UNITED STATES AIR FORCE
ABBREVIATED AIRCRAFT ACCIDENT INVESTIGATION
BOARD REPORT

MQ-9A, T/N 13-004245

89TH ATTACK SQUADRON
28TH BOMB WING
ELLSWORTH AIR FORCE BASE

LOCATION: UNITED STATES CENTRAL COMMAND AREA OF RESPONSIBILITY

DATE OF ACCIDENT: 31 AUGUST 2025

BOARD PRESIDENT: COLONEL BRIAN L. DESAUTELS

Abbreviated Accident Investigation, conducted pursuant to Chapter 12 of Air Force Instruction 51-307

EXECUTIVE SUMMARY
UNITED STATES AIR FORCE
ABBREVIATED ACCIDENT INVESTIGATION

MQ-9A, T/N 13-004245
UNITED STATES CENTRAL COMMAND AREA OF RESPONSIBILITY
31 AUGUST 2025

On 31 August 2025, an unmanned MQ-9A, tail number (T/N) 13-4245, assigned to the 432 Wing impacted the ground after a 19-hour mission at an undisclosed location within the United States Central Command (CENTCOM) Area of Responsibility (AOR). The mishap aircraft (MA) was operated in the AOR by the Mission Control Element (MCE) comprised of Mishap Pilot 1 (MP1) and Mishap Sensor Operator (MSO1) assigned to the 89th Attack Squadron (89 ATKS) at Ellsworth AFB, South Dakota. The mishap resulted in no damage to civilian property, no injuries, and no fatalities. The MA was demolished on site; the loss of government property was valued at $23,600,000.00.

This mishap occurred on the MA's first flight after receiving a complete engine change and passing ground maintenance engine runs. Following a 19-hour mission in the AOR the MA experienced an engine-out while enroute from the operating area to its deployed base. Five seconds after the engine malfunction, the aircraft attempted an automatic engine air restart without success and began losing altitude. Moments later, the aircraft attempted a second automatic engine air restart, which was also unsuccessful. As the aircraft descended, the Mishap Crew (MC) followed their emergency checklist and attempted a manual engine air restart, which was unsuccessful.

As the MA continued to lose altitude, the MC decided to attempt a second manual engine air restart, but MA did not recover engine power. After declaring an emergency to Air Traffic Control (ATC), the Liaison Officer (LNO) directed the MC to conduct a soft forced-landing to preserve the aircraft. The MC continued running their forced-landing checklist and designated a relatively isolated patch of what appeared to be flat land and conducted the forced landing. Based on the circumstances and the location of its landing, sensitive equipment was recovered from the MA and its remaining wreckage was demolished on site.

The Abbreviated Accident Investigation Board President (AAIB BP) found, by a preponderance of the evidence, that the cause of the mishap was internal electrical wire chafing within the fuel control unit (FCU) that prevented it from properly regulating fuel flow to the engine, starving the engine of fuel.

SUMMARY OF FACTS AND STATEMENT OF OPINION
MQ-9A, T/N 13-004245
AFCENTCOM AOR
31 AUGUST 2025

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ACRONYMS AND ABBREVIATIONS

AAIB	Abbreviated Accident Investigation Board
ACC	Air Combat Command
ACF	Acceptance Check Flight
AFB	Air Force Base
AFCENTCOM	Air Force Central Command
AFE	Aircrew Flight Equipment
AFI	Air Force Instruction
AFTO	Air Force Technical Order
AGE	Aerospace Ground Equipment
AGL	Above Ground Level
AIB	Accident Investigation Board
AOR	Area of Responsibility
ATC	Air Traffic Control
ATKS	Attack Squadron
ATLC	Automatic Takeoff and Landing Capability
AW	Attack Wing
BP	Board President
BW	Bomb Wing
CAPs	Critical Action Procedures
DEEC	Digital Electronic Engine Control
DLI	Datalink Integrity
DoD	Department of Defense
EGT	Exhaust Gas Temperature
EP	Electronic Protection
EPE	Emergency Procedure Exam
ER	Extended Range
FCF	Functional Check Flight
FCIF	Flight Crew Information File
FCU	Fuel Control Unit
FOD	Foreign Object Damage/Debris
FSOV	Fuel Shutoff Valve
GCS	Ground Control Station
GLC	Generator Line Contractor
GSE	Ground Support Equipment
HFACS	Human Factors Analysis Classification System
HUD	Head-Up Display
ISB	Interim Safety Board
ISR	Intelligence, Surveillance and Reconnaissance
LA	Legal Advisor
LNO	Liaison Officer
LR	Launch and Recovery
LRE	Launch and Recovery Element
MA	Mishap Aircraft
MAJCOM	Major Command
MC	Mishap Crew
MCE	Mission Control Element
Mids	Mid Shift
mIRC	Internet Relay Chat
MM	Maintenance Member
MOPSUP	Mishap Operations Supervisor
MP	Mishap Pilot
MQT	Mission Qualification Training
MSL	Mean Sea Level
MSO	Mishap Sensor Operator
MSOB	Mishap Safety Observer
MTS	Multi-spectral Targeting System
NAV	Navigation
OCF	Operational Check Flight
Ops Cell	Operations Cell
Ops Sup	Operations Supervisor
OSFG	Overspeed Fuel Governor
PACS	Portable Aircraft Control Station
PM	Pilot Member
PSO	Pilot Sensor Operator
REC	Recorder
RL	Return Link
RPA	Remotely Piloted Aircraft
RPM	Revolutions Per Minute
RTB	Return to Base
SA	Situational Awareness
SAR	Search and Rescue
SATCOM	Satellite Communications
SIM	Simulation

T/N	Tail Number
TO	Technical Orders
TTP	Tactics, Techniques, and Procedures
UNCLASS	Unclassified
WG	Wing
Z	Zulu

SUMMARY OF FACTS

1. AUTHORITY AND PURPOSE

a. Authority

On 1 December 2025, the Air Combat Command (ACC) Deputy Commander appointed Colonel Brian L. Desautels as the Accident Investigation Board (AIB) President (BP) to investigate a mishap that occurred on 31 August 2025, involving an MQ-9A aircraft in the CENTCOM AOR (Tab Y-3). The AIB was conducted in accordance with Air Force Instruction (AFI) 51-307, *Aerospace and Ground Accident Investigations* (Tab Y-3). The Deputy Commander, ACC, appointed four additional board members to the AIB to include Legal Advisor (LA) (Major), MQ-9A Pilot Member (PM) (Captain), Maintenance Member (MM) (Technical Sergeant), and a Recorder (REC) (Technical Sergeant) (Tab Y-3). This investigation is an Abbreviated Accident Investigation in accordance with AFI 51-307, Chapter 12.

b. Purpose

In accordance with AFI 51-307, *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 (Tab BB-46).

2. ACCIDENT SUMMARY

On 31 August 2025, an unmanned MQ-9A, T/N 13-4245, experienced a fuel system malfunction that led to an engine failure during the MA's Return-to-Base (RTB) phase, resulting in a controlled ground impact in the CENTCOM AOR (Tabs J-4, J-5, S-3, V-3.3). The MA was operated in the AOR by the MCE comprised of the MP1 and the MSO1 assigned to the 89 ATKS at Ellsworth AFB, South Dakota (Tabs K-3, V-1.2, V-3.2). The MA was flying at approximately cruising altitude when the emergency started (Tab J-5). After 19 hours of flying under normal conditions, at 14:03:45z the MA's fuel flow rate suddenly jumped from 163 lb/hr to 280 lb/hr and stagnated at 235 lb/hr (Tab J-5). The MA's engine torque immediately dropped to zero and its engine speed fell from 92.6% to 64% (Tab J-5). The MC ran their Critical Action Procedures (CAPs) for an engine failure and ran the checklist as the emergency continued (Tab R-7, R-31, R-36).

The MA attempted its first automatic engine air restart at 14:03:50z, 5 seconds after initial engine issues, which ended unsuccessfully (Tab J-5). At 14:09:31z the MA attempted another automatic engine air restart, which was also unsuccessful (Tab J-5). As the MA continued its descent the MC followed checklist procedures and attempted a manual engine air restart at 14:10:36z that was unsuccessful (Tab J-5). On their own initiative, the MC attempted a second manual engine air restart later in the descent but was unsuccessful (Tab V-15.4). Subsequently, the LNO advised the MC to conduct a soft landing to preserve the MA (Tabs R-9, V-15.3). The MC continued running

their forced landing checklist and designated a patch of relatively flat and isolated land to conduct the forced landing (Tab R-16, R-32, R-38). The mishap resulted in no reported damage to civilian property, no injuries, and no fatalities (Tab P-3). The loss of government property was valued at $23,600,000.00 (Tab P-3). Leading up to the mishap, the MA had completed a nearly nineteen-hour mission under the control of the MCE with all systems normal (Tab J-4, J-5).

3. BACKGROUND

a. Air Combat Command (ACC)

ACC, headquartered at Joint Base Langley-Eustis, Virginia, is one of ten major commands (MAJCOMs) in the United States Air Force (Tab CC-3). For more than seven decades, ACC has served as the primary provider of air combat forces to America's warfighting commanders (Tab CC-3). ACC organizes, trains, and equips Airmen who fight in and from multiple domains to control the air, space, and cyberspace (Tab CC-3). As the lead command for fighter, command and control, intelligence, surveillance and reconnaissance, personnel recovery, persistent attack and reconnaissance, electronic warfare, and cyber operations, ACC is responsible for providing combat air, space, and cyber power and combat support that assures mission success to America's warfighting commands (Tab CC-3).

b. 432d Wing (432 WG)

The 432 WG is located at Creech AFB, Nevada (Tab CC-7). The 432 WG is the U.S. Air Force's first unmanned (and later remotely piloted) aircraft systems wing (Tab CC-7). The wing's mission is to conduct unmanned precision attack and intelligence, surveillance, and reconnaissance combat missions in support of overseas contingency operations (Tab CC-7).

c. 28th Bomb Wing (28 BW)

The 28th Bomb Wing is located at Ellsworth AFB, South Dakota (Tab CC-8). The 28th Bomb Wing is one of only two B-1 Main Operating Bases in the world (Tab CC-8). Additionally, the 28th Bomb Wing hosted 432 WG assisgned ground control stations for MQ-9 Reaper aircraft reinforcing Ellsworth AFB's ability to adapt to emerging challenges (Tab CC-8).

d. 25th Attack Wing (25 AW)

The 25th Attack Wing is headquartered at Shaw AFB, South Carolina (Tab CC-11). It is the central hub for conventional MQ-9 combat operations worldwide (Tab CC-11). Their mission is to execute and sustain dominant MQ-9 combat air power, training, and test operations across the globe (Tab CC-11).

e. 89th Attack Squadron (89 ATKS)

The 89th Attack Squadron's mission is to remotely employ MQ-9 Reaper aircraft from ground control facilities located at Ellsworth AFB in support of worldwide combatant commander requirements (Tab CC-13).[1] The 89th Attack Squadron provides combatant commanders with actionable precision reconnaissance capabilities for time critical targets, air interdiction, close air support, and strike coordination (Tab CC-13).

f. MQ-9A Reaper

The MQ-9A Reaper is an armed, multi-mission, medium-altitude, long-endurance remotely piloted aircraft primarily employed against high-value assets (Tab CC-14). Given its significant loiter time, multi-mode communications suite, precision weapons, and a wide array of signals intelligence sensors, it provides a unique capability to perform strike, coordination and reconnaissance against top-tier, fleeting and time-sensitive targets (Tab CC-14). Reapers can also perform the following missions and tasks: intelligence, surveillance, and reconnaissance; close air support; combat search and rescue; precision strike; buddy-lase; convoy and raid overwatch; target development; and terminal air guidance (Tab CC-14). The MQ-9's capabilities make it uniquely qualified to conduct global operations (Tab CC-14).

g. Amentum

Amentum is a publicly traded corporation that directly supports Air Combat Command by providing high-level MQ-9 Reaper and RQ-4 Global Hawk organizational-level maintenance and provides MQ-9 Launch and Recovery Element (LRE) pilots and sensor operator aircrew to support tasked locations worldwide (Tab CC-15). Amentum delivers operations support; aircraft maintenance management, including Comprehensive Engine Management System support; Aerospace Ground Equipment (AGE) and Ground Support Equipment (GSE) maintenance; supply support; quality assurance and quality control; and ancillary support programs (Tab CC-15).

[1] The 89th Attack Squadron was transferred to the 25th Attack Wing after the mishap.

4. SEQUENCE OF EVENTS

a. Mission

On 31 August 2025, the MA was scheduled to conduct an operational mission within the CENTCOM AOR. The operations crew from the 89th ATKS finished with its mission and was on the RTB phase under normal operation conditions prior to the mishap (Tabs K-3, V-4.2, R-31). No evidence indicates the mission profile was a factor in this mishap.

b. Planning

Prior to the beginning of mass brief starting for the mids crew, the crew members fill out their Risk Management forms to identify any personal factors that could raise their risk levels at their shift (Tab K-5). Following the mids mass brief, the MP1 went to the Ops Sup (Operations Supervisor) desk to conduct Ops Sup duties, and the MSO1 went to his Ground Control Station (GCS) for the remainder of the shift (Tab V-1.2, V-3.2, V-6.2). No evidence indicates the planning was a factor in the mishap.

c. Preflight

Prior to the flight, the MSO1 filled out their risk management form and checked their currency documents (Tab K-5). The MP1 gave the mids crew a mass brief update of where they were flying and how operations would be done for the day, the weather, and any applicable Flight Crew Information File (FCIF) reviews (Tabs K-12, V-6.2). MP1 swapped MP2 in need of a restroom break but had not specified if they received a changeover or summary brief of the aircraft (Tab V-1.2, V-2.2, V-2.3). No evidence indicates the preflight procedures were a factor in this mishap.

d. Summary of Accident

Prior to the emergency starting, MP2 and MSO1 are in the GCS, and MP1 worked in the Operations Cell (Ops Cell) as the mids Ops Sup (Tab V-6.2). The Mishap Operations Supervisor (MOPSUP), who served as the Ops Sup for the day shift, comes to the Ops Cell to receive a standard changeover brief from MP1 (Tab V-6.2). At this time, MP1 received a message from MP2 requesting a restroom break (Tab V-6.2). MP1 leaves the Ops Cell to give MP2 a break and leaves the MOPSUP to stay at the Ops Sup desk (Tab V-6.3).

After MP1 received a pilot changeover brief from MP2, MP2 left the GCS for their restroom break (Tab V-2.3). While MP2 is gone, at 14:03:43Z the engine starts rolling back, and the aircraft noses down as the engine unexpectedly fails due to the engine torque, engine speed, and the fuel pressure decreasing as an indication of an engine failure (Tab J-5). MP1 performed the CAPs for engine failure and elected to keep the condition lever in the full forward position (Tab V-1.3). Seconds after the engine failed, the Digital Electronic Engine Control (DEEC) entered backup mode, followed by the aircraft attempting its first automatic engine air restart at 14:03:50z (Tab J-5). While running through the engine failure checklist, MP2 returns to the GCS after his break and acted as a safety observer for the remainder of the emergency (Tab V-2.3).

At 14:09:31z, the aircraft attempted a second unsuccessful automatic engine air restart (Tab J-5). Shortly after the second automatic engine air restart, Mishap Safety Observer B (MSOB) walked into the GCS to help with communications and checklist quality control (Tab V-5.3).

At 14:10:36z, the MC ran through the engine air restart checklist after running through the engine failure checklist, in an attempt to manually restart the engine (Tab J-5). The MC followed the engine air restart checklist correctly with the consideration of the DEEC in backup mode and were unsuccessful in restarting the engine (Tab V-5.3). The MC eventually declared an emergency, and load shared ATC communications to a fellow observer pilot while the MC dealt with the emergency (Tab V-15.2). After the engine failure, the MA's stall protect system activated two times as the MA flew close to stall speeds (Tabs R-26, V-15.2).

Based on remaining altitude, the MC elected to attempt a second manual engine air restart (Tabs R-15, V-1.3, V-3.3). This second attempt at a manual engine restart was not required by the MC's emergency checklist (Tab V-15.4). Despite the MC's initiative, the second manual engine restart was also unsuccessful (Tab V-1.3, V-15.2). Shortly after, the LNO instructed the MC to force land the aircraft with the attempt for a "soft landing" for minimal damage to the aircraft (Tab V-1.3, V-2.3, V-3.3). Accordingly, the MC looked for a flat area in the dessert (Tab V-1.4, V-3.3, V-15.3). The MC reassessed their landing site to prepare for a forced landing and changed the landing site a few times to meet their intent of a minimal damage landing and avoiding populated areas (Tab V-3.3).

The MC referenced their forced landing checklist with no issues and elected to perform the forced landing with their landing gear down (Tab V-15.3). The MC maintained aircraft control with normal responsiveness and continued with its descent until the MA landed near the intended landing site (Tab V-15.3). After the MC lost link below 2000 feet Above Ground Level (AGL), the MC ran through the appropriate CAPs by disabling the command link and completed the rest of the following checklist steps with no issues (Tab V-1.4, V-3.4).

e. Impact

The MC continued its unpowered descent with the intent to conduct a minimal damage forced landing per the guidance they received from the LNO (Tab V-1.3, V-2.3, V-3.3, V-5.3,). Once the decision was made to no longer try additional engine air restarts, the MC searched and selected an updated landing site to improve landing conditions in an attempt to preserve the MA (Tab V-3.3, V-15.3). The MC ran the forced landing procedures and elected to do a soft landing with the landing gear down, with the aimpoint of what appeared to be a patch of flat land (Tab R-37, V-1.4, V-15.3). The MA landed near the planned aimpoint, the force of the impact caused its landing gear to collapse (Tab V-15.3). Following the landing, sensitive equipment was removed from the MA and the remaining wreckage was demolished on site (Tab DD-9).

f. Egress and Aircrew Flight Equipment (AFE)

Not applicable.

g. Search and Rescue (SAR)

Not applicable.

h. Recovery of Remains

Not applicable.

5. MAINTENANCE

a. Forms Documentation

A review of the Air Force Technical Order (AFTO) 781 series forms and maintenance records was conducted for the MA (Tab DD-4). Records showed no outstanding discrepancies or related overdue Time Compliance Technical Orders (TCTOs) (Tab D-107 to D-109). No evidence suggests that maintenance forms or documentation were contributing factors in this mishap.

b. Inspections

At the time of the mishap, the MA accumulated over 9600 flight hours (Tab D-86). The MA was not overdue for any inspections (Tabs D-86, D-107, DD-4). Maintenance records indicated that the 200 Hour Airframe Inspection, 400 Hour Airframe Inspection, 2000 Hour inspections, and the 3000 Hour Engine Inspection were complied with on 28 August 2025 (Tab D-13, D-14, D-32). There were no other relevant discrepancies or concerns with the MA and engine identified during inspections (Tab DD-4).

c. Maintenance Procedures

The MA Engine was replaced for the 3000 Hour Engine inspection on 28 August 2025 (Tab D-32). Following the MA engine replacement all post installation checks and inspections were complied with and no defects were noted (Tab D-37 to D42, D-147). For most airframes, an engine replacement prompts a mandatory Functional Check Flight (FCF) or Operational Check Flight (OCF) (Tab BB-80). FCFs are intended to ensure the aircraft is airworthy and to test the flight integrity of all systems, particularly critical systems like those affecting engines (Tab BB-80). An airframe's requirements for conducting an FCF for airworthiness are specified in its maintenance inspection manual. (Tab BB-80). For MQ9s, there is no FCF or OCF requirement after an engine replacement (Tabs DD-4, V-8.5, V-8.6). Accordingly, neither the maintenance team, nor the MC, conducted a FCF or OCF after the engine replacement (Tab V-8.5). The mishap occurred on the first flight following the engine replacement for the 3000 Hour Engine Inspection (Tabs D-86, D-97, V-9.2). All maintenance procedures were conducted in accordance with applicable Technical Orders (TO's) and guidance (Tab DD-4). No evidence indicates that maintenance procedures executed were a factor in this mishap.

d. Maintenance Personnel and Supervision

No evidence suggests that the training, qualification, or supervision of the maintenance personnel were a factor in this mishap (Tab DD-3).

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

At the time of the investigation, no fluid analysis of recovered fluids was conducted due to unrecovered wreckage (Tab DD-9).

f. Unscheduled Maintenance

Prior to the mishap, the MA engine was replaced as part of the 3,000-hour engine inspection (Tab D-32, D-44). The MC was not aware of the replacement (Tab V-2.4). The mishap occurred on the first flight after the replacement (Tabs D-86, D-97, V-9.2). The MA engine core was serviced and inspected by Honeywell on 18 April 2025 (Tab D-176). During the inspection of the MA engine, Honeywell noted three observations in addition to normal wear: the propeller governor cable was chafed and replaced, the FCU was replaced due to a missing log card with a new FCU overhauled in April 2025, and the compressor seal was leaking and replaced (Tab J-6). It was postulated that the FCU also had a damaged internal wire that was not identified during the inspection (Tab J-8). This is because during a standard inspection at Honeywell, the top cover of the FCU is not removed (Tab J-6). The engine core was received by Tinker AFB on 24 April 2025, reassembled and sent to Creech AFB 5 June 2025 (Tab J-7). Figure 1 below shows the container the engine is stored in during shipping and remains in until ready for installation (Tab Z-3). The engine was installed on the MA on 28 August 2025 with a likely damaged FCU (Tab D-44). The FCU's internal wiring failed during flight likely due to chaffing against the chassis of the FCU (Tab J-8). This chaffing likely caused voltage to get sent to the Fuel Shutoff Valve (FSOV) to command close, starving the engine of fuel (Tab J-8).

Figure 1. MQ-9 Engine Storage Container (Tab Z-3)

6. AIRFRAME, MISSILE, OR SPACE VEHICLE SYSTEMS

(1) MQ-9 Engine Control System

The MQ-9 utilizes an electronic engine controller to control the throttle and speed functions of the engine (Tab DD-3). The engine controller has two modes of operation Normal and Backup (Tab DD-3). In Normal mode the engine controller automatically adjusts fuel flow through a torque motor within the FCU (Tab J-9). The engine controller also adjusts the propeller blade angle through the propellor governor torque motor (Tab J-9). The manipulations of the two motors enable the engine controller to meet engine power and engine speed commands in response to the pilot's throttle position (Tab J-9). The engine controller constantly monitors two speed sensors to determine engine speed (Tab J-9). The primary selected sensor is the propellor governor monopole and the FCU monopole is the secondary (Tab J-9). The FCU sensor will be selected if the propellor governor sensor experiences a fault or if the FCU sensor reads a higher value (Tab J-9). The FCU sensor provides speed data by sensing the rotation of a gear in the Overspeed Fuel Governor (OSFG) (Tab J-9). The engine controller also provides fault monitoring for the engine (Tab J-9). In the event of a failure the engine controller will automatically switch to Backup mode (Tab J-9). In Backup mode fuel flow is manually controlled by the throttle lever and engine speed is limited to a preset range to mitigate additional damage to engine components (Tab J-9).

(2) MQ-9 Engine Fuel Flow System

Two fuel pumps are utilized to pump fuel from the header tank to the jet pump manifold (Tab J-8). Fuel pressure is measured at the jet pump manifold inlet (Tab J-8). The jet pump manifold solenoids direct pressurized fuel to the selected tank to source fuel from that tank (Tab J-8). Pressurized fuel continues from the jet pump manifold through the fuel flow meter to the engine mounted fuel assembly (Tab J-8). Fuel pressure is measured between the boost stage and high-pressure stage of the fuel pump assembly (Tab J-8). Fuel flow is then metered by the FCU and directed through the fuel nozzles (Tab J-8).

(3) MQ-9 Engine Fuel Control System

The FCU meters fuel to the engine to increase or decrease torque in response to commands from the engine controller (Figure 2) (Tab J-9). The fuel flow to the engine is regulated by a main metering valve in the FCU (Tab J-9). Engine compressor discharge air pressure is supplied to the FCU through a metal line (Tab J-9). The torque motor within the FCU will open and close in response to commands from the engine controller to bleed excess pressure to maintain desired control pressure (Tab J-9). The main metering valve moves based on changing pressure to allow lower or higher fuel flow to the engine (Tab J-9). The FCU also mechanically limits fuel flow if engine speeds exceed the set limits of the OSFG (Tab J-9). The OSFG is a mechanical system that is the most downstream fuel control measure, the purpose is so that it can override any upstream fuel metering regardless of engine control mode (Tab J-9). The FSOV in the FCU is responsible for shutting off fuel to the engine (Tab J-9). It is electronically triggered when the engine is commanded to shut down from the GCS ignition (Tab J-9).

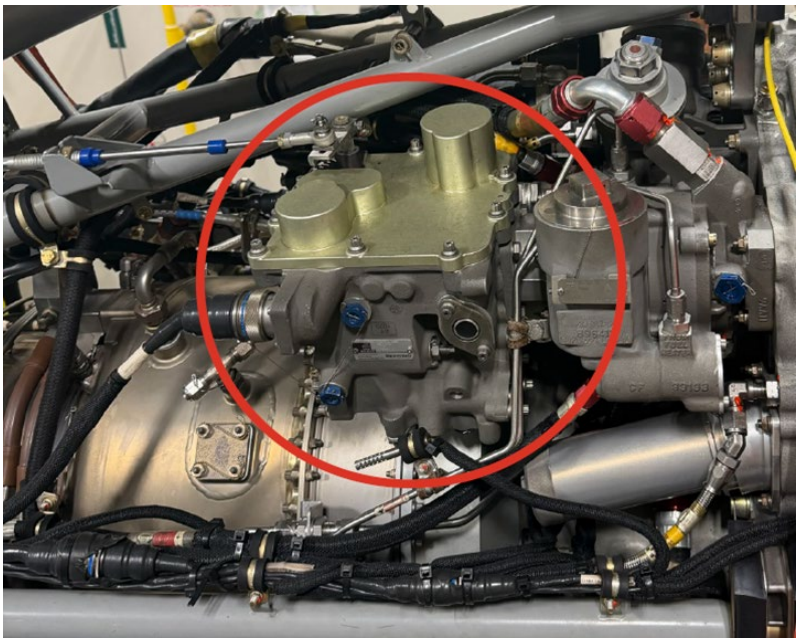

Figure 2. Fuel Control Unit (Tab Z-5)

b. Evaluation and Analysis

At the time of the investigation, the aircraft was unrecovered and no evaluation or analysis of the original MA components was conducted (Tabs DD-9, J-14). The data logs from the MA were available and were sent to General Atomics for review (Tab J-3 to J-19)

The data logs showed that the MA operated without incident for 18 hours and 40 minutes (Tab J-5). At the start of the mishap, data indicated that there was a loss of engine combustion due to a loss of fuel flow (Tab J-4). The data logs also indicated an FCU monopole failure and a temporary N1 fault (Tab J-10). The N1 failure occurred due to the engine controller indicating a mismatch of speed from the FCU sensor and the propellor governor sensor (Tab J-4, J-5). The electronic engine controller also entered backup mode due to the failures (Tab J-5). Data also indicated that there were two automatic and one manual attempt to restart the engine, but engine torque remained at zero (Tab J-5). Throughout the flight fuel levels for both the forward and aft tanks remained constant, indicating fuel availability (Tab J-6). Data indicated that the MA control surfaces responded to all commands from liftoff until the end of the flight (Tab J-6).

(1) Fuel Flow Analysis

There was an indication of a spike in fuel flow rate then a decrease to zero, as shown in figure 3 below (Tab J-14). General Atomics was able to reproduce this in their lab during Fuel System testing (Tab J-7, J-10). This was achieved by suddenly closing the FSOV that is upstream from the FCU (Tab J-7). This suggests that the FSOV was un-commanded closed during the mishap (Tab J-7).

(2) Fuel Control Unit Analysis

General Atomics reports that there are known examples of the FCU sensor wire chaffing within the FCU (Tab J-10). During previous testing of an FCU Honeywell observed a relay wire shorting and sparking (Tab J-10). This could be a source of voltage to command the FSOV closed and cause the FCU sensor failure (Tab J-4, J-10). The FCU internal wire likely failed, due to chaffing against the chassis, causing the FSOV to suddenly close (Tab J-10). This starved the engine of fuel, resulting in the loss of engine torque and combustion of the MA (Tab J-10).

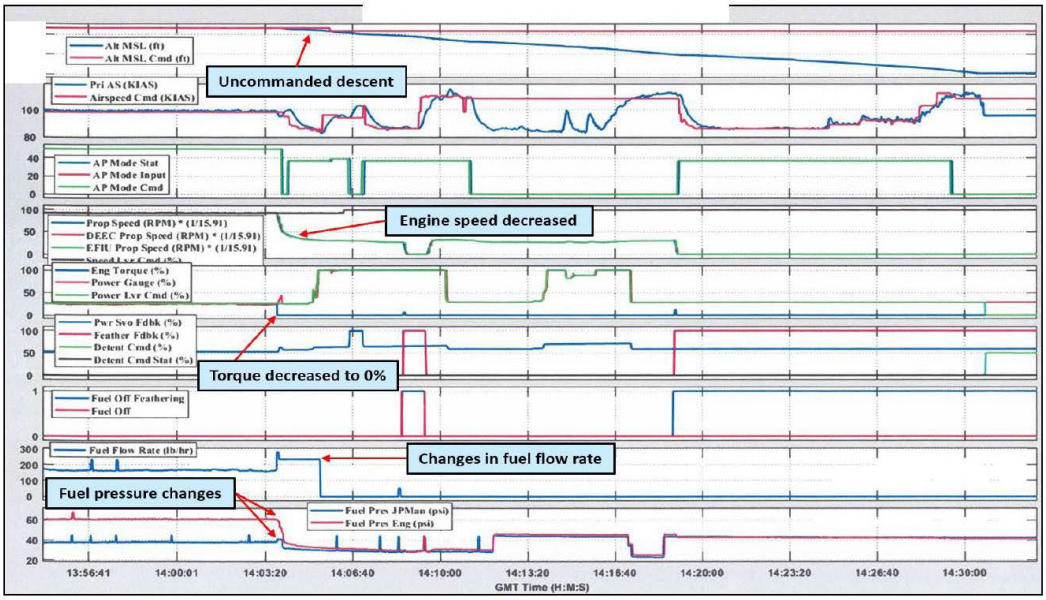

Figure 3. Mishap Data Log (Tab J-14)

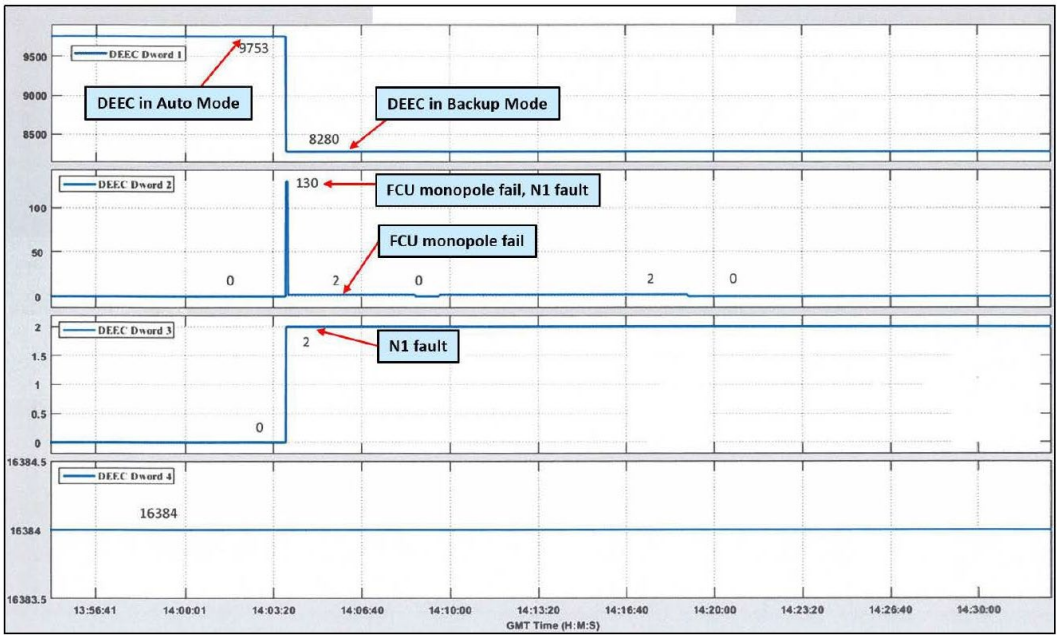

Figure 4. Mishap Faults (Tab J-17)

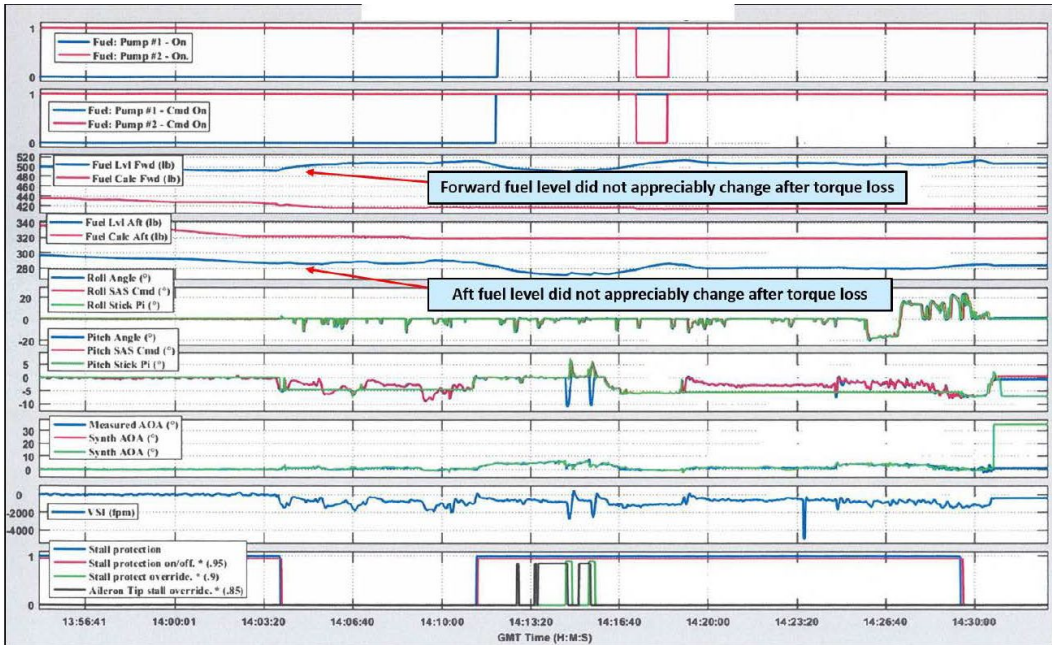

Figure 5. Fuel Quantity (Tab J-16)

7. WEATHER

a. Forecast Weather

The forecasted weather provided to the MC provided by the weather personnel had winds 7-10 knots with no turbulence (Tab F3). The visibility was clear and had no significant weather forecasted in the area of operation (Tab F-11).

b. Observed Weather

MSO1 was in the GCS for 8 hours before the emergency happened and stated that the MC did not experience any form of turbulence, icing, high flight level winds), or any other weather concerns before or during the emergency beginning (Tabs F-3, V-3.2). There is no evidence to indicate the observed weather was a factor in this mishap.

c. Space Environment

Not applicable.

d. Operations

The operation was conducted within their weather limitations allowed for the aircraft.

8. CREW QUALIFICATIONS

a. Mishap Pilot

The MP1 completed their initial MQ-9 training, which includes their Emergency Procedure Exam (EPE) and Evaluation, at Holloman AFB, NM in June 2021 (Tab G-14). The MP1 received a grade of Q1 (Tab G-14). In May and December of 2022, the MP1 completed their EPE and first Launch and Recovery (LR) EPE with a Q1 with no discrepancies at Creech AFB, NV (Tab G-10 to G-12). In April 2024, the MP1 completed their EPE with a Q1 with one flight discrepancy at Creech AFB, NV (Tab G-8, G-9). In July 2025, the MP1 completed their EPE with a Q1 score and discrepancies for weapons employment, task prioritization, and crew resource management (Tab G-6, G-7). The MP1 had 629.7 hours as the primary pilot prior to the 31 August 2025 emergency (Tab G-16).

The MP1 30/60/90 flight and sortie lookback (Tab G-18 to G-20):

	Hours	Sorties
30 Days	55	19
60 Days	98.6	35
90 Days	174.8	59

b. Mishap Sensor Operator

The MSO1 received a Q1 with no discrepancies on 31 March 2021 at Holloman AFB, New Mexico (Tab G-62, G-63). On 23 June 2022, the MSO1 completed their EPE with a Q1 with no discretions (Tab G-60, G-61). On 10 November 2023, the MSO1 completed their EPE with a Q1 with no discretions (Tab G-56, G-57). On 19 March 2025, the MSO1 completed their EPE with a Q1 with no discretions relevant to the emergency on 31 August 2025 (Tab G-52, G-53).

The MSO1 30/60/90 flight and sortie lookback (Tab EE-3 to EE-5):

	Hours	Sorties
30 Days	55	23
60 Days	110.9	41
90 Days	142.3	56

9. MEDICAL

a. Qualifications

All crewmembers were medically qualified for their specific duties at the time of the mishap (Tab DD-11).

b. Health

No evidence indicates that any members' health contributed to the mishap (Tab DD-11).

c. Pathology

Toxicology test samples were collected from crew members after the mishap; the associated reports indicate toxicology was not a factor in the mishap (Tab DD-11).

d. Lifestyle

There is no evidence to suggest lifestyle factors were a factor in the mishap (Tab DD-11).

e. Crew Rest and Crew Duty Time

At the time of the mishap, AFMAN 11-202, Volume (V) 3, Flight Operations, 10 January 2022, required aircrew members have proper crew rest prior to performing any duties involving aircraft operations (Tab BB-43). Paragraph 3.1 of the applicable version of AFMAN 11-202 V3 defined crew rest periods as a minimum 12-hour non-duty period before the flight duty period begins (Tab BB-43). Its purpose is to ensure the aircrew members adequately rest before performing duties or flight related duties (Tab BB-43). Crew rest is defined as "free time and includes time for meals, transportation, and an opportunity for at least 8 hours of uninterrupted sleep" (Tab BB-43). The MC verified they received adequate crew rest before the mishap on the required Operational Risk Management form (Tab K-5).

10. OPERATIONS AND SUPERVISION

a. Operations

Prior to the emergency, there were no issues during the MA's flight; all in-flight operation checks were normal (Tabs R-33, V-2.4, V-4.3). There were no signs the MC needed evasive maneuvers during the emergency, nor that there was any enemy action directed towards MA (Tabs R-36, V-4.3). The operation was a non-kinetic combat flight (Tabs K-3, V-4.3). At the time of impact, the MA was still armed with ordinance (Tabs DD-7, P-3, V-15.3).

b. Supervision

Leading up to the time of the incident, MP1 served as the Mids Ops Sup (Tab R-31). Around midnight, during the changeover from the Mids to Day shift, MP1 asked the incoming Days Ops Sup (MOPSUP) to momentarily watch the desk so that MP2 could take a restroom break and MP1 could temporarily take MP2's place (Tabs R-31, V-6.2). The Days Ops Sup (MOPSUP) then took temporary control as acting Ops Sup and MP1 took over piloting the MA (Tabs R-31, R-32, V-6.3). After MP1 took over piloting, the emergency began (Tab V-6.3). The acting Ops Sup quickly established communications with external agencies to coordinate potential recovery operations and supplied an additional Safety Observer, MSOB (Tab V-5.3, V-6.3). There is no evidence to indicate supervision was a factor for the cause or outcome of the mishap.

11. HUMAN FACTORS ANALYSIS

a. Introduction

The Department of Defense Human Factors Analysis and Classification System 8.0 (DoD HFACS 8.0) lists potential human factors that can play a role in aircraft mishaps and identifies potential areas of assessment during an accident investigation (Tab BB-48).

The framework is divided into four main categories: Acts, Preconditions, Supervisions, and Organization Influences (Tab BB-51, BB-54, BB-65, BB-70). The categories allow for a complete analysis of all levels of human error and demonstrate how such errors may interact together to contribute to a mishap. Three factors were identified as relevant to the mishap.

b. Relevant Factors Identified by AAIB

(1) PE205 Automated System Created a Hazardous Condition: is when the design, function, reliability, symbology, logic or other aspects of automated systems negatively affected performance, which resulted in a hazardous condition or unsafe act (Tab BB-62). This includes designs of tooling machines, ship or aircraft components, etc (Tab BB-62).

(2) PP109 Task/Mission Planning and/or Briefing Inadequate: is when an individual, crew or team failed to complete all preparatory tasks associated with planning the mission and/or effective briefing the tasks, which resulted in a hazardous condition or unsafe act (Tab BB-63). Planning tasks include information collection and analysis, coordinating activities within the crew or team and with appropriate external agencies, risk assessment followed by the pre-mission/task safety briefing (Tab BB-63).

(3) OP003 Provided Unclear, Impractical, or Inadequate Policy, Procedural Guidance or Publications: is when written standards (policies, directives, procedural guidance/standard operating procedures, technical manuals, checklists, or publications) for normal or abnormal/emergency conditions are impractical, too vague/unclear, incorrect or ineffectively disseminated for safe operations throughout the organization or within a subordinate unit, resulting in hazardous conditions or unsafe acts throughout subordinate units or the field/fleet (Tab BB-72).

12. GOVERNING DIRECTIVES AND PUBLICATIONS

a. Publicly Available Directives and Publications Relevant to the Mishap

(1) Department of the Air Force Instruction (DAFI) 21-101, *Aircraft & Equipment Maintenance Management*, dated 16 January 2020.

(2) DAFI 91-204, *Safety Investigations and Reports*, dated 10 March 2021.

(3) Air Force Instruction (AFI) 51-307, *Aerospace and Ground Accident Investigations*, dated 18 March 2019.

(4) Air Force Manual (AFMAN) 11-202, Volume 3, *Flight Operations*, dated 10 January 2022.

(5) Air Force Manual (AFMAN) 11-2MQ-9 Volume 3, *MQ-9 Operations Procedures*, dated 12 January 2023

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

b. Other Directives and Publications Relevant to the Mishap

(1) Department of Defense, Human Factors Analysis and Classification System 8.0.

(2) Technical Order (TO), 1Q-9(M)A-1, dated 15 October 2023.

(3) Technical Manual, TO 1-1-300, Maintenance Operational Checks and Check Flights, dated 26 March 2026.

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6 August 2026

BRIAN L. DESAUTELS, Colonel, USAF
President, Accident Investigation Board

STATEMENT OF OPINION

MQ-9A, T/N 13-004245
UNITED STATES CENTRAL COMMAND AREA OF RESPONSIBILITY
31 AUGUST 2025

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 31 August 2025, an unmanned MQ-9A, T/N 13-4245, experienced a fuel system malfunction due to internal electrical wiring issues inside the Fuel Control Unit (FCU) that led to engine failure during its enroute flight phase from the operating area to the deployed base. The Mishap Aircraft (MA) conducted a controlled forced landing in open terrain in the United States Central Command (CENTCOM) Area of Responsibility (AOR). The MA was operated in the AOR by the Mission Control Element (MCE) comprised of the Mishap Pilot (MP) and the Mishap Sensor Operator (MSO1) assigned to the 89th Attack Squadron (89 ATKS) at Ellsworth AFB, South Dakota.

Prior to the incident, the aircraft received an engine change and passed ground maintenance engine runs. At no time leading up to the MA's mission was Mishap Crew, consisting of MP1 and MSO1, notified that the MA had undergone a complete engine change. Furthermore, consistent with prior practice, neither the aircrew nor maintenance team conducted a functional check flight of the MA after the engine change. As noted by several witnesses, complete engine changes, like the one performed on the MA, were considered routine maintenance.

The incident under investigation occurred during the tail-end of the MA's first mission following its engine change. After approximately 19 hours of flight under normal flight conditions, the MA experienced its initial engine malfunction. The MA promptly attempted its first automatic engine air restart without success and began losing altitude. The MA then attempted a second automatic engine air restart, which was also unsuccessful. Following their checklists the MC attempted their first manual engine air restart, which was unsuccessful. As the aircraft lost altitude, the MC attempted a second unsuccessful manual engine air restart later in the decent. After declaring an emergency to Air Traffic Control (ATC), the Liaison Officer (LNO) directed the MC to conduct a soft landing of the MA in an attempt to preserve the aircraft.

The MC continued running their forced landing checklist and designated a relatively isolated patch of relatively flat land and conducted a forced landing. The mishap resulted in no reported damage to civilian property, no injuries, and no fatalities. Based on the circumstances, sensitive equipment was removed from the crash site and the aircraft was demolished on-site. The loss of government property was valued at $23,600,000.00.

2. CAUSE

As the Abbreviated Accident Investigation Board President, I found, by a preponderance of the evidence, that the cause of the mishap was due to internal electrical wire chafing within the FCU that prevented it from properly regulating fuel flow to the engine, starving the engine of fuel.

The MA's engine was re-installed into the MA on 28 August 2025. Throughout the MA's 19-hour mission, the FCU, through a metering valve, metered fuel to the engine to increase or decrease torque in response to commands from the engine controller. The main metering valve moved based on changing pressure to allow lower or higher fuel flow to the engine. The data logs showed at the start of the mishap, there was a loss of engine combustion due to a loss of fuel flow after a spike in fuel flow rate. Chaffing of the FCU's internal wiring against the FCU's chassis caused voltage and created a mismatch of the speed reading from the FCU sensor and the propellor governor sensor. Consequently, the voltage from the chaffing wires also commanded the Fuel Shutoff Valve (FSOV) to close, starving the engine of fuel. Despite two automatic and two manual attempts to restart the engine, the engine torque remained at zero, forcing the MC to bring down the MA.

3. CONCLUSION

I have reviewed aircraft data logs, aircraft maintenance documentation, video recordings, crewmember and maintenance member testimony, training records, technical analysis, and operational and maintenance practices. I find, by a preponderance of the evidence, the cause of this mishap was electrical wire chafing within the FCU that prevented the FCU from properly regulating fuel flow to the engine. The FCU's failure deprived the engine of fuel and resulted in the MA catastrophically impacting the ground.

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6 August 2026

BRIAN L. DESAUTELS, Colonel, USAF
President, Accident Investigation Board

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