UNITED STATES AIR FORCE
AIRCRAFT ACCIDENT INVESTIGATION
BOARD REPORT

F-16D, T/N 91-0466

UNITED STATES AIR FORCE DEMONSTRATION SQUADRON
57th WING
NELLIS AIR FORCE BASE, NEVADA

LOCATION: DAYTON, OH

DATE OF ACCIDENT: 23 JUNE 2017

BOARD PRESIDENT: COLONEL JASON W. EVENSON

Conducted IAW Air Force Instruction 51-503

Volume One of One

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
JOINT BASE LANGLEY-EUSTIS VA

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30 OCT 2017

ACTION OF THE CONVENING AUTHORITY

The Report of the Accident Investigation Board, conducted under the provisions of AFI 51-503, that investigated the 23 June 2017 mishap involving an F-16D, T/N 91-0466, United States Air Force Air Demonstration Squadron, 57th Wing, Nellis Air Force Base, Nevada, complies with applicable regulatory and statutory guidance; on that basis it is approved.

//signed//

JOHN K. MCMULLEN
Major General, USAF
Deputy Commander

*** On 2 November 2017, the Board President approved non-material, administrative changes to the report. Such changes included the deletion of a few words in the Executive Summary and Statement of Opinion.**

EXECUTIVE SUMMARY
UNITED STATES AIR FORCE
AIRCRAFT ACCIDENT INVESTIGATION

BLOCK 52 F-16D, T/N 91-0466
DAYTON, OH
23 JUNE 2017

On 23 June 2017, at 12:31 local time (L), a block 52 F-16D, tail number 91-0466, assigned to the United States Air Force Air Demonstration Squadron (USAFADS), 57th Wing, Nellis AFB, NV, departed the prepared runway surface at James M Cox Dayton International Airport (KDAY) and overturned, resulting in injuries to the mishap pilot (MP); the mishap crewmember (MC) was uninjured. There was no attempt to eject. Both personnel are assigned to the USAFADS. The mishap aircraft (MA), valued at $29,268,599, was destroyed.

The mishap occurred during a familiarization sortie for the MC, with the MP demonstrating the capabilities of the F-16 and the maneuvers performed by the USAFADS. The weather at KDAY was reported as broken at 900 feet, broken at 1,500 feet, and overcast at 2,500 feet; winds 340 at 17 knots, gusting to 20 knots; 1 ½ miles visibility with heavy rain and mist. Prior to landing, Dayton Tower advised MP there was previously reported wind shear and heavy precipitation at KDAY. MP executed a missed approach on the first approach to KDAY due to an inability to see the runway environment because of standing water on the canopy that obscured MP's vision. MP received holding instructions from Columbus Approach Control to wait for the weather to clear at KDAY. After holding for approximately 30 minutes, MP proceeded on vectors to the Instrument Landing System (ILS) approach to KDAY Runway 6 Left (6L). MP had adequate fuel to attempt one approach to KDAY then divert to Wilmington Airport if necessary. On MP's final instrument approach to Runway 6L, MP again experienced standing water on the MA's canopy, directly in front of the head-up display (HUD), obscuring the MP's forward vision and blurring the HUD. MP considered the crosswinds and wind shear and planned to fly a faster approach of 160-165 knots. The Crash Survivable Flight Data Recorder (CSFDR) shows that MA maintained approximately 200 Knots Calibrated Airspeed (KCAS) on final approach. The MA crossed the runway approach end threshold at approximately 193 knots, 43 knots faster than the Technical Order calculated approach airspeed. This excess airspeed significantly increased the distance required to land the MA.

The MA landed on Runway 6L, approximately 4,764 feet down the wet runway, 25 knots above computed touchdown speed, leaving 6,137 feet of prepared surface available to stop the aircraft prior to the overrun. MP was unable to stop the MA on the prepared surface. MA entered the overrun at approximately 50 knots; 4 seconds later the MA departed the overrun and overturned in the grass.

The Accident Board President found by a preponderance of the evidence that the cause of the mishap was landing with excess airspeed and insufficient distance to stop the MA on the wet runway. Substantially contributing factors were environmental conditions affecting vision, misperception of changing environment, and procedures not followed correctly.

SUMMARY OF FACTS AND STATEMENT OF OPINION
F-16D, T/N 91-0406
23 JUNE 2017

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

57 WG	57th Wing
1CO	Aviation Resource Manager
AB	Air Base
ACC	Air Combat Command
AFB	Air Force Base
AFE	Aircrew Flight Equipment
AFI	Air Force Instruction
AFPET	Air Force Petroleum Office
AFSAS	Air Force Safety Automated System
AGE	Aerospace Ground Equipment
AGL	Above Ground Level
AIB	Accident Investigation Board
AMMOS	Advanced Maintenance and Munitions Operations School
AOA	Angle of Attack
ATC	Air Traffic Control
ATIS	Automated Terminal Information System
BPO	Basic Post-Flight
CC	Commander
CFR	Crash, Fire, and Rescue
COMACC	Commander, Air Combat Command
CSFDR	Crash Survivable Flight Data Recorder
DIAFD	Dayton International Airport Fire Department
DO	Director of Operations
DoD	Department of Defense
DRU	Direct Reporting Unit
DVR	Digital Video Recorder
ECSMU	Enhanced Crash Survivable Memory Unit
EOD	Explosive Ordnance Disposal
EP	Emergency Procedure
EPT	Emergency Parachute Training
EPU	Emergency Power Unit
ER	Emergency Room
Fam	Familiarization
FBO	Fixed Base Operator
FCIF	Flight Crew Information File
FDP	Flight Duty Period
FDR	Flight Data Recorder
FEF	Flight Evaluation Folder
FERNS	Fire Emergency Response Notification System
FRC	Fault Reporting Codes
FS	Fighter Squadron
Ft	Feet
HFACS	Human Factors Analysis & Classification
HRT	Hydrazine Response Team
HSI	Horizontal Situation Indicator
HUD	Head-Up Display
IAW	In Accordance With
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IMDS	Integrated Maintenance Data System
IP	Instructor Pilot
JOAP	Joint Oil Analysis Program
JTS	Joint Tactics Squadron
K	Thousand
KCAS	Knots Calibrated Airspeed
KDAY	James M Cox Dayton International Airport
KILN	Wilmington Airport
KISP	Long Island Mac Arthur Airport
Kts	Knots
L	Local Time
LA	Legal Advisor
LBS	Pounds
LM-Aero	Lockheed Martin Aeronautics Company
LMR	Land Mobile Radio
Lt Col	Lieutenant Colonel
M	Mach
MA	Mishap Aircraft
Maj	Major
MAJCOM	Major Command
MC	Mishap Crewmember
MDS	Mission Design Series
METAR	Meteorological Terminal Aviation Routine Weather Report
MFL	Maintenance Fault List
MOA	Military Operating Area
MP	Mishap Pilot
MS	Mishap Sortie
MSgt	Master Sergeant
MSL	Mean Sea Level
MTC	Mission Training Center
NIFRS	National Fire Incident Reporting System
NM	Nautical Miles
NOTAMs	Notices to Airmen
OBOGS	Onboard Oxygen-Generating System
OG	Operations Group
Ops	Operations
ORM	Operational Risk Management
OTI	One Time Inspection
PA	Public Affairs
P&W	Pratt and Whitney
PCS	Permanent Change of Station
PR	Pre-Flight
PRD	Pilot-Reported Discrepancy
RCR	Runway Condition Reading
ROK	Republic of Korea
RTB	Return-To-Base
RVR	Runway Visual Range
SAR	Search and Rescue
SARM	Squadron Aviation Resource Management

SDO	Squadron Duty Officer
SEPT	Simulated Emergency Procedure Training
SIB	Safety Investigation Board
SII	Special Interest Item
SOF	Supervisor of Flying
SSgt	Staff Sergeant
TAF	Terminal Area Forecast
TCTO	Time Compliance Technical Order
TDY	Temporary Duty
TFN	Temporary Flight Restriction
T/N	Tail Number
TO	Technical Order
TOLD	Takeoff and Landing Data
TX	Transition Course
UFC	Upfront
UHF	Ultra High Frequency
UPT	Undergraduate Pilot Training
USAFADS	United States Air Force Air Demonstration Squadron
USAFWC	United States Air Force Warfare Center
UTD	Unit Training Device
VFR	Visual Flight Rules
VVI	Vertical Velocity Indication
WAI	Walk-Around Inspection
WPAFBFD	Wright-Patterson Air Force Base Fire Department
Z	Zulu

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

SUMMARY OF FACTS

1. AUTHORITY AND PURPOSE

a. Authority

On 1 August 2017, Major General John K. McMullen, Vice Commander, Air Combat Command (ACC), appointed Colonel Jason W. Evenson to conduct an aircraft accident investigation of the 23 June 2017 mishap involving an F-16 Thunderbird aircraft in Dayton, Ohio (Tab Y-3). On 7 August 2017, the Accident Investigation Board (AIB) convened at Wright Patterson Air Force Base (AFB), OH. A legal advisor (Lt Col), pilot member (Major), medical member (Captain), maintenance member (MSgt), and a recorder (SSgt) were appointed to the board (Tab Y-3). The AIB was conducted in accordance (IAW) with Air Force Instruction (AFI) 51-503, *Aerospace and Ground Accident Investigations*, dated 14 April 2015, and AFI 51-503, ACC Supplement, *Aerospace and Ground Accident Investigations*, dated 28 January 2016.

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 aerospace accident, prepare a publicly releasable report, and obtain and preserve all available evidence for use in litigation, claims, disciplinary action, and adverse administrative action.

2. ACCIDENT SUMMARY

On 23 June 2017, at approximately 12:31 local time (L), a block 52 F-16D, tail number 91-0466 [Mishap Aircraft (MA)], assigned to the United States Air Force Air Demonstration Squadron (USAFADS), 57th Wing (57 WG), Nellis AFB, NV, departed the prepared runway surface of James M Cox Dayton International Airport (KDAY) (Tab P-3). The MA overturned after departing the runway destroying the MA and injuring the mishap pilot (MP) (Tab P-4, Tab X-3). The mishap crewmember (MC) was uninjured (Tab X-3). The MA damage resulted in a total government loss of $29,268,599 (Tab P-4). The crash also resulted in damage to one runway end light, one runway approach light, and grass off the end of the runway (Tab P-3). There were no environmental clean-up costs (Tab P-2).

3. BACKGROUND

a. Air Combat Command (ACC)

Air Combat Command is the primary provider of air combat forces to America's warfighting commanders (Tab CC-3). To support global implementation of national security strategy, ACC operates fighter, bomber, reconnaissance, battle-management and electronic-combat aircraft (Tab CC-3). It also provides command, control, communications and intelligence systems, and conducts global information operations (Tab CC-3). ACC's mission is to support global implementation of national security strategy (Tab CC-3). ACC operates over 1,300 aircraft across 34 wings and 19 bases, comprising over 94,000 active duty and civilian personnel, and more than 49,000 Air National Guard and Air Force Reserve personnel (Tab CC-3).

b. United States Air Force Warfare Center (USAFWC)

The USAFWC's mission is to develop innovative leaders and full spectrum capabilities through responsive, realistic, and relevant testing, tactics development, and advanced training across all levels of current and future warfare (Tab CC-9). The USAFWC ensures deployed forces are well trained and well equipped to conduct integrated combat operations(Tab CC-9). USAFWC oversees the operations of four wings, two named units and one detachment, comprised of 11,000 active duty, guard, reserve and civilian personnel located in 23 states and 37 different locations (Tab CC-10).

c. 57th Wing

The 57 WG provides advanced aerospace training to world-wide combat air forces with innovative professionals leading advanced, realistic, multi-domain training focused on winning the high-end fight (Tab CC-12). Their dynamic and challenging flying operations include flying and maintaining A-10, F-15C/D, F-15E, F-16C/CG/CJ, F-22A, F-35A, MQ-9 and HH-60G aircraft (Tab CC-12). The 57 WG is comprised of seven distinct organizations (4 Groups [57th Adversary Tactics Group, 57th Operations Group, 57th Maintenance Group and the U.S. Air Force Weapons School] and 3 DRUs [561 JTS, USAFADS, USAF AMMOS]) (Tab CC-13 to Tab CC-14). Through those organizations they conduct advanced aircrew, space, logistics and command and control training, to include the premiere Red Flag and Green Flag exercises (Tab CC-12 to Tab CC-13). Finally, the wing supports the USAFWC's test/evaluation activities and showcases air power through annual USAFADS "Thunderbirds" demonstration schedules (Tab CC-14).

d. United States Air Force Air Demonstration Squadron

The USAFADS, also known as the Thunderbirds, performs precision aerial maneuvers demonstrating the capabilities of Air Force high performance aircraft to people throughout the world (Tab CC-15). The squadron exhibits the professional qualities the Air Force develops in the people who fly, maintain and support these aircraft (Tab CC-15).

e. F-16

The F-16 Fighting Falcon is a compact multi-role fighter aircraft (Tab CC-21). It is highly maneuverable and has proven itself in air-to-air combat and air-to-surface attack (Tab CC-21). It provides a relatively low-cost, high performance weapon system and air demonstration capabilities for the United States and allied nations (Tab CC-21).

4. SEQUENCE OF EVENTS

a. Mission

The mishap sortie (MS) was comprised of one F-16D (Tab V-1.2). The mission was to conduct the first of three familiarization flights on the day of 23 June 2017 (Tab V-1.2). The USAFADS director of operations manages and approves the familiarization flight program (Tab V-3.10). The familiarization flight program is designed to expose non-flying USAFADS team members to the F-16 and the aerobatic flying environment (Tab V-3.10). Prior to the mishap, the MA took off at approximately 11:15L from James M Cox Dayton Intl Airport (KDAY) and returned at approximately 12:30L (Tab GG-10, Tab GG-12). KDAY Runway 6 Left (6L) measures 10,901 feet long by 150 feet wide (Tab GG-5). The field elevation is 1,009 feet Mean Sea Level (MSL) (Tab GG-5). The runway is grooved asphalt until 1,400 feet remaining then grooved concrete (Tab GG-5). There are no arresting cables on this civilian airport (Tab GG-5).

b. Planning

Prior to going to the airfield, the mishap pilot (MP), the USAFADS Director of Operations (DO), and the USAFADS Commander (CC) discussed forecasted weather the morning of the MS (Tab V-1.2). MP arrived at KDAY at approximately 08:40L for mission planning and briefing in accordance with normal USAFADS procedures (Tab R-7, Tab V-1.3). MP and the DO used Fore Flight to observe forecasted and current weather observations (Tab V-3.2). The MP planned for a 1900 pound divert fuel with an alternate airfield of Wilmington Airport (KILN) (Tab V-1.4). MP briefed the Mishap Crewmember (MC) on emergency procedures, egress procedures, and normal procedures for a familiarization flight using the USAFADS Incentive Briefing Guide and Egress Training Power Point (Tab V-1.3, Tab HH-3).

c. Preflight

MP met with the USAFADS CC and DO on the morning of 23 June 2017 (Tab V-1.2). After looking at the forecast for the day, the CC decided to cancel the team practice but fly the scheduled

familiarization rides (Tab V-2.2). MP and the DO checked weather at the airfield and MP called the Wright-Patterson weather office to check on weather in the Buckeye Military Operation Area (MOA) (Tab R-32). There were no applicable notices to airmen (NOTAMS) that affected the MS (Tab II). MP and MC stepped to the aircraft with all appropriate Aircrew Flight Equipment (AFE) (Tab H-3). MA was configured with missile launchers on each wingtip and a 300-gallon fuel tank on the centerline station (Tab GG-5). MP and MC movement to the aircraft and engine start was uneventful (Tab V-1.3).

d. Summary of Accident

The Mishap Aircraft (MA) took off from James M Cox International Airport (KDAY) at approximately 11:15L on an instrument flight rules (IFR) clearance (Tab GG-10, Tab K-8). The departure, enroute, and airspace portions of the sortie were uneventful (Tab V-1.3).

Columbus Approach Control directed the MA via radar vectors to a runway "2-4 right" (24R) Instrument Landing System (ILS) final approach course (Tab V-1.3, Tab FF-3). During the final approach to runway 24R, Dayton Tower advised the MP of wind shear and extreme precipitation over the field (Tab FF-3). Upon reaching decision height, the MP executed a missed approach due to the MP's inability to see the runway environment because of standing water on the canopy (Tab V-1.4). During the missed approach, the water on the canopy dissipated allowing the MP to see the runway environment (Tab V-1.4). Columbus approach provided holding instructions for the MP to await improved weather conditions at KDAY (Tab FF-4).

MP held north of the Dayton Very High Frequency Omnidirectional Range (VOR) for 15 minutes (Tab FF-3 to Tab FF-6). MP planned to commence another approach upon reaching 1900 pounds of fuel (Tab V-1.4). Because the precipitation was heavier on the east side of the Dayton airport, Approach Control, Dayton Tower, and the MP coordinated for an approach to runway 6L (Tab V-1.4, Tab FF-7). MP received radar vectors to the runway 6L ILS final approach course (Tab FF-8). MP considered the crosswinds and previously reported wind shear, and planned to fly a slightly faster approach of 160-165 knots (Tab V-1.5 to Tab V-1.6). Crash Survivable Flight Data Recorder (CSFDR) shows a fuel weight of 1,665[1] pounds and a total MA weight of 22,288 pounds at landing (Tab GG-17, Tab GG-5). Computed approach and landing speeds for the MA at this weight are 150 and 138 knots respectively (Tab BB-8, Tab BB-40).

MP configured the MA for landing with landing gear down and speedbrakes (Tab GG-10, Tab V-1.6). On final approach, the Flight Data Recorder (FDR) shows MA maintained approximately 200 Knots Calibrated Airspeed (KCAS) (Tab Z-6). MA descended below the base of the clouds at approximately 1432 feet Mean Sea Level (MSL) and 486 feet Above Ground Level (AGL) (Tab GG-10). MP observed standing water on the canopy that was similar to the first approach to 24R (Tab V-1.5). The standing water on the canopy rendered the Head-Up Display (HUD) unusable so the MP transitioned his instrument cross check to the cockpit instruments (Tab V-1.5). MP flew the MA into a right yaw, and the turn enabled MP to visually acquire the runway environment at the left 11 o'clock visual position, to the left of the HUD (Tab V-1.5). The MA crossed the

[1] The Lockheed Martin Report has a typographical error on page 5, reflecting that the aircraft had 1,165lbs of fuel rather than 1,665lbs of fuel. Lockheed Martin acknowledged the error and confirmed the aircraft had 1,665 lbs of fuel.

runway approach end threshold at approximately 193 KCAS, 43 knots faster than the Technical Order computed approach airspeed (Tab Z-7, Tab BB-8, Tab BB-39). MP maintained greater than 190 knots for the first 2,000 feet of the runway then pulled back the throttle slowing to 178 knots at 3,000 feet down the runway (Tab Z-7 to Tab Z-8, Tab GG-14). The MA landed on the right side of Runway 6L, approximately 4,764 feet down the wet runway (Tab GG-4, Tab S-3). The MA touched down at approximately 163 knots, leaving approximately 6,137 feet available to stop prior to the overrun (Tab GG-4). After touchdown, the MP observed standing water on the front of the canopy until lowering the nose and applying brake pressure (Tab V-1.7). MP held the nose at a 10.5 degree nose high attitude to aerodynamically slow the MA (Tab GG-11). At approximately 110 knots, the MP lowered the nose and began maximum differential braking along with stick and rudder inputs to slow the MA and maneuver it back towards the centerline of the runway (GG-11, Tab V-1.7). The data shows the MP unintentionally induced forward stick pressure (Tab GG-11, Tab V-1.7). Forward stick pressure during 3-point landing roll of an F-16 increases landing distance in addition to pulling the aircraft to the right (Tab GG-22). The MA entered the overrun at approximately 50 knots in a skid to the left; 4 seconds later the MA departed the overrun (Tab GG-12, Tab Z-9 to Tab Z-10). At 12:31L, the MA departed the runway, the nose landing gear collapsed, and the right wing tip dug into the ground as the MA overturned (Tab GG-18, Tab GG-12, Tab Z-3). MP was able to shut the engine off with the assistance of the MC (Tab R-15). Dayton Tower immediately cleared pre-positioned Crash, Fire, and Rescue (CFR) onto the runway to begin rescue operations (Tab FF-11).

Figure 1 MA prior to emergency crews arriving (Tab S-3)

Figure 2 Tracks from MA through overrun (Tab S-2)

Figure 3. Tracks through grass and Rescue Operations (Tab S-2)

e. Impact

Aircraft T/N 91-0466 departed Dayton International Airport runway 6L at approximately 12:31L on 23 June 2017, at approximately 50 knots and 70 feet right of runway centerline (Tab GG-4, Tab GG-5, Tab S-2, Tab S-3, Tab GG-12). As the MA entered the soil beyond the overrun, the nose landing gear collapsed (Tab GG-18,). The nose and right wing tip contacted the ground and the MA overturned (Tab GG-18, Tab Z-3, GG-4). The impact resulted in the forward cockpit and canopy partially breaking off from the aircraft, and the front ejection seat disconnecting from the aircraft (Tab V-5.4).

Figure 4. Initial rescue operations (Tab S-5)

f. Egress and Aircrew Flight Equipment (AFE)

The MP and MC made no attempt to eject from the aircraft (Tab GG-21). The front ejection seat became dislodged from the aircraft and caused difficulty in extracting the MP (Tab V-5.4). CFR extracted the MP and MC from the aircraft at approximately 13:52L and 14:29L respectively (Tab GG-25). All flight equipment was up to date on inspections (Tab H-3).

g. Search and Rescue (SAR)

The MA departed the prepared surface at 12:31L (Tab L-5). The Dayton International Airport Fire Department (DIAFD) was staged for an exercise at this time, witnessed the mishap, and responded immediately (Tab V-4.1). DIAFD requested support from Wright-Patterson AFB Fire Department (WPAFBFD) at 12:39L (Tab GG-25). WPAFBFD arrived on scene at 13:05L, confirmed aircraft shutdown, pinned the Emergency Power Unit (EPU), and confirmed that the EPU had not fired (Tab GG-25, Tab V-5.5). A front-end loader, a fork lift, a tow truck, and straps

were used to elevate the MA and keep it and the MP from sinking into the mud (Tab V-5.4 to Tab V-5.5). Cribbing was used to support the MA during the extrication process (Tab V-5.4). Emergency response crews used a circular saw to cut through the MA canopy and hydraulic spreaders to get to MP (Tab V-5.5 to Tab V-5.6). At 13:48L, medics gained access to MP and initiated treatment (Tab GG-25). Medics assessed that MC was not injured and focused their efforts on the MP (Tab V-5.5). MP was removed from the overturned aircraft and was transported to Miami Valley Hospital (Tab GG-25). MP sustained several injuries (Tab X-3). Emergency response crews gained access to the MC at 14:26L and removed him from the MA approximately three minutes later (Tab GG-25). Medics transported the MC to Miami Valley Hospital where he was released without injury (Tab GG-25, Tab X-3). At 14:35L, the Hydrazine Response Team (HRT) entered the scene to secure the EPU/Hydrazine system. At 15:06L, the HRT confirmed that the hydrazine system was intact and the system had been secured (Tab GG-25).

Figure 5. MA stabilized by cribbing and heavy equipment (Tab S-6)

h. Recovery of Remains

Not applicable.

5. MAINTENANCE

a. Forms Documentation

The Air Force Technical Order (AFTO) 781 series of forms collectively document maintenance actions, inspections, servicing, configurations, status, and flight activities (Tab BB-13). The Integrated Maintenance Data Systems (IMDS) is a comprehensive database used to track maintenance actions, flight activity, and to schedule future maintenance (Tab BB-15). Review of the active AFTO 781 forms and IMDS revealed no discrepancies, and no overdue inspections or overdue Time Compliance Technical Orders (TCTOs) that would ground the MA from flight operations (Tab D-9 to Tab D-17). A thorough review of the active AFTO 781 forms and IMDS historical records for the 10 days preceding the mishap revealed no recurring maintenance problems (Tab D, Tab U). Additionally, there is no evidence of mechanical, structural, or electrical failure that would have contributed to the mishap (Tab D-2 to Tab D-17, Tab U-3 to Tab U-102, Tab U-103 to Tab U-122).

b. Inspections

The Pre-Flight (PR) Inspection and Basic Post-Flight (BPO) Inspection include visually examining the aerospace vehicle and operationally checking certain systems and components "to ensure no serious defects or malfunctions" exist (Tab BB-10 to Tab BB-11). Phase inspections are a thorough inspection of the entire aerospace vehicle (Tab BB-12). Walk-Around Inspections (WAI) are an abbreviated PR Inspection and are completed as required prior to launch IAW the applicable TO (Tab BB-11).

Review of the active AFTO 781 forms and IMDS revealed no overdue inspections or overdue Time Compliance Technical Orders (TCTOs) that would ground the MA from flight operations (Tab D-9 to Tab D-17). The total airframe operating time of the MA at takeoff of the MS was 5,460.3 hours (Tab D-3). The MA had flown 350.9 hours since its last phase inspection, which was completed on 1 August 2016 (Tab D-2). The last PR inspection occurred on 22 June 2017 at 16:30L with no discrepancies noted (Tab D-3). A WAI occurred on 23 June 2017 at approximately 09:00L with no discrepancies noted (Tab D-3). Prior to the mishap, the MA had no relevant reportable maintenance issues and inspections were satisfactorily completed (Tab D-3, Tab D-4, Tab D-6, Tab D-9 to Tab D-17).

c. Maintenance Procedures

A review of the MA active and historical AFTO 781 series forms and IMDS revealed all maintenance actions complied with standard approved maintenance procedures and Technical Orders (TOs) and not related to the mishap (Tab D-2 to Tab D-17, Tab U-3 to Tab U-102, Tab U-103 to Tab U-122).

d. Maintenance Personnel and Supervision

The USAFADS Maintenance Team performed all required inspections, documentations, and servicing for the MA prior to flight (Tab D-2 to Tab D-17). A detailed review of maintenance activities and documentation revealed no errors (Tab D-2 to Tab D-17, Tab U-103 to Tab U-122). Personnel involved with the MA's preparation for flight had proper and adequate training, experience, expertise, and supervision to perform their assigned tasks (Tab D-3, Tab T).

e. Fuel, Hydraulic, and Oil Inspection Analyses

According to the Air Force Petroleum (AFPET) Office Joint Oil Analysis Program (JOAP), samples from the MA engine and associated servicing carts were normal and no unusual volatiles were noted in the spectrum (Tab U-130). Oil contamination is not suspected as a contributing factor to the mishap (Tab U-130). Additionally, fuel samples from the MA were normal and the material tested was satisfactory for use (Tab U-128). Fuel contamination is not suspected as a contributing factor in the mishap (Tab GG-17 to Tab GG-18). Hydraulic fluid samples from the MA were within normal tolerance (Tab U-123 to Tab U-127). Hydraulic fluid contamination is not suspected as a contributing factor to the mishap (Tab GG-17, Tab U-123 to Tab U-127).

f. Unscheduled Maintenance

Unscheduled maintenance is any maintenance action taken that is not the result of a scheduled inspection, and normally is the result of a pilot-reported discrepancy (PRD) during flight operations, or a condition discovered by ground personnel during ground operations (Tab BB-16). There was no unscheduled maintenance that had any bearing on the mishap (Tab D-2 to Tab D-17, Tab U-3 to Tab U-102). All other unscheduled maintenance performed prior to the day of the mishap had no relevance to the accident (Tab D-2 to Tab D-17).

6. AIRFRAME, MISSILE, OR SPACE VEHICLE SYSTEMS

a. Structures and Systems

The MA overturned in the grass at the end of runway 6L at Dayton International Airport (Tab P-3 and Tab S-2). The canopy was broken when the jet overturned (Tab S-5). The canopy was removed by the rescue team to facilitate aircraft recovery (Tab V-5.5, Tab S-5). During the rollover, the right wing station 9 rail was partially torn off and the vertical stabilizer was folded over (Tab Z-3, Tab S-7). The vertical stabilizer was removed for transport to Wright-Patterson Air Force Base (Tab GG-6 to Tab GG-7). The forward fuselage had partially detached from the rest of the aircraft (Tab S-6). The remainder of the forward fuselage was removed during aircraft recovery (Tab S-7, Tab GG-6). The nose landing gear broke away from the drag brace assembly, causing the nose gear to collapse (Tab GG-18, Tab S-4 to Tab S-5). This damage most likely occurred after departing the prepared surface (Tab GG-18). According to the Lockheed Martin (LM) analysis, all systems operated properly and no faults were recorded which affected braking throughout recorded data (Tab GG-24).

(1) Head-Up Display (HUD)

The symbology displayed on the HUD conveys information relating to air-to-air and air-to-ground weapons aiming/delivery, heading, airspeed, altitude, artificial horizon, great circle steering, and instrument landing system (ILS) (Tab BB-29). MP reported the HUD was operating normally with exception of being blurred during a period of pooled water on the canopy (Tab V-1.7). No other system faults were recorded as contributing factors to the mishap (Tab GG-15).

(2) Landing Gear

The F-16 is equipped with a conventional, fuselage-mounted, tricycle landing gear system consisting of a single-wheel nose landing gear and two single wheel main landing gears (Tab BB-21). The landing gear system functioned appropriately and is not suspected as a contributing factor to the mishap (Tab GG-18 to Tab GG-19).

(3) Brake System

The wheels and brakes subsystem provides for normal braking, automatic prebraking during landing gear retraction, holding the aircraft stationary (parking brake), and antiskid protection (Tab BB-23). Each main gear wheel is equipped with an electrical controlled, hydraulically actuated, multidisc brake assembly (Tab BB-23). The braking system functioned properly and is not suspected as a contributing factor to the mishap (Tab GG-24).

(4) Speedbrakes

The speedbrake consists of two pairs of clamshell surfaces (doors) located adjacent to the engine nozzle and inboard of the horizontal stabilizer (Tab BB-20). The primary function of the speedbrake subsystem is to provide aerodynamic braking of the aircraft (Tab BB-25). This assists in maneuverability in turns and in speed control during landings (Tab BB-25). The MP did not report any speedbrake malfunctions (Tab V-1.6).

b. Evaluation and Analysis

Not applicable

7. WEATHER

a. Forecast Weather

The MS had a planned takeoff time of 10:30L (Tab V-1.3). The forecasted weather at KDAY for takeoff time was winds from 220 at 14 knots gusting to 20 knots (Tab W-4). Visibility was forecast to be 3 nautical miles (NM) with a ceiling of 800 feet AGL, thunderstorms, and rain (Tab W-4).

b. Observed Weather

The MP decided to delay planned takeoff time to allow the thunderstorms and rain showers to move to the east away from KDAY (Tab V-1.3). Prior to takeoff (11:15L), MP received weather information for takeoff to be winds from 220 at 12 knots, 10 nm visibility, light rain, scattered at 900 feet AGL, scattered at 2,100 AGL, and overcast at 3,000 AGL (Tab W-3, Tab V-1.3). Weather reported at KDAY during the first attempted approach to 24R was winds from 260 at 13 knots, 1 1/2 miles visibility with heavy rain and mist (Tab F-3, Tab W-3). The ceilings were broken at 900 feet, broken at 1,500 feet, and overcast at 2,500 feet (Tab F-3). The Dayton Tower controller advised MP of weather conditions at that time, including that the winds were 340 degrees at 17 knots gust 20 knots, with reported wind shear and heavy precipitation during the approach to 24R (Tab FF-8, FF-3). Heavy rain continued throughout the evening and during the rescue operation (Tab F-3, Tab W-3).

c. Space Environment

Not applicable.

d. Operations

Based on the forecast and prevailing conditions, the weather was in limits for the MS. Operations were conducted in accordance with AFI 11-202, Volume 3, *General Flight Rules*, 10 August 2016.

8. CREW QUALIFICATIONS

a. USAFADS Pilot Waivers

Due to the unique nature of their mission, the USAFADS maintain a list of waivers to Air Force documents in a memorandum from the ACC/A3 Director of Operations (Tab BB-36 to Tab BB-38). Waivers related to crew qualifications are listed below:

"Waiver to AFMAN 11-210 paragraph 1.3.1 (Instrument Refresher Program), coordinated with and approved by AFFSA/XOT: USAFADS assigned aircrew will accomplish instrument refresher course annually, not later than the end of the first quarter of any calendar year after expiration." (Tab BB-36).

"Waiver to AFI 11-2F16V2 paragraph 2.5.1 (Instructor Pilot Initial Flight Evaluation): USAFADS instructor pilots will be selected by the USAFADS/CC based on experience level and previous qualifications. USAFADS pilots are singularly qualified for their specific position and only one pilot is certified to fly each position. During the first phases of the training season, outbound pilots will train their replacement and second year pilots will then serve as Instructor Pilots throughout the remainder of the training and show season. USAFADS instructor upgrades will be IAW the Combined Thunderbird Pilot Syllabus and will be designated in the gradebooks as well as the letter of X's, without requiring an Initial Instructor Form-8. Included in the pilot's Flight Evaluation Folder (FEF) will be a memorandum that explains their specific instructor duties while assigned to the squadron. The USAFADS Training Officer will complete a form AF4324 updating the crew duty position from MP [Mission Pilot] to IP [Instructor Pilot]. A copy of the AF4324 will be given to the Squadron Aviation Resource Management (SARM) to update Crew Duty Position." (Tab BB-36).

b. Mishap Pilot

The MP was a current and qualified USAFADS pilot (Tab G-2). MP completed Air Force Undergraduate Pilot Training (UPT) at Sheppard AFB, Texas in November of 2010 (Tab T-34). The MP attended initial qualification training in the A-10 at Davis-Monthan AFB, Arizona from November 2010 to July 2011 (Tab T-34). After completing initial qualification training, the MP flew A-10s at Osan Air Base (AB), Republic of Korea (ROK) from July 2011 to October 2013 (Tab T-34). The MP completed his instructor pilot (IP) upgrade at Moody AFB, Georgia during his assignment from January 2015 to July 2016 (Tab T-34). The MP's initial qualification and

most recent F-16 instrument checkride was completed on 26 August 2016 (Tab G-20). His total flight time was 1761.8 hours, 147.4 of those in the F-16 (Tab G-11, Tab G-10).

On the day of the mishap, the MP's recent flight time was as follows (Tab G-6):

MP	Hours	Sorties
Last 30 Days	13.3	9
Last 60 Days	40.6	25
Last 90 Days	56.4	38

c. Mishap Crewmember

MC received the required emergency parachute training (EPT), egress training, and AFE training for the familiarization flight (Tab G-25).

9. MEDICAL

a. Qualifications

MP was medically qualified for flying duties without restrictions at the time of the mishap (Tab EE-3 to Tab EE-4). The MP's most recent annual military Periodic Health Assessment was performed on 16 November 2016 (Tab EE-3). His medical records contained a current Air Force Form 2992, Medical Recommendation for Flying or Special Operational Duty, dated 16 November 2016 (Tab EE-3). Additionally, MP had no active medical waivers in the Aeromedical Information Management Waiver Tracking System at the time of the mishap (Tab EE-4).

b. Health

The post-accident medical records for MP, as well as his 72-hour and 7-day histories were reviewed (Tab R-6 to Tab R-13). MP sustained a number of significant injuries from the mishap (Tab X-3).

The post-accident medical records for MC, as well as his 72-hour and 7-day histories were reviewed (Tab R-20 to Tab R-27). MC did not have any injuries resulting from the mishap (Tab X-3).

c. Pathology

Toxicology samples were submitted to the Armed Forces Medical Examiner System at Dover Air Force Base, Delaware for toxicological analysis (Tab EE-5 to Tab EE-19). These tests identify carbon monoxide and ethanol levels in the blood and detect traces of drugs (amphetamine, barbiturates, benzodiazepines, cannabinoids, cocaine, opiods, phencyclidine, and sympathomimetic amines) in urine (Tab EE-5 to Tab EE-19).

The following members were tested: MP, MC, and all MA maintenance crewmembers (Tab EE-6 to Tab EE-19). All results were negative, with the exception of MP (Tab EE-6). However,

MP's positive result was consistent with medication used to treat the injuries sustained from the mishap prior to sample collection (Tab EE-5).

d. Lifestyle

There is no evidence to suggest lifestyle was a factor in the mishap (Tab R-2 to Tab R-27, Tab V-1.8).

e. Crew Rest and Crew Duty Time

AFI 11-202, Volume 3, General Flight Rules, dated 10 August 2016, prescribes mandatory crew rest and maximum Flight Duty Periods for all personnel who operate USAF aircraft (Tab BB-31). Based on the information provided from 72-hour and 7-day histories, crew rest was adequate and IAW published guidance (Tab R-2 to Tab R-13).

10. OPERATIONS AND SUPERVISION

a. Operations

The USAFADS were operating at a slightly slower operational tempo for the team at the time of the incident (Tab V-2.2). The USAFADS typically departs Nellis AFB, NV to travel to a show on Thursday and returns to Nellis AFB, NV on the following Monday (Tab V-2.2). The team typically practices once or twice on Tuesdays and has Wednesday as a day off (Tab V-2.2). The team departed Youngstown, Ohio on Monday 19 June and arrived at Dayton, Ohio the same day. The team had two scheduled days off until they flew a practice airshow on Thursday 22 June 2017 (Tab V-2.2).

b. Supervision

The MS was appropriately scheduled and approved for the familiarization flight by the USAFADS DO (Tab V-3.3). The MP discussed weather considerations with both the CC and the DO (Tab V-1.2, Tab V-3.2). All operational risk management elements were appropriately covered (Tab V-3.2).

11. HUMAN FACTORS ANALYSIS

The AIB considered all human factors as prescribed in the Department of Defense Human Factors Analysis and Classification System 7.0 (DoD HFACS 7.0) (Tab BB-32).

The AIB identified 3 human factors relevant to the mishap: (1) Procedure Not Followed Correctly; (2) Environmental Conditions Affecting Vision; and (3) Misperception of Changing Environment.

a. Procedure Not Followed Correctly

The definition of 'Procedure Not Followed Correctly' is when a procedure is performed incorrectly or accomplished in the wrong sequence (AE103) (Tab BB-33).

MP did not follow procedures correctly for landing and maximum performance braking (Tab GG-21 to GG-24).

MP landed approximately 4,764' down the runway, with insufficient distance to stop the MA on a wet runway (Tabs GG-4). Braking procedures for a wet runway include maintaining full aft stick, opening the speedbrakes fully, and maximum wheel braking after the nosewheel is on the runway (Tab BB-6).

MP applied forward stick pressure starting at 21 seconds after touchdown (Tab GG-22). This resulted in decreased longitudinal deceleration values and an increased distance needed to safely stop on the runway (Tab GG-22).

b. Environmental Conditions Affecting Vision

The definition of 'Environmental Conditions Affecting Vision' is a factor that includes obscured windows; weather, fog, haze, darkness; smoke, etc.; brownout/whiteout (dust, snow, water, ash or other particulates); or when exposure to windblast affects the individual's ability to perform required duties (PE101) (Tab BB-34).

MP observed standing water on the canopy that obscured MP's vision and rendered the HUD unusable; the MP transitioned his instrument cross check to the cockpit instruments (Tab V-1.5). MP had not seen or experienced this condition during previous flights in the F-16 (Tab V-1.4). MP then flew the MA into a right yaw to obtain visual contact of the runway (Tab V-1.5). The F-16 Technical Order contains a warning that "when flying in heavy rain, water tends to be aerodynamically held on the forward position of the canopy….on final approach, the water is generally confined to the position of the canopy immediately in front of the HUD. It may be necessary to look out the sides of the canopy to acquire the runway and to flare and land the aircraft" (Tab BB-5).

c. Misperception of Changing Environment

The definition of 'Misperception of Changing Environment' is when an individual misperceives or misjudges altitude, separation, speed, closure rate, road/sea conditions, aircraft/vehicle location within the performance envelope or other operational conditions (PC504) (Tab BB-35).

MP misperceived the MA's final approach speed. MP reports maintaining 160-165 knots on approach, however the CSFDR data shows the MA at 193 knots when crossing the runway threshold (Tab V-1.6, Tab Z-7). The MA landed at approximately 163 knots (Tab GG-4). Modeling software using MA's landing parameters on a wet runway shows that landing at 163 knots requires between 7,000 feet and 8,100 feet to stop the aircraft (Tab GG-23).

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 51-503 Air Combat Command Supplement Aerospace and Ground Accident Investigations, dated 28 January 2016
(3) AFI 48-123, Medical Evaluations and Standards, dated 5 November 2013
(4) AFI 11-202V3, General Flight Rules, dated 10 August 2016
(5) AFI 11-2F-16V3, Flying Operations, dated 13 July 2016

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) TO 1F-16CM-1, Flight Manual, USAF SERIES F-16C AND F-16D
(2) TO 1F-16CM-1-1, Supplemental Manual, USAF SERIES F-16C AND F-16D
(3) TO 1F-16CJ-2-00GV-00-1, Technical Manual, GENERAL VEHICLE, ORGANIZATIONAL MAINTENANCE, USAF SERIES F-16C AND F-16D
(4) TO 1F-16CJ-2-32GS-00-1, Technical Manual, GENERAL SYSTEM, LANDING GEAR SYSTEM, USAF SERIES F-16C AND F-16D
(5) TO 1F-16CJ-2-27GS-00-1, Technical Manual, GENERAL SYSTEM, FLIGHT CONTROL SYSTEM (DIGITAL), USAF SERIES F-16C AND F-16D
(6) TO 1F-16CJ-2-94FI-00-1, Technical Manual, FAULT ISOLATION, WEAPONS SYSTEM USAF SERIES F-16C AND F-16D
(7) TO 1F-16CJ-2-94GS-00-1, Technical Manual, GENERAL SYSTEM, WEAPONS SYSTEM USAF SERIES F-16C AND F-16D
(8) TO 1F-16CM-1CL-1, Flight Crew Checklist, USAF SERIES F-16C/D
(9) TO 00-20-1, Technical Manual, AEROSPACE EQUIPMENT MAINTENANCE
(10) TO 00-20-2, Technical Manual, MAINTENANCE DATA DOCUMENTATION
(11) TO 42B2-1-3, Technical Manual, GENERAL, FLUIDS FOR HYDRAULIC EQUIPMENT
(12) DoD Human Factors Analysis and Classification System version 7.0

c. Known or Suspected Deviations from Directives or Publications

None.

11 October 2017

X **//signed//**

Jason Evenson

Signed by: EVENSON.JASON.W.

JASON W. EVENSON, Colonel, USAF
President, Accident Investigation Board

STATEMENT OF OPINION

F-16D, T/N 91-0466
DAYTON, OH
23 JUNE 2017

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

On 23 June 2017, at 12:31 local time (L), a block 52 F-16D, tail number 91-0466, assigned to the United States Air Force Air Demonstration Squadron (USAFADS), 57th Wing, Nellis AFB, NV, departed the prepared runway surface at James M Cox Dayton International Airport (KDAY) and overturned, resulting in injuries to the mishap pilot (MP); the mishap crewmember (MC) was uninjured. There was no attempt to eject. Both personnel are assigned to the USAFADS. The mishap aircraft (MA) valued at $29,268,599, was destroyed,.

I found by a preponderance of the evidence that the cause of the mishap was landing with excess airspeed and insufficient distance to stop the MA on the wet runway.

I developed my opinion by interviewing the mishap pilot telephonically and first responder personnel in person. Additionally I reviewed applicable Air Force directives, information provided by technical experts and other witness testimony. I also analyzed recorded flight data, engineering analysis and animated simulations.

2. CAUSE

The cause of this mishap was landing with excess airspeed and insufficient distance to stop the MA on the wet runway. MA had sufficient fuel to divert to a Visual Flight Rules (VFR) alternate. MP did not elect to go around.

a. Landing with excess airspeed and insufficient distance to stop

Dayton International Runway 6L measures 10,901 feet long by 150 feet wide. The MA landed approximately 4,764 feet down the runway, leaving approximately 6,137 feet of available runway to stop the MA. Technical Order landing data determined the MA calculated approach speed to be 150 knots with a 138 knot touchdown speed. According to the Crash Survivable Flight Data Recorder (CSFDR) the MA crossed the runway approach end at approximately 193 knots, 43 knots above calculated approach speed. MP maintained greater than 190 knots for the first 2,000 feet of the runway then pulled back the throttle slowing to 178 knots at 3,000 feet down the runway. This excess approach speed, coupled with a late throttle reduction, led to a long landing. MA touched

down at 163 knots, 25 knots faster than calculated touchdown speed. This excess touchdown speed increased the distance required to stop the MA. Modeling software using MA's landing parameters on a wet runway shows that landing at 163 knots requires between 7,000 feet and 8,000 feet to stop the aircraft. Based on landing with these conditions, the MP was unable to stop MA prior to departing the runway.

3. SUBSTANTIALLY CONTRIBUTING FACTORS

Substantially contributing factors include environmental conditions affecting vision, misperception of changing environment, and procedures not followed correctly.

a. Environmental Conditions Affecting Vision

During MP's first instrument approach at KDAY, MP described the canopy as having standing water that made it impossible to see the runway environment. MP had not seen or experienced this condition during previous flights in the F-16. The F-16 Technical Order contains a warning that "when flying in heavy rain, water tends to be aerodynamically held on the forward position of the canopy….on final approach, the water is generally confined to the position of the canopy immediately in front of the HUD. It may be necessary to look out the sides of the canopy to acquire the runway and to flare and land the aircraft." On MP's first approach to KDAY, MP executed a missed approach due to an inability to see the runway environment through the canopy. While executing the missed approach, the water dissipated. MP reports the HUD was unusable on approach due to appearing blurry. MP transitioned to the cockpit instruments as the sole instrument reference. During MP's second and final approach to KDAY, MP again experienced this same standing water condition. MP flew the MA into a right yaw and was able to visually acquire the runway environment at the left 11 o'clock position. This water on the canopy negatively impacted the MP twice during this sortie. On both occurrences, the MP transitioned to the cockpit instruments when the HUD became unusable. While contained as a warning in the Technical Order, MP had not experienced this particular condition. Coupled with crosswinds, this condition led to the MP spending more time on navigating toward the runway environment and less time on the aircraft's parameters. The MP's visual crosscheck broke down which led to a loss of situational awareness and to the decision to attempt a landing outside landing parameters, instead of executing a go around and proceeding to the VFR alternate.

b. Misperception of Changing Environment

The standing water on the canopy caused MP's visual crosscheck to break down, which led to the MP misjudging MA's speed on final approach, touchdown distance, and stopping distance. MP reports maintaining 165 knots on approach, however the CSFDR records MA indicating 193 knots as it crossed the runway threshold and it maintained this speed for the first 2,000 feet of the runway. MP then began to reduce the throttle in order to slow the MA for landing. MP landed in excess of recommended landing speeds and at a position on the wet runway that did not permit a safe landing. The MP did not elect to go around although the CSFDR shows the MA had enough fuel to proceed to the planned alternate field, which was VFR. The misperception of speed on approach and the position of the MA in relation to the runway resulted in MP landing without enough runway distance remaining to stop MA on the prepared surface. The misperception of speed on approach

and the misperception of the aircraft's position in relation to the runway resulted in landing without sufficient distance to stop the aircraft.

c. Procedure Not Followed Correctly

From the CSFDR data, forward stick pressure was applied beginning at 21 seconds after touchdown. Braking procedures for a wet runway include maintaining full aft stick, opening the speedbrakes fully, and maximum wheel braking after the nosewheel is on the runway. The forward stick application resulted in decreased deceleration and an increased stopping distance needed to stop the MA. Although the MP reported opening the speedbrakes prior to landing, the CSFDR does not record speedbrake positioning; so there is no data to determine the impact of the use of speedbrakes during the MA landing. Had the MP applied proper braking procedures throughout the landing roll, the probability of the MA departing the overrun and overturning would have been reduced.

4. CONCLUSION

I find by a preponderance of the evidence that the cause of the mishap was landing with excess airspeed and insufficient distance to stop the MA on the wet runway. Substantially contributing factors include environmental conditions affecting vision, misperception of changing environment, and procedures not followed correctly.

11 October 2017

X **//signed//**

Jason Evenson

Signed by: EVENSON.JASON.W

JASON W. EVENSON, Colonel, USAF
President, Accident Investigation Board

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