

UNITED STATES AIR FORCE
AIRCRAFT ACCIDENT INVESTIGATION
BOARD REPORT



MQ-1B, T/N 00-3068

11TH RECONNAISSANCE SQUADRON
432ND WING
CREECH AIR FORCE BASE, NEVADA



LOCATION: NEVADA TEST AND TRAINING RANGE,
NEVADA

DATE OF ACCIDENT: 27 JUNE 2014

BOARD PRESIDENT:
LIEUTENANT COLONEL MICHAEL A. EDWARDS

Abbreviated Accident Investigation conducted IAW
Air Force Instruction 51-503 Chapter 11

**EXECUTIVE SUMMARY
AIRCRAFT ACCIDENT INVESTIGATION**

**MQ-1B, T/N 00-3068
Nevada Test and Training Range
27 June 2014**

On 27 June 2014 at approximately 1301 hours local time (L), an MQ-1B, tail number 00-3068, crashed on the Nevada Test and Training Range (NTTR) approximately nine miles from Creech Air Force Base (AFB), Nevada, after it departed controlled flight following a missile launch from its left wing at approximately 1258L. The mishap remotely piloted aircraft (MRPA) belonged to the 11th Reconnaissance Squadron (11 RS). All members of the mishap crew (MC) were assigned to the 15 Reconnaissance Squadron (15 RS). The 11 RS and 15 RS are assigned to the 432nd Wing (432 WG), Creech AFB, Nevada. The MRPA, one missile, two missile electronic control units, and two missile rails were destroyed. Damage to United States government property totaled \$4,624,512. There were no fatalities, injuries, or damage to other property.

The MRPA took off at 0633L, loaded with two live missiles, and flew for 5.5 hours prior to the MC taking control. Between takeoff and 1200L, the MRPA was used to conduct multiple training missions for crews other than the MC. The MC took control at approximately 1200L to conduct a training mission practicing missile launches at ground targets. The MC completed several simulated missile launches before attempting to actually launch one of the live missiles.

At 1259:35L the MC commanded the live missile on the left wing to launch. At 1259:37L three events occurred simultaneously. First, the MC received a warning the right wing control module (RWCM) had failed. Second, the RWCM lowered and locked the right wing aileron into a full down position. Lowering an aileron on only one wing of the MRPA causes the MRPA to roll and turn in the opposite direction. Third, the MRPA began a left roll and turn, un-commanded by the MC.

At 1259:38L the MRPA computer indicated the missile had fired. Shortly after that, the MRPA reached a roll angle of 60 degrees left, which angle was too steep to maintain controlled flight. At 1259:41L the MC's data feed froze, eliminating the MCs ability to monitor the positioning and orientation of the MRPA. At 1259:46L, the MC received a warning indicating the MRPA lost satellite communication. The MRPA continued out of control until impacting the ground at approximately 1301L.

The Abbreviated Accident Investigation Board (AAIB) president found, by clear and convincing evidence, the cause of this mishap was the failure of the RWCM. There was no action that the MC could have performed which would have prevented the MRPA from going out of control.

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 00-3068
27 June 2014

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ACRONYMS AND ABBREVIATIONS

11 RS	11th Reconnaissance Squadron	FL	Flight Level
12 AF	12th Air Force	FMC	Fully Mission Capable
15 RS	15th Reconnaissance Squadron	FOA	Forward Operating Agency
432 AMXS	432d Aircraft Maintenance Squadron	FPM	Flight Path Marker
432 OG	432d Operations Group	FSU	Flight Sensor Unit
432 WG	432d Wing	FT	Feet
99 AMDS	99th Aerospace Medicine Squadron	FTU	Formal Training Unit
AAIB	Abbreviated Accident Investigation Board	G	Gravitational Forces
ACC	Air Combat Command	GA	General Atomics Aeronautical Systems, Inc.
ACFT	Aircraft	GBU	Guided Bomb Unit
AETC	Air Education and Training Command	GCS	Ground Control Station
AF	Air Force	GMT	Greenwich Mean Time
AFB	Air Force Base	GRR	Graphical Range Restrictions
AFE	Aircrew Flight Equipment	HF	Hellfire
AFI	Air Force Instruction	HQ	Headquarters
AFCAA	Air Force Cost Analysis Agency	HUD	Heads-Up Display
AFLCMC	Air Force Life Cycle Management Center	HDD	Heads-Down Display
AFMC	Air Force Material Command	IAW	In Accordance With
AFNORTH	Air Forces North	IMDS	Integrated Maintenance Data System
AFSAS	Air Force Safety Automated System	Init	Initial
AFSC	Air Force Specialty Code	INST	Instructor
AFSEC	Air Force Safety Center	IP	Instructor Pilot
AFTO	Air Force Technical Order	ISB	Interim Safety Board
AGL	Above Ground Level	ISO	Instructor Sensor Operator
AGM	Air to Ground Missile	JA	Judge Advocate
AIB	Accident Investigation Board	JAMS	Joint Attack Munitions Systems
AMXS	Aircraft Maintenance Squadron	IMA	Interim Modem Assembly
AOA	Angle of Attack	ISR	Intelligence Surveillance and Reconnaissance
ATC	Air Traffic Control	ITL	Individual Task List
ATRS	Aerial Target Squadron	KIAS	Knots Indicated True Airspeed
AWACS	Airborne Warning and Control System	KT	Knots
AWBS	Automated Weight and Balance System	L	Local Time
BIT	Built In Test	LH	Left Hand
BP	Board President	LL	Liquid Liters
BS	Bomb Squadron	LOLA	Live Ordinance Load Area
C2	Command and Control	LR	Launch and Recovery
CA	Convening Authority	LRD	Laser Designator
CAP	Critical Action Procedure	LRS	Logistics Readiness Squadron
CAS	Close Air Support	LRU	Line Replaceable Unit
CC	Commander	Lt Col	Lieutenant Colonel
CD	Compact Disc	LWCM	Left Wing Control Module
COMACC	Commander Air Combat Command	MA	Mishap Aircraft
DOD	Department of Defense	MAG	Magnetic
DFAC	Dining Facility	MAJCOM	Major Command
DPI	Desired Point of Impact	MC	Mishap Crew
DR	Deficiency Report	MCE	Mission Control Element
DRU	Direct Reporting Unit	MFR	Memorandum For Record
DSCA	Defense Support to Civil Authorities	MIP	Mishap Instructor Pilot
DVD	Digital Video Disk	MP	Mishap Pilot
EOD	Explosive Ordnance Disposal	MRPA	Mishap Remotely Piloted Aircraft
EPE	Emergency Procedures Evaluation	MSO	Mishap Sensor Operator
FA	Flight Authorization	MSL	Mean Sea Level

MSN	Mission	SIM	Simulator
MWP	Mission Weather Product	SME	Subject Matter Expert
NCOIC	Non Commissioned Officer In Charge	SO	Sensor Operator
NOTAMs	Notices to Airmen	SOF	Supervisor of Flying
NOAA	National Oceanic and Atmospheric Admin	SPINS	Special Instructions
NTTR	Nevada Test and Training Range	TAF	Terminal Aerodrome Forecast
NWJB	Network Junction Box	T/N	Tail Number
OG	Operations Group	T/O	Takeoff
OGV	Standards and Evaluations	TO	Technical Order
ORM	Operational Resource Management	TOF	Time of flight
OSS	Operations Support Squadron	TOT	Time on target
OSW	Operations Weather Flight	TX	Transmission
PCM	Primary Control Module	UAS	Unmanned Aerial System
PEO MS	Program Executive Office, Missiles/Space	UAV	Unmanned Aerial Vehicle
POC	Point of Contact	UCMJ	Uniformed Code of Military Justice
Qual	Qualification	US	United States
RH	Right Hand	USAF	United States Air Force
RPA	Remotely Piloted Aircraft	UTC	Coordinated Universal Time
RPM	Revolutions Per Minute	VDC	Voltage Direct Current
RQS	Rescue Squadron	VDVR	Video graphics array Digital Video Recorder
RWCM	Right Wing Control Module	VIT	Variable Information Table
SAF	Secretary of the Air Force	VSI	Vertical Speed Indicator
SAR	Search and Rescue	VT	Valid Time
SARM	Squadron Aviation Resource Management	VVI	Vertical Velocity Indicator
SATCOM	Satellite Communications	WCM	Wing Control Module
SCAR	Strike Coordination and Reconnaissance	WEZ	Weapons Engagement Zone
SE	Safety	WX	Weather
SEF	Aviation Safety	Z	Zulu
SIB	Safety Investigation Board		

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 22 October 2014, the Vice Commander of Air Combat Command (ACC), Major General James N. Post III, appointed Lieutenant Colonel (Lt Col) Michael A. Edwards to conduct an Abbreviated Accident Investigation Board (AAIB) to investigate the mishap of an MQ-1B, tail number (T/N) 00-3068, near Creech AFB, Nevada, on 27 June 2014 (Tab Y-2). The Convening Order of 22 October 2014, as amended on 4 November 2014, also appointed a judge advocate Major as the Legal Advisor, and a paralegal Technical Sergeant (TSgt) as the Recorder (Tab Y-2). The AAIB conducted its investigation under the authority of and in accordance with Air Force Instruction (AFI) 51-503, *Aerospace Accident Investigations*, Chapter 11, *Abbreviated Accident Investigations*, at Creech Air Force Base (AFB), Nevada, from 18 March 2014 through 8 April 2015 (Tab Y-2).

b. Purpose

This is a legal investigation convened to inquire into the facts surrounding the aircraft or aerospace accident, to prepare a publicly-releasable report, and to gather and preserve all available evidence for use in litigation, claims, disciplinary actions, administrative proceedings, and for other purposes.

2. ACCIDENT SUMMARY

On 27 June 2014, at approximately 1301 hours local time (L), the mishap remotely piloted aircraft (MRPA), an MQ-1B, T/N 00-3068, crashed on the Nevada Test and Training Range (NTTR) approximately nine miles northwest of Creech AFB, Nevada, after it departed controlled flight immediately following a live missile launch from its left wing at approximately 1258L (Tabs CC-2 and S-11). The MRPA, one missile, two missile electronic control units, and two missile rails were destroyed (Tab P-2). The damage to United States government property totaled \$4,624,512 (Tab P-2). There were no fatalities, injuries, or damage to other property (Tab P-2).

3. BACKGROUND

The MRPA belonged to the 11th Reconnaissance Squadron (11 RS) (Tab D-2). All members of the mishap crew (MC) were assigned to the 15th Reconnaissance Squadron (15 RS) (Tab K-3). Both squadrons are stationed at Creech AFB, Nevada (Tabs DD-14, 17). Both squadrons belong to the 432d Wing (432 WG) of Twelfth Air Force (12 AF) of Air Combat Command (ACC) (Tabs DD-2, 9, and 12).

a. Air Combat Command (ACC)

Air Combat Command is the primary force provider of combat airpower to America's warfighting commands (Tab DD-2). To support global implementation of national security strategy, ACC operates fighter, bomber, reconnaissance, battle-management and electronic-combat aircraft (Tab DD-2). It also provides command, control, communications and intelligence systems, and conducts global information operations (Tab DD-2). As a force provider, 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 DD-2). ACC numbered air forces provide the air component to U.S. Central, Southern and Northern Commands, with Headquarters ACC serving as the air component to Joint Forces Commands (Tab DD-2). ACC also augments forces to U.S. European, Pacific and Strategic Command (Tab DD-2).



b. Twelfth Air Force (12 AF)

12th Air Force controls ACC's conventional forces in the western United States and has the warfighting responsibility for U.S. Southern Command as well as the U.S. Air Forces Southern (Tab DD-9). It manages all Air Force assets and personnel in the USSOUTHCOM Area of Responsibility, which includes Central and South America (Tab DD-9). As one of four numbered air forces assigned to ACC, 12th AF's mission is to provide combat ready forces to ACC, train and equip 8 combat wings and one RED HORSE squadron (Tab DD-9). Its subordinate commands operate more than 731 combat aircraft with more than 66,400 uniformed and civilian Airmen (Tab DD-9). 12th Air Force directs 8 active duty wings and one direct reporting unit as well as 17 gained wings and other units of the Air National Guard and Reserve (Tab DD-9).



c. 432d Wing (432 WG)

The 432d Wing (432 WG), stationed at Creech AFB, Nevada, flies remotely piloted aircraft (RPA) systems to provide real-time reconnaissance, surveillance, and precision attack against fixed and time critical targets to support American and coalition forces worldwide (Tab DD-12). The 432 WG also conducts initial qualification training for aircrew, intelligence, weather, and maintenance personnel who will fly and support RPA systems (Tab DD-12). The wing's organization includes two groups, six RPA flying squadrons, an operational support squadron, and three maintenance squadrons. The wing and its subordinate units are components of the Air Force's ACC and 12 AF (Tab DD-12).



d. Eleventh Reconnaissance Squadron (11 RS)

Following inactivation in 1994, the 11 RS was re-designated and re-Activated in July 1995 (Tab DD-14). In 1996, it became the first RPA Squadron in the Air Force (Tab DD-14). From 1996 through present, it provided deployable, long-endurance, serial reconnaissance and



surveillance (Tab DD-14). Since 2003, it has conducted flight training on the MQ-1B Predator RPA (Tab DD-14). It is headquartered at Creech AFB, Nevada (Tab DD-14).

e. Fifteenth Reconnaissance Squadron (15 RS)

Following inactivation in 1994, the 15 RS was re-designated and re-Activated in July 1997 (Tab DD-17). From 1997 through present, it provided deployable, long-endurance, serial reconnaissance and surveillance (Tab DD-17). It is headquartered at Creech AFB, Nevada (Tab DD-17).

f. MQ-1B PREDATOR

The MQ-1B Predator is an armed, multi-mission, medium-altitude, long-endurance remotely piloted aircraft that is employed primarily as an intelligence-collection asset and secondarily against dynamic execution targets (Tab DD-21). 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 (SCAR) against high-value, fleeting, and time-sensitive targets (Tab DD-21). Predators can also perform the following missions and tasks: intelligence, surveillance, reconnaissance, close air support, combat search and rescue, precision strike, buddy-lase, convoy/raid overwatch, route clearance, target development, and terminal air guidance (Tab DD-21). The MQ-1's capabilities make it uniquely qualified to conduct irregular warfare operations in support of combatant commander objectives (Tab DD-21).

4. SEQUENCE OF EVENTS

a. Mission

The purpose of the MC's mission using the MRPA on 27 June 2014 was to train the MC in close air support (CAS) tactics (V-2). Specifically, the training plan anticipated the MC would practice launching missiles at ground targets (Tab V-2). If the conditions remained acceptable after simulated launches, the MC planned to actually launch a missile at a ground target (Tab V-2). The 432d Operations Group (OG) Commander (CC) authorized the mission (Tab K-3).

b. Planning

The mishap pilot (MP) briefed the mission plan to the MC according to standard procedures (Tab V-2). The MP briefed the plan for the flight, the proposed training activity, the logistical details of the mission, and the forecast weather conditions (Tab V-2). The brief was attended by the mishap Sensor Operator (MSO) and mishap Instructor Pilot (MIP) (Tab V-2).

c. Preflight

The MC consisted of the MP, MIP and MSO (Tab K-3). The MC took control of the MRPA while it was airborne (Tab R-2). The MRPA took off at 0633L and had been flying for approximately 5.5 hours when the MC took control (Tab CC-4). Between takeoff and the MC

taking control, other crews used the MRPA to conduct training missions (Tab CC-4). When the MC took control, the MRPA was carrying two live missiles, one under each wing (Tab CC-4). Prior to taking control, the MC received Notices to Airmen (NOTAMs) and a weather report, completed a mission brief, and filed their flight plan with Air Traffic Control (ATC) (Tab V-2).

d. Summary of Accident

The MC took control of the MRPA at approximately 1200L while it was located in the airspace above the NTTR (Tab R-2). The MC completed several simulated missile launches before attempting to actually launch a missile at a ground target (Tab R-2).

At 1259:35L the MC commanded the live missile on the left wing to launch (Tab CC-5).

At 1259:37L three events occurred simultaneously (Tab CC-5). First, the MC received a warning the right wing control module (RWCM) had failed (Tab CC-5). Second, the RWCM lowered and locked the right wing aileron into a full down position (Tab CC-5). Lowering an aileron on only one wing of the MRPA causes the MRPA to roll and turn in the opposite direction (Tab CC-18). Third, the MRPA began a left roll and turn, un-commanded by the MC (Tab CC-4).

At 1259:38L the MRPA computer indicated the missile had fired (Tab CC-4). Shortly after that, the MRPA reached a roll angle of 60 degrees left, which angle was too steep to maintain controlled flight (Tab CC-5). At 1259:41L the MC's data feed froze, eliminating the MCs ability to monitor the positioning and orientation of the MRPA (Tab EE-3). At 1259:46L, the MC received a warning indicating the MRPA lost satellite communication (Tab CC-6). The MRPA continued out of control until impacting the ground at approximately 1301L (Tab M-2).

e. Impact

The MRPA experienced lost link at 1259:46L (Tab CC-6), impacting the ground shortly thereafter on the NTTR approximately 9 miles northwest of Creech AFB, Nevada (Tab S-11). The MRPA crashed carrying one missile under its right wing (Tab S-5). Due to the loss of satellite link and video feed from the MRPA to the MC, the MRPA crashed while not under the control of the MC and in an unknown orientation (Tab M-2).

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

The AAIB had a Flight Line Expediter from the 432 AMXS review the Air Force Technical Order (AFTO) 781-series forms for the MRPA (Tab V-3). The forms were documented in accordance with applicable maintenance guidelines (Tab V-3). The records revealed no outstanding discrepancies in the maintenance performed on this MRPA or recurring problems, which would have prevented it from flying on 27 June 2014 (Tab V-3). Additionally, a review of the forms indicated that there were no overdue MRPA time compliance technical orders (TCTOs) (Tab V-3).

b. Inspections

All required and scheduled inspections were satisfactorily accomplished for the MRPA (Tab V-3). On 25 June 2014, the maintenance crew satisfactorily completed a through flight inspection on the MRPA IAW 1Q-1(M)B-6WC-1 (Tabs D-3 and V-3). On 27 June 2014 a preflight inspection, including a visual walk around the plane, was conducted IAW 1Q-1(M)B-6WC-1 and 1Q-1(M)B-33-2-1CL-1 (Tabs D-3). There were no open discrepancies, which would have rendered the MRPA unsafe to fly (Tab D-3).

c. Maintenance Procedures

All maintenance procedures were properly followed for maintenance performed on the MRPA (Tab V-3). All individual training records indicate that the maintainers were trained and qualified (Tab V-3).

d. Maintenance Personnel and Supervision

According to the AFTO form 781 for T/N 00-3068, all preflight maintenance for the MRPA mission on 27 June 2014 was properly performed (TAB V-3). All supervisory and/or quality reviews of preflight maintenance for the MRPA mission of 27 June 2014 were properly performed IAW technical order guidance (Tab V-3). All personnel involved in the preflight maintenance for the MRPA's 27 June 2014 mission were appropriately trained, experienced, and certified (Tab V-3).

e. Fuel, Hydraulic, and Oil Inspection Analyses

According to the forms review, maintenance personnel properly serviced fuel tanks and oil reservoirs in accordance with TO 1Q—1(M)B-2-1256-10-1 (Tab V-3). The servicing certification on the AFTO form 781H reflected adequate oil and fuel levels on the day of the mishap (Tab D-4). The MRPA did not contain any hydraulic systems (Tab D-3). Due to the destruction of the MRPA, post mishap analysis was not conducted (Tab P-2).

f. Unscheduled Maintenance

No unscheduled maintenance was performed on the MRPA between the date of the last scheduled inspection on 19 May 2014 and the date of the mishap, 27 June 2014 (Tab V-3).

6. AIRFRAME, MISSILE, OR SPACE VEHICLE SYSTEMS

a. Structures and Systems

A review of the maintenance records, forms, and data logs for the MRPA revealed no evidence of anomalies or malfunctions that would contribute to the mishap (Tab V-3).

The following components were recovered from the crash site and submitted to General Atomics Aeronautical Systems, Inc. (GA) for technical analysis: left missile rail assembly, left wing control module (LWCM), left aileron actuator, interim modem assembly, wire bundles and attached remnants of line replaceable units (Tab CC-8). The MRPA heads up display (HUD) videos and data files were also provided to the contractor performing the technical analysis (Tab CC-8).

The RWCM was not recovered (Tab CC-8). An Explosive Ordnance Disposal (EOD) team destroyed the remaining missile, which consequently destroyed the RWCM, to render the wreckage site safe for exploration and retrieval (Tab S-7).

Left missile rail assembly

The technical analysis concluded the missile rail for the left wing functioned adequately (Tab CC-8). The left missile launcher rail assembly was inspected on 23 July 2014 (Tab CC-8). The inspection revealed no evidence of damage to the missile rail, shotgun assembly, latch, etc., that could have resulted in an abnormal condition during missile launch (Tab CC-8). The dimensions of the missile rail were measured post-mishap and no issues were identified (Tab CC-8).

b. Evaluation and Analysis

The technical analysis determined it is not likely that the mishap was caused by any abnormalities with the missile launch equipment (Tab CC-18). First, the MC received a notification from the MRPA at 1259:38L that the missile had launched (Tab CC-5). Second, post-mishap inspection of the rail assembly revealed no abnormalities that would preclude normal missile launch (Tab CC-8). Third, the missile impacted within the expected footprint of the intended target (Tab CC-8).

The technical analysis determined a RWCM failure was the only likely scenario which could cause the mishap (Tab CC-19). First, the MC received a warning of RWCM failure, "Right aileron TX failure," at 1259:37L simultaneous with the MRPA beginning an un-commanded left roll and turn (Tab CC-5). This warning indicated the RWCM stopped transmitting data to the MRPA, including the position of the right aileron (Tab CC-5). Second, no other warnings or faults were indicated in other systems, according to review of the MRPA data logs (Tab CC-17). Third, based on simulation testing conducted by GA, the observed MRPA behavior (i.e. the left roll and turn) during the loss of control was consistent with the right aileron being driven to full down position (Tab CC-18). Lowering an aileron on only one wing of the MRPA causes the MRPA to roll and turn in the opposite direction (Tab CC-18). The other aileron cannot be deflected downward to counteract the rolling moment (Tab CC-19). There was no action that the

MC could have performed which would have counteracted the MRPA going out of control (Tab CC-18).

7. WEATHER

a. Forecast Weather

The forecast for the area in which the MRPA was operating at the time of the mishap consisted of clear conditions with light winds (Tab F-2-9).

b. Observed Weather

The weather at the time of the mishap consisted of clear conditions with light winds (Tab F-2-10). Post-mishap weather conditions were the same (Tab F-2-10).

c. Space Environment

Not applicable.

d. Operations

The MRPA was being operated within its prescribed weather limitations (Tab F-2-10).

8. CREW QUALIFICATIONS

All members of the MC were current and qualified to fly on 27 June 2014 (Tab G-3-5, 16-17, 30-32).

a. Mishap Pilot

MP was a current and qualified pilot in the MQ-1B (Tab G-3-5). He had 62.4 total MQ-1B hours (Tab G-6-7). The MP was formerly qualified as a C-130 combat systems operator (Tab G-6-7).

Recent flight time is as follows (Tab G-8):

	Hours	Sorties
Last 30 Days	5.5	2
Last 60 Days	12.1	6
Last 90 Days	12.1	6

b. Mishap Instructor Pilot

The MIP was a current and qualified MQ-1B Instructor Pilot (Tab G-16-17). He had 260.2 hours as an MQ-1B Instructor Pilot and 1922.2 hours total MQ-1B time (Tab G-18-19).

Recent flight time is as follows (Tab G-20):

	Hours	Sorties
Last 30 Days	2.2	1
Last 60 Days	11.4	6
Last 90 Days	18.2	10

c. Mishap Sensor Operator

The MSO was a current and qualified MQ-1B Instructor Sensor Operator (Tab G-16-17). He had 18.2 hours as an MQ-1B Instructor Sensor Operator and 1255.1 hours total MQ-1B time (Tab G-33).

Recent flight time is as follows (Tab G-34):

	Hours	Sorties
Last 30 Days	31.4	14
Last 60 Days	32.7	16
Last 90 Days	51.7	27

9. MEDICAL

a. Qualifications

All MC members were medically qualified for flight duty at the time of the mishap (Tab V-4).

b. Health

A review of the medical records and the 72-hour and 14-day histories was accomplished (Tab V-4). Records revealed that all members of the MC were in good health and had no performance-limiting condition or illness prior to the mishap (Tab V-4).

c. Pathology

Not applicable.

d. Lifestyle

No lifestyle factors were found to be relevant to the mishap (Tabs R-3-27). Post-mishap toxicology reports showed negative results for all MC members and maintenance personnel involved in preflight maintenance (Tab V-4).

e. Crew Rest and Crew Duty Time

Aircrew members must have proper rest, as defined in AFI 11-202, Volume 3, General Flight rules (ACC Supplement), 7 November 2014, prior to performing in flight duties. AFI 11-202 V3 defines normal crew rest as a minimum of 12-hour non-duty period before the designated flight duty period begins, during which time an aircrew member may participate in meals, transportation or rest.

All members of the MC met all requirements for crew rest and were within their respective crew duty days at the time of the mishap (Tabs R-3-27).

10. OPERATIONS AND SUPERVISION

a. Operations

At the time of the mishap, the operations tempo for the aircrew was average and sustainable (Tab R-3-27).

b. Supervision

On 27 June 2014, the MC performed all of the standard flight briefings (Tab V-2). The MC included supervision in the form of the MIP (Tab V-2).

11. HUMAN FACTORS

No human factors contributed to this mishap.

12. GOVERNING DIRECTIVES AND PUBLICATIONS

a. Publicly Available Directives and Publications Relevant to the Mishap (access through the AF e-Publishing web site: <http://www.e-publishing.af.mil>)

- (1) AFI 11-2MQ-1, Volume 1, MQ-1—*Aircrew Training*, 21 January 2010
- (2) AFI 11-2MQ-1, Volume 2, MQ-1—*Crew Evaluation Criteria*, 28 November 2008, certified current 8 January 2013
- (3) AFI 11-2MQ-1&9, Volume 3, MQ-1 and MQ-9—*Operations Procedures*, 1 November 2012
- (4) AFI 11-202, Volume 3, *General Flight Rules (ACC Supplement)*, 7 November 2014
- (5) AFI 51-503, *Aerospace Accident Investigations*, 26 May 2010

b. Other Directives and Publications Relevant to the Mishap

- (1) TO 1Q-1(M)B-1, *Flight Manual*, USAF Series MQ-1B System, 13 December 2010
- (2) TO 1Q-1(M)B-1CL-1, *Flight Crew Checklist*, USAF Series MQ-1B System, 13 December 2010
- (3) 1Q-1(M)B-6WC-1, *Preflight, Thruflight, Basic Post Flight, Combined Postflight/Preflight Inspection Requirements* USAF Series MQ-1B Remotely

Piloted Aircraft Work Card Number: 4-001 Basic Date: 31 July 2012 Change Date: 30 June 2014

- (4) 1Q-1(M)B-2-12JG-10-1, Job Guide Servicing, General, USAF Series, MQ-1B Remotely Piloted Aircraft Basic Date: 27 January 2014 Change Date: 15 October 2014
- (5) 1Q-1(M)B-33-2-1CL-1, Checklist Non-Nuclear Munitions Loading Procedures USAF Series MQ-1B Remotely Piloted Aircraft Chapter/Page Number: Chap 3.5, Pages 3-10 Basic Date: 11 February 2009 Change Date: 3 July 2014

c. Known or Suspected Deviations from Directives or Publications

Not applicable.

13. ADDITIONAL AREAS OF CONCERN

Not applicable.

8 APRIL 2015



MICHAEL A. EDWARDS, Lt Col, USAF
President, Abbreviated Accident Investigation
Board

STATEMENT OF OPINION

**MQ-1B, T/N 00-3068
Creech AFB, Nevada
27 June 2014**

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 27 June 2014 at approximately 1301 hours local time (L), an MQ-1B, tail number 00-3068, crashed on the Nevada Test and Training Range (NTTR) approximately nine miles from Creech Air Force Base (AFB), Nevada, after it departed controlled flight following a missile launch from its left wing at approximately 1258L. The mishap remotely piloted aircraft (MRPA) belonged to the 11th Reconnaissance Squadron (11 RS). All members of the mishap crew (MC) were assigned to the 15 Reconnaissance Squadron (15 RS). The 11 RS and 15 RS are assigned to the 432nd Wing (432 WG), Creech AFB, Nevada. The MRPA, one missile, two missile electronic control units, and two missile rails were destroyed. Damage to United States government property totaled \$4,624,512. There were no fatalities, injuries, or damage to other property.

The MRPA took off at 0633L, loaded with two live missiles, and flew for 5.5 hours prior to the MC taking control. Between takeoff and 1200L, the MRPA was used to conduct multiple training missions for crews other than the MC. The MC took control at approximately 1200L to conduct a training mission practicing missile launches at ground targets. The MC completed several simulated missile launches before attempting to actually launch one of the live missiles.

At 1259:35L the MC commanded the live missile on the left wing to launch.

At 1259:37L three events occurred simultaneously. First, the MC received a warning the right wing control module (RWCM) had failed. Second, the RWCM lowered and locked the right wing aileron into a full down position. Lowering an aileron on only one wing of the MRPA causes the MRPA to roll and turn in the opposite direction. Third, the MRPA began a left roll and turn, un-commanded by the MC.

At 1259:38L the MRPA computer indicated the missile had fired. Shortly after that, the MRPA reached a roll angle of 60 degrees left, which angle was too steep to maintain controlled flight. At 1259:41L the MC's data feed froze, eliminating the MC's ability to monitor the positioning and orientation of the MRPA. At 1259:46L, the MC received a warning indicating the MRPA lost satellite communication. The MRPA continued out of control until impacting the ground at approximately 1301L.

I find, by clear and convincing evidence, the cause of this mishap was the failure of the RWCM. Once the RWCM failure locked the right aileron into the full down position, there was no action the MC could have performed which would have prevented the MRPA from going out of control.

I developed my opinion by analyzing witness testimony, factual data from the flight data recordings, the General Atomics (GA) contractor report, applicable technical orders and maintenance records. All evidence is consistent with a RWCM failure.

2. CAUSE

The only indication of malfunction from the MRPA was the "Right aileron TX failure" warning. This warning indicated the RWCM stopped transmitting data to the MRPA, including the position of the right aileron. The RWCM failure warning occurred simultaneous with the MRPA beginning an un-commanded left roll and turn. Simulation testing conducted by GA demonstrated the MRPA's observed behavior immediately following the RWCM failure warning was consistent with the right aileron being driven to full down position. If an MQ-1B aileron is lowered to the full down position, the opposite aileron cannot be deflected downward to counteract the rolling movement. In this situation, an MQ-1B would continue rolling until it was out of control. Once the RWCM failure locked the MRPA's right aileron into the full down position, there was no action that the MC could have performed which would have prevented the MRPA from going out of control.

3. CONCLUSION

I find by clear and convincing evidence, the cause of this mishap was the failure of the RWCM. Once the RWCM failure locked the right aileron into the full down position, there was no other MC action that could have counteracted the banking movement that placed the MRPA out of control.

8 APRIL 2015



MICHAEL A. EDWARDS, Lt Col, USAF
President, Abbreviated Accident Investigation
Board

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