navigation system to monitor and adjust his energy level to meet T.O. 1F-16CM-1 parameters throughout the SFO approach to Lake Havasu City Airport. This resulted in an excess energy state, which caused the MA to cross the runway threshold more than 25 knots (kts) faster than prescribed in T.O. 1F-16CM-1 and caused the MA to touchdown at 180 kts with 3,400 feet of runway remaining. Based upon the calculated landing distance and the runway remaining, the MP should have initiated a go around.

I find, by a preponderance of the evidence, the MP misperceived the functionality of the MA's engine, failed to properly assess and correct both his airspeed and altitude on final approach, failed to properly assess his airspeed and the runway remaining while landing, and failed to initiate a go around.

3. SUBSTANTIALLY CONTRIBUTING FACTORS

I find, by a preponderance of the evidence, that the substantially contributing factors in this mishap were the position of the MA's intercom switch, a breakdown in communication between the MP and MIP, and the MIP's failure to provide adequate instruction to the MP.

a. Cold Mic

The MA's intercom switch was in the cold mic position, which created an auditory condition that amplified normal aircraft systems' noises inside the cockpit. The MA's slow airspeed and idle power setting further reduced the ambient noise inside the cockpit. Normal system noises in the quiet cockpit environment were unfamiliar to the MP.

I find, by a preponderance of evidence, that the position of the MA's intercom switch was a substantially contributing factor in this mishap.

b. Failure to Communicate Critical Information

The MP failed to communicate critical information to the MIP. The MP failed to inform the MIP about perceived continuing engine concerns. Furthermore, when asked, the MP told the MIP that the engine was operating normally following restart. Additionally, the MIP saw that the MA climbed to 29,000 feet Mean Sea Level and accelerated to over 350 kts. The MIP had every indication that the MA's engine was operating normally. Additionally, the MP failed to inform the MIP that the MA's navigation system was not configured for the approach to Lake Havasu City Airport. The MIP was unaware of the MP's need for additional navigation assistance. This delayed the MIP's intervention and ultimately, the MP's descent for the approach. While landing, the MP was task over-saturated to the point that he was unable to communicate at all.

I find, by a preponderance of the evidence, that the MP's failure to communicate his perceived ongoing engine malfunction and inability to navigate was a substantially contributing factor in this mishap.

c. MIP

The MIP failed to remain in a formation position that would allow him to monitor the MA's parameters and provide timely and accurate instruction to the MP throughout the approach and landing sequence. Shortly after initiating the descent to Lake Havasu City Airport, the MP lowered his landing gear. The MIP lowered his landing gear after the MP, causing an increase in his airspeed relative to the MA's. The airspeed differential between the MA and MIP created a condition that forced the MIP to maneuver aggressively away from the MA, resulting in a 4,000-foot altitude separation between the MIP and MA. Because he was out of position, the MIP did not accurately assess the MA's airspeed and rate of descent. As a result, the MIP provided untimely and inaccurate inputs to the MP.

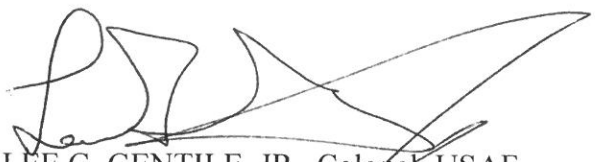
Furthermore, the MIP lacked assertiveness when communicating critical information to the MP. The MIP identified the MA's high energy state to the MP twice rather than directing the MP to correct the high energy during the simulated flameout approach. The MIP also informed the MP

that the MA was on a 1:1 glide ratio but did not direct the MP to descend. Additionally, the MIP reminded the MP to go-around if he needed but did not direct a go-around even as the MA continued down the runway at a high rate of speed.

I find, by a preponderance of the evidence, that the MIP's failure to effectively monitor the MP's performance and provide timely, accurate direction was a substantially contributing factor in this mishap.

4. CONCLUSION

I find, by the preponderance of the evidence, that the cause of the mishap was pilot error. The MP misinterpreted the MA's engine instruments and sounds inside the cockpit, and subsequently, the MP shut down a normally operating engine. The MP's failure to use the MA's navigation system degraded his ability to manage the MA's energy during the approach, which caused a long and fast touchdown. The MP failed to recognize the unsafe landing condition and initiate a go around. Furthermore, the MP's cold mic and failure to communicate with the MIP as well as the MIP's failure to monitor the MA's performance while providing timely and accurate instruction substantially contributed to the mishap. However, regardless of external influences, it is ultimately the pilot-in-command's responsibility to land the aircraft safely. Therefore, I find that the MP, as the qualified pilot-in-command of his F-16, was causal in this mishap.



18 January 2019

LEE G. GENTILE, JR., Colonel, USAF
President, Accident Investigation Board

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