

UNITED STATES AIR FORCE
ABBREVIATED AIRCRAFT ACCIDENT
INVESTIGATION BOARD REPORT



MQ-1B, T/N 06-3166

**432D AIR EXPEDITIONARY WING
CREECH AFB, NV**



**LOCATION: UNITED STATES CENTRAL COMMAND
AREA OF RESPONSIBILITY**

DATE OF ACCIDENT: 17 AUGUST 2017

BOARD PRESIDENT: LT COL ALFRED J. ROSALES

**Abbreviated Accident Investigation, conducted pursuant to
Chapter 11 of Air Force Instruction 51-503**



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

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18 JAN 2019

ACTION OF THE CONVENING AUTHORITY

The report of the Abbreviated Accident Investigation Board, conducted under the provisions of AFI 51-503, that investigated the 17 August 2017 mishap in the United States Central Command Area of Responsibility, involving an MQ-1B, T/N 06-3166, assigned to the 432d Wing, Creech Air Force Base, Nevada, and operated by the 432d Air Expeditionary Wing, Creech Air Force Base, Nevada, complies with applicable regulatory and statutory guidance, and on that basis it is approved.

CHRISTOPHER P. WEGGEMAN
Lieutenant General, USAF
Deputy Commander

Dominant Combat Airpower for America

EXECUTIVE SUMMARY
ABBREVIATED AIRCRAFT ACCIDENT INVESTIGATION

MQ-1B, T/N 06-3166
US CENTCOM AOR
17 August 2017

On 17 August 2017, at approximately 18:59:32 Zulu (Z), the mishap aircraft (MA), a remotely piloted MQ-1B, tail number (T/N) 06-3166, from the 432d Wing, Creech Air Force Base (AFB), Nevada (NV), was lost in the United States Central Command Area of Responsibility (US CENTCOM AOR) while forward deployed participating in a combat support mission. At the time of the mishap, the MA was being operated by an aircrew from the 432d Air Expeditionary Wing, Creech AFB, NV. The MA executed an unrecoverable flight maneuver after the aircraft was transferred from the Launch and Recovery Element (LRE). The majority of the MA was destroyed from a fire at the impact site. The estimated cost of the MA and environmental clean-up cost was \$5,380,813. There were no reported fatalities or injuries.

After normal transfer of aircraft control from the LRE, commonly known as a Gaining Handover in the Air Force Technical Order, the mishap crew (i.e. mishap instructor pilot (MIP), mishap pilot (MP) and mishap sensor operator (MSO)) observed the MA execute a rapid, unrecoverable flight maneuver without pilot flight control inputs. This occurred 27 seconds after gaining handover. Based on testimony from the MIP and the LRE pilot, the handover was successful. The MA was flying level at 4,100 feet mean sea level (MSL) with both mishap crew and LRE aircrew receiving the video feeds from different transmitters. Although the mishap crew lost their video feed (“lost link”) immediately after the un-commanded pitch down maneuver, the LRE aircrew observed the MA pitch over then initiate a rolling dive towards the ground until impact. The LRE attempted to regain control of the MA through their transmitters, but the connection was unsuccessful. Gaining Handover checklist procedures were not a factor. Weather was not a factor. The ground control station (GCS), otherwise known as the cockpit, and the maintenance of the cockpit was not a factor. The 72-Hour/7-Day History review of the mishap crew did not highlight any notable factors. The LRE and their contract maintenance teams were found not to be a factor. The primary contractor, General Atomics – Aeronautical Systems Incorporated, completed analysis on the cockpit data log recordings and found the cause of the rapid unrecoverable maneuver was a failure of an electrical cable that resulted in a loss of power in the left tail flight control surface. This loss of power moved the left tail electrical components to the maximum trailing-edge-down deflection, resulting in a non-flyable configuration.

The Abbreviated Accident Investigation Board President determined, by a preponderance of the evidence, the cause of the mishap was an internal electrical failure that caused the un-commanded movement of the left tail surface, which resulted in the aircraft’s inability to continue flight.

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.

SUMMARY OF FACTS AND STATEMENT OF OPINION
MQ-1B, T/N 06-3166
17 AUGUST 2017

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ACRONYMS AND ABBREVIATIONS

12 AF	12th Air Force	GP	Ground Pilot
432 WG	432d Wing	GSO	Ground Sensor Operator
ACC	Air Combat Command	HFACS	Human Factors Analysis and Classification System
AF	Air Force	IAW	In Accordance With
AFB	Air Force Base	LRE	Launch and Recovery Element
AFI	Air Force Instruction	MA	Mishap Aircraft
AFSOUTH	Air Forces Southern	MAJCOM	Major Command
AFTO	Air Force Technical Order	MCE	Mission Combat Element
AFLCMC/WIIQL	Air Force Life Cycle Management Center/ MQ-1 System	MP	Mishap Pilot
	Program Office	MIP	Mishap Instructor Pilot
	Logistics Section	MSO	Mishap Sensor Operator
AGL	Above Ground Level	MSL	Mean Sea Level
AAIB	Abbreviated Accident Investigation Board	MTS	Multi-Spectral Targeting System
AIB	Accident Investigation Board	NOTAM	Notice to Airmen
AOR	Area of Responsibility	ORM	Operational Risk Management
ATO	Air Tasking Order	RPA	Remotely Piloted Aircraft
CC	Commander	SIB	Safety Investigation Board
CS	Chief of Safety	T/N	Tail Number
CTR	Contractor	TO	Technical Order
DoD	Department of Defense	USAF	United States Air Force
GA-ASI	General Atomics Aeronautical Systems Incorporated	US CENTCOM	United States Central Command
GCS	Ground Control Station or Cockpit	V	Volume
		Z	Zulu Time

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 24 July 2018, Major General Patrick M. Wade, Deputy Commander, Air Combat Command (ACC), appointed Lieutenant Colonel Alfred J. Rosales as the Abbreviated Accident Investigation Board (AAIB) President to investigate the 17 August 2017 accident involving a MQ-1B aircraft, tail number (T/N) 06-3166 (Tab Y-2 to Y-3). An AAIB was conducted at Nellis Air Force Base (AFB), Nevada (NV), from 7 August 2018 to 29 August 2018, in accordance with (IAW) the provisions of Air Force Instruction (AFI) 51-503, *Aerospace and Ground Accident Investigations*, Chapter 11 (Tab Y-2 to Y-3). A legal advisor (Captain) and a recorder (Staff Sergeant) were also appointed to the AAIB (Tab Y-2).

b. Purpose

IAW AFI 51-503, the AAIB 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 17 August 2017, at approximately 18:59:32 Zulu (Z), the mishap aircraft (MA), an MQ-1B aircraft, T/N 06-3166, from the 432d Wing (432 WG), Creech AFB, NV, crashed within the United States Central Command Area of Responsibility (US CENTCOM AOR) while forward deployed participating in a combat support mission (Tabs S-3, DD-2, DD-4, and V-5.1). At the time of the mishap, the MA was operated by an aircrew from the 432d Air Expeditionary Wing (432 AEW), Creech AFB, NV (Tabs K-2 to K-4, V-5.1, and CC-15). The MA executed an unrecoverable flight maneuver after the aircraft was transferred from the Launch and Recover Element (LRE) (Tab V-1.1, V-2.1, and V-4.1). The majority of the MA was destroyed from a fire at the impact site (Tabs S-3 and DD-4). The estimated cost of the aircraft and environmental clean-up costs was \$5,380,813 (Tab P-2 and P-6). There were no reported fatalities or injuries (Tab Q-5 to Q-6).

3. BACKGROUND

The MA belonged to the 432 WG, Twelfth Air Force (12 AF), ACC, based at Creech AFB, NV, but was operated by the 432 AEW during the mishap (Tabs V-4.1, V-5.1, and CC-10).

a. Air Combat Command

ACC is a major command (MAJCOM) of the United States Air Force (USAF) and the primary force provider of combat airpower to America's warfighting commands, established to support global implementation of national security strategy (Tab CC-2). ACC operates fighter, reconnaissance, battle-management and electronic-combat aircraft (Tab CC-2). It also provides command, control, communications and intelligence missions, and conducts global information operations (Tab CC-2). As a force provider and Combat Air Forces lead agent, ACC organizes, trains, equips and maintains combat-ready forces for rapid deployment and employment while ensuring strategic air defense forces are ready to meet the challenges of peacetime air sovereignty and wartime air defense (Tab CC-2). ACC numbered air forces provide the air component to United States Central, Southern and Northern Commands, with Headquarters ACC serving as the air component to Joint Forces Commands (Tab CC-2). ACC also augments forces to United States European, Pacific, Africa-based and Strategic Commands (Tab CC-2).



b. Twelfth Air Force

12 AF, or Air Forces Southern (AFSOUTH), enables combat ready forces for rapid global employment; and receives and employs joint air component assets to meet US strategic objectives in the United States Southern Command (Tab CC-5). 12 AF is responsible for United States air and space operations in Central America, South American and the Caribbean and its subordinate commands operate more than 360 aircraft with more than 20,300 uniformed and civilian Airmen (Tab CC-5).



c. 432d Wing, 432d Air Expeditionary Wing

The 432 WG consists of combat-ready Airmen who fly and maintain the MQ-1 Predator and MQ-9 Reaper remotely piloted aircraft (RPA) in direct support of the United States total force components and combatant commanders (Tab CC-9 and CC-10). The 432 WG also trains aircrew, intelligence, weather, and maintenance personnel for RPA operations (Tab CC-9 and CC-10). The RPA systems provide real-time intelligence, surveillance and reconnaissance (ISR), as well as precision attack against fixed and time-critical targets (Tab CC-15). The veteran combat unit returned to active service on 1 May 2007, at Creech AFB, NV, as the 432 WG, and formed the U.S. Air Force's first unmanned aircraft (later, RPA) systems wing (CC-15). In doing so, the 432 WG took charge of existing and rapidly expanding unmanned precision attack and ISR combat missions there in support of overseas contingency operations (Tab CC-15). On 15 May 2008, the provisional 432 AEW activated at Creech AFB to offer the fullest possible spectrum of leadership to these fights, while complementing the operate, train and equip efforts of the 432 WG (Tab CC-15).



d. MQ- 1B Predator

The MQ-1B Predator is an armed, multi-mission, medium-altitude, long endurance RPA that is employed primarily as an intelligence-collection asset and secondarily against dynamic execution targets (Tab CC-11). Given its significant loiter time, wide-range sensors, multi-mode communications suite, and precision weapons, it provides a unique capability to perform strike, coordination and reconnaissance against high-value, fleeting, and time-sensitive targets (Tab CC-11). Predators can also perform the following missions and tasks: intelligence, surveillance and reconnaissance, close air support, combat search and rescue, precision strike, buddy-lase, convoy/raid overwatch, route clearance, target development, and terminal air guidance (Tab CC-11). The MQ-1B's capabilities make it uniquely qualified to conduct irregular warfare operations in support of combatant commander objectives (Tab CC-11).



The Predator carries the Multi-spectral Targeting Systems (MTS), which integrates an infrared sensor, color/monochrome daylight TV camera, image-intensified TV camera, laser designator and laser illuminator (Tab CC-11). The full-motion video from each of the imaging sensors can be viewed as separate video streams or fused (Tab CC-11). The aircraft can employ two laser-guided Hellfire missiles that possess high accuracy, low-collateral damage anti-armor/anti-personnel engagement capabilities (Tab CC-11).

The aircraft is employed from a ground control station (GCS), commonly known as a cockpit, via a line-of-sight datalink or a satellite datalink for beyond line-of-sight operations (Tab CC-11 to C-12). The basic crew for the Predator is a rated pilot to control the aircraft and command the mission and an enlisted aircrew member to operate sensors and weapons inside the cockpit (Tab CC-11).

4. SEQUENCE OF EVENTS

a. Mission

On 17 August 2017, the mishap Mission Control Element (MCE) crew accomplished a normal transfer of aircraft control with the LRE to continue an assigned Air Tasking Order (ATO) mission in the US CENTCOM AOR (Tab V-3.1 and V-5.1). The mishap crew consisted of the Mishap Pilot (MP), Mishap Instructor Pilot (MIP), and Mishap Sensor Operator (MSO) (Tabs K-3, V-2.1, V-3.1, and V-4.1). The MP was qualified to accomplish the mission, but was non-current on Gaining Handover checklist procedures so the MIP was present to observe (Tab V-2.1). There is no evidence to suggest the Gaining Handover checklist procedures were a factor in the mishap (Tab V-1.1 and V-2.1).

b. Planning

There is no evidence to suggest the mishap crew's mission planning was a factor (Tab V-2.1 and V-3.1). Flight authorization and certification paperwork were completed (Tabs G-8, G-21, G-39 and K-3). The risk management assessment was low and there was no adverse weather (Tabs F-2, F-3, V-1.1, V-2.1, V-3.1, and V-4.1).

c. Preflight

No discrepancies were noted in the maintenance records for the MA (Tabs D-2 to D-12, R-25, and U-3 to U-4). At the time of the mishap, the MA had accumulated 23,691 total flight hours and was not overdue for any inspections (Tab D-2 and D-11).

d. Summary of Accident

After normal transfer of aircraft control from the LRE, commonly known as a Gaining Handover in the Air Force Technical Order (AFTO), the MP and LRE pilot observed the MA execute an uncommanded nose high then nose low pitch attitude followed quickly by a lost link (Tab V-3.1 and V-4.1). This occurred 27 seconds after gaining handover (Tab DD-2). Based on testimony from the MIP and the LRE pilot, the handover was successful (Tab V-1.1 and V-2.1). The MA was flying level at 4,100 feet mean sea level (MSL) with both mishap crew and LRE aircrew receiving the video feeds from different transmitters (Tabs V-1.1, V-4.1, and DD-2).

There are two links with the aircraft – command link and return link (Tab V-5.1). Command link enables the aircrew to control the aircraft, and return link enables aircrew to see what the aircraft is doing based on the commands it receives (Tab V-5.1). Although the mishap crew lost their video feed (“lost link”) immediately after the un-commanded pitch down maneuver, the LRE aircrew observed the MA pitch over then initiate a rolling dive towards the ground until impact in an open field (Tabs S-2, V-1.1 and V-3.1). The LRE attempted to regain control of the MA through their transmitters, but the connection was unsuccessful (Tab V-1.1).

e. Impact

The MA impact location was in the US CENTCOM AOR (Tab V-1.1 and V-2.1).

f. Egress and Aircrew Flight Equipment

Not applicable.

g. Search and Rescue (SAR)

Not applicable.

h. Recovery of Remains

Not Applicable.

5. MAINTENANCE

a. Forms Documentation

A review of the maintenance records for the MA leading up to the mishap day revealed no relevant discrepancies or issues, and showed no overdue Time Compliance Technical Orders, time change items, or special inspections (Tabs D-2, U-3, and U-4). Prior to launch, there was no evidence of

procedural violations on the MA's flight and post- and pre-flight inspections (Tabs D-11 and U-3 to U-4).

b. Inspections

There was no evidence of maintenance discrepancies (Tabs D-2, D-11, U-3, U-4, and DD-6). AFTO Form 781H indicated the MA was inspected prior to its last flight (Tabs D-11 and U-4).

c. Maintenance Procedures

There was no evidence to suggest maintenance procedures were not conducted in accordance with applicable AFTOs and guidance (Tabs D-2 to D-12, U-3, and U-4).

d. Maintenance Personnel and Supervision

There was no evidence to suggest preflight servicing and maintenance was not documented by military and civilian maintenance personnel (Tabs D-2 to D-12, and U-3 to U-4). No evidence existed that the training, qualifications, and/or supervision of the maintenance personnel were factors in this mishap (Tabs D-2 to D-12, and U-3 to U-4).

e. Fuel, Hydraulic, and Oil Inspection Analyses

According to the MA's AFTO 781H forms, fluid levels checks/inspections were conducted prior to the mishap mission (Tabs D-11 to D-12 and U-3 to U-4).

f. Unscheduled Maintenance

Maintenance documentation revealed a cowl flap servo was removed and replaced when it did not pass the pre-flight ground checks prior to the MA taxi and takeoff (Tabs D-10 and R-25). Post-installation operations checks for the replaced cowl flap servo were normal and there was nothing out of the ordinary, and there is no indication that the replacement was a factor in the mishap (Tab R-25).

6. AIRFRAME, MISSILE, OR SPACE VEHICLE SYSTEMS

a. Structures and Systems

The Air Force Life Cycle Management Center (AFLCMC) examined the mishap cockpit logs following the incident and did not note any issues, concluding that the cockpit was fully mission capable (Tab DD-2).

b. Evaluation and Analysis

The MCE data logs were downloaded by maintenance personnel from the cockpit following the MA incident and sent for review to the Air Force Life Cycle Management Center – MQ-1 Predator System Program Office Logistics Section (AFLCMC/WIIQL) to release the cockpit back into service (Tab DD-2). Their summary indicated a possible failure of the left tail actuator or the left tail actuator driver board (Tab DD-2). An additional review of the data logs from General

Atomics-Aeronautical Systems (GA-ASI) identified the cause of the rapid unrecoverable maneuver as a failure of an electrical cable resulting in a loss of power in the left tail flight control surface (Tabs V-2.1, V-3.1, DD-2 and DD-5). Review of a post-mishap flight video revealed the left tail electrical components moved to the maximum trailing-edge-down deflection resulting in a non-flyable configuration (Tab DD-5).

7. WEATHER

a. Forecast Weather

The weather slides briefed prior to the mishap flight indicate that the forecast for the flight operation had no significant weather that would inhibit MQ-1B flight operations (Tab F-2 to F-3). Forecasted weather included low-moderate wind speeds and scattered clouds from 3000-4000' MSL (Tab F-2).

b. Observed Weather

No significant weather was reported or observed at the time of the mishap (Tab F-4). Weather observations included wind from east southeast at 2 knots, scattered clouds at 3500' MSL, and a normal altimeter reading (Tab F-4).

c. Space Environment

Not Applicable.

d. Operations

No evidence suggests that the MA was commanded to operate outside of prescribed operational weather limits (Tab F-4).

8. CREW QUALIFICATIONS

a. Mishap Pilot (MP)

The MP was current and qualified to conduct MCE operations in the MQ-1B at the time of the mishap with exception of a non-currency for Gaining Handover procedures (Tabs G-8, G-9, V-2.1, and V-3.1). The MP had 742 hours of MQ-1B flight time around the time of the mishap (Tab G-10). Recent MQ-1B flight hours were as follows (Tab G-11):

	Flight Hours	Flight Sorties
Last 30 Days	28.1	9
Last 60 Days	59.6	20
Last 90 Days	86.3	32

b. Mishap Instructor Pilot (MIP)

The MIP was current and qualified to conduct mission combat element operations in the MQ-1B at the time of the mishap (Tab G-19 to G-22). The MIP had 1118 hours of MQ-1B flight time around the time of the mishap (Tab G-23). Recent MQ-1B flight hours were as follows (Tab G-24):

	Flight Hours	Flight Sorties
Last 30 Days	43.5	22
Last 60 Days	82.1	32
Last 90 Days	133.0	48

c. Mishap Sensor Operator (MSO)

The MSO was current and qualified to conduct mission combat element operations in the MQ-1B at the time of the mishap (Tab G-39 to G-40). The MSO had 2412 hours of MQ-1B flight time around the time of the mishap (Tab G-41). Recent MQ-1B flight hours were as follows (Tab G-42):

	Flight Hours	Flight Sorties
Last 30 Days	68.5	20
Last 60 Days	167.6	44
Last 90 Days	238.4	66

9. MEDICAL

a. Qualifications

No evidence exists to suggest crews were not qualified for flight duty (Tab K-3).

b. Health

Not applicable.

c. Pathology/Toxicology

Toxicology was not a factor in this mishap (Tab EE-2 to EE-9).

d. Lifestyle

A review of the crew's 72-hour, 7-day histories did not highlight any notable factors (Tab R-5 and R-14).

e. Crew Rest and Crew Duty Time

Prior to performing in-flight duties, aircrew members must have proper rest, as defined in the ACC Supplement to AFI 11-202, Volume (V) 3, General Flight Rules (Tab BB-5). AFI 11-202 V3

defines normal crew rest as a minimum of 12-hour non-duty period before the designated flight duty period begins (Tab BB-6). Crew rest is defined as free time and includes time for meals, transportation and the opportunity to sleep (Tab BB-6).

The mishap crew verified they had received the proper crew rest by signing the pre-flight authorization (Tab K-3).

10. OPERATIONS AND SUPERVISION

a. Operations

There is no evidence to suggest operations tempo contributed to the mishap (Tab V-5.1).

b. Supervision

There is no evidence to suggest the Operations Supervision contributed to the mishap (Tab V-2.1).

11. HUMAN FACTORS ANALYSIS

The AAIB considered all human factors as prescribed in the Department of Defense (DoD) Human Factors Analysis and Classification System (HFACS), Version 7.0, to determine those human factors that directly related to the mishap (Tab BB-2). Based on the evidence, human factors did not play a factor in this mishap.

12. GOVERNING DIRECTIVES AND PUBLICATIONS

a. Publicly Available Directives and Publications Relevant to the Mishap

- (1) AFI 51-503, *Aerospace and Ground Accident Investigations*, 14 April 2015, Incorporating AFGM2018-01, 12 March 2018
- (2) AFI 51-503, *Aerospace Accident Investigations*, ACC Supplement, 28 January 2016
- (3) AFI 11-2MQ-1&9, Volume 1, *MQ-1&9 - Aircrew Training*, 23 April 2015
- (4) AFI 11-2MQ-1&9, Volume 3, *MQ-1 and MQ-9 - Operations Procedures*, 28 August 2015
- (5) AFI 11-202, Volume 3, *General Flight Rules*, ACC Supplement, 28 November 2012
- (6) AFI 91-204, *Safety Investigations and Reports*, 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) DoD HFACS, Version 7.0

c. Known or Suspected Deviations from Directives or Publications

There is no evidence to suggest that any directive or publication deviations occurred during this mishap (Tabs V-1.1 to V-4.1, BB-12, and BB-13).

02 January 2019

ALFRED J. ROSALES, Lt Col, USAF
President, Abbreviated Accident Investigation Board

STATEMENT OF OPINION

**MQ-1B, T/N 06-3166
US CENTCOM AOR
17 AUGUST 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 17 August 2017, at approximately 18:59:32 Zulu (Z), the mishap aircraft (MA), a remotely piloted MQ-1B, tail number (T/N) 06-3166, from the 432d Wing, Creech Air Force Base (AFB), Nevada (NV), was lost in the United States Central Command Area of Responsibility (US CENTCOM AOR) while forward deployed participating in a combat support mission. At the time of the mishap, the MA was being operated by an aircrew from the 432d Air Expeditionary Wing, Creech AFB, NV. The MA executed an unrecoverable flight maneuver after it was transferred from the Launch and Recovery Element (LRE). The majority of the MA was destroyed from a fire at the impact site. The estimated cost of the MA and environmental clean-up cost was \$5,380,813. There were no reported fatalities or injuries.

2. CAUSE

The preponderance of the evidence indicates the cause of the mishap was an internal electrical failure that caused the un-commanded movement of the left tail surface, which resulted in the aircraft's inability to continue flight. After normal transfer of aircraft control from the LRE, commonly known as a Gaining Handover in the Air Force Technical Order, the mishap crew (i.e. mishap instructor pilot (MIP), mishap pilot (MP) and mishap sensor operator (MSO)) observed the MA execute an unrecoverable flight maneuver without pilot flight control inputs. This occurred 27 seconds after gaining handover. Based on testimony from the MIP and the LRE pilot, the handover was successful. The MA was flying level at 4,100 feet mean sea level (MSL) with both mishap crew and LRE aircrew receiving the video feeds from different transmitters. Although the mishap crew lost their video feed ("lost link") immediately after the un-commanded pitch down maneuver, the LRE aircrew observed the MA pitch over then initiate a rolling dive towards the ground until impact. The LRE attempted to regain control of the MA through their transmitters, but the connection was unsuccessful. Gaining Handover checklist procedures were not a factor. Weather was not a factor. The ground control station (GCS) otherwise known as the cockpit and the maintenance of the cockpit was not a factor. The 72-Hour/7-Day History review of the mishap crew did not highlight any notable factors. The LRE and their contract maintenance teams were found not to be a factor. The primary contractor, General Atomics – Aeronautical Systems Incorporated completed analysis on the cockpit data log recordings and found the cause of the rapid unrecoverable maneuver was a failure of an electrical cable that resulted in a loss of power

in the left tail flight control surface. This loss of power moved the left tail electrical components to the maximum trailing-edge-down deflection, resulting in a non-flyable configuration.

3. SUBSTANTIALLY CONTRIBUTING FACTORS

I find no preponderance of evidence indicating any substantially contributing factors.

4. CONCLUSION

I find, by a preponderance of the evidence, the cause of the mishap was an internal electrical failure that caused the un-commanded movement of the left tail surface, which resulted in the aircraft's inability to continue flight. There was insufficient evidence of additional substantially contributing factors.

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02 January 2019

ALFRED J. ROSALES, Lt Col, USAF
President, Abbreviated Accident Investigation Board

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Legal Board Appointment Documents	Y
Photographs, Videos, Diagrams, and Animations Not Included In Tab S [Not Used].....	Z
Flight Documents.....	AA
Applicable Regulations, Directives, and Other Government Documents	BB
Fact Sheets	CC
Additional Substantiating Documents	DD
Toxicology Reports.....	EE