

UNITED STATES AIR FORCE
GROUND ACCIDENT INVESTIGATION
BOARD REPORT



**M1165A1 High Mobility Multipurpose Wheeled Vehicle (HMMWV),
S/N 337321**

**284th Air Support Operations Squadron
184th Wing
McConnell AFB, Wichita, Kansas**



LOCATION: Smoky Hill Air National Guard Range (SHANGR), Salina, Kansas

DATE OF ACCIDENT: 08 June 2021

TYPE OF ACCIDENT: Motor Vehicle Fatality

BOARD PRESIDENT: Brigadier General Bradley L. Pyburn

Conducted IAW Air Force Instruction 51-307



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND



AIR COMBAT COMMAND
1992 - 2022

OFFICE OF THE COMMANDER
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ACTION OF THE CONVENING AUTHORITY

The report of the ground accident investigation board conducted under the provisions of Air Force Instruction 51 307, *Aerospace and Ground Accident Investigations*, that investigated the 8 June 2021 fatal mishap involving an High Mobility Multipurpose Wheeled Vehicle, S/N 337321, 184th Wing, complies with applicable regulatory and statutory guidance, and on that basis it is approved.

MARK D. KELLY
General, USAF
Commander

OCT 28 2021

People First... Mission Always...

**EXECUTIVE SUMMARY
UNITED STATES AIR FORCE
GROUND ACCIDENT INVESTIGATION**

**M1165A1 High Mobility Multipurpose Wheeled Vehicle, S/N 337321
Smoky Hill Air National Guard Range, Salina, Kansas
08 June 2021**

On 08 June 2021 at approximately 1355 local (L) at the Smoky Hill Air National Guard Range (SHANGR) near Salina, Kansas, Mishap Airman 1 (MA1) sustained fatal injuries when the M1165A1 High Mobility Multipurpose Wheeled Vehicle, serial number (S/N) 337321, (the Mishap Vehicle – MV), in which MA1 was a passenger rolled over while moving between range Observation Points (OPs). The other members of the Mishap Team (MT) included the Mishap Vehicle Operator (MVO) and Mishap Airman 2 (MA2), who were both injured. All three members of MT were Tactical Air Control Party Specialists from the 284th Air Support Operations Squadron, SHANGR, Kansas.

On 08 June 2021, MT was conducting Close Air Support (CAS) training missions at SHANGR. From 1300L to 1500L, MVO and MA2 planned to conduct CAS training with a single B-52 from the 23rd Bomb Squadron from Minot Air Force Base, North Dakota. Additionally, from 1500L to 1600L, MA1 planned to conduct CAS training with two F-16s from the 175th Fighter Squadron from the South Dakota Air National Guard.

At approximately 1355L while traveling from the Range Control Tower (RCT) toward an OP called Soldier's Cap (SC) on Parsons Road, MV approached the intersection of Parsons Road and Main Road. This portion of Parsons Road is slightly uphill (heading northeast), with a broad, sweeping left turn to the north approaching SC. MV entered the turn on the left side of Parsons Road and began to skid sideways for approximately 100 feet while rotating counterclockwise. As MV became perpendicular to the road, the front right tire furrowed in the dirt north of the road surface, causing MV to roll over one and one half times. During the rollover, all three MT members were ejected from MV. There is insufficient evidence to determine the speed MV was traveling at the time of the mishap.

Unable to establish communications following MT's expected arrival at SC, the Range Control Officer (RCO) dispatched the Operations Controller (OC) to determine the status of MT. After arriving at the Mishap Site (MS), OC recognized the severity of the situation and contacted the RCT Member (RM), requesting emergency support. At approximately 1419L, RM contacted 9-1-1, which dispatched the Saline County Police Department and the Saline County Fire Department Emergency Medical Services (EMS). RCO drove to MS and directed RM to run the vehicle accident checklist. Ground EMS arrived at 1435L, determined MA1 was in critical condition, and requested an air ambulance to shorten transport time. The air ambulance arrived at 1502L. Two ground ambulances departed SHANGR with MVO at 1505L and MA2 at 1507L for Salina Regional Health Center, Salina, Kansas. At 1519L, the air ambulance departed SHANGR with MA1. The Emergency Department (ED) at McPherson Hospital in McPherson, KS, began providing care for MA1 at 1535L. Despite medical intervention, MA1's injuries were fatal and ED declared MA1 deceased at 1559L.

SUMMARY OF FACTS
M1165A1 High Mobility Multipurpose Wheeled Vehicle (HMMWV),
S/N 337321
Smoky Hill Air National Guard Range (SHANGR), Salina, Kansas
08 June 2021

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ACRONYMS AND ABBREVIATIONS

184 WG	184th Wing	L	Local Time
284 ASOS	284th Air Support Operations Squadron	Lt Col	Lieutenant Colonel
ACC	Air Combat Command	MA1	Mishap Airman 1
AF	Air Force	MA2	Mishap Airman 2
AFB	Air Force Base	Maj	Major
AFI	Air Force Instruction	MAJCOM	Major Command
AFMAN	Air Force Manual	mph	miles per hour
AFSC	Air Force Specialty Code	MS	Mishap Site
ANG	Air National Guard	MT	Mishap Team
Brig Gen	Brigadier General	MT/R	Maximum Traction/Reinforced
C2	Command and Control	MV	Mishap Vehicle
Capt	Captain	MVO	Mishap Vehicle Operator
CAS	Close Air Support	OC	Operations Controller
CFETP	Career Field Education and Training Plan	OP	Observation Point
Col	Colonel	ORM	Operational Risk Management
CONOP	Concept of Operations	PA	Public Affairs
DIDO	Detachment 1 Director of Operations	PM&I	Preventative Maintenance and Inspections
DC	District of Columbia	RCO	Range Control Officer
DoD	Department of Defense	RCT	Range Control Tower
DPAS	Defense Property Accountability System	RM	RCT Member
ED	Emergency Department	SABC	Self Aid Buddy Care
EMS	Emergency Medical Services	SAR	Search and Rescue
GAIB	Ground Accident Investigation Board	SC	Soldier's Cap
GOV	Government Vehicle	SHANGR	Smoky Hill ANG Range
HMMWV	High Mobility Multipurpose Wheeled Vehicle	SIB	Safety Investigation Board
IAW	In Accordance With	SN	Serial Number
IBA	Individual Body Armor	SSgt	Staff Sergeant
IETM	Interactive Electronic Technical Manual	TACP	Tactical Air Control Party
JAAT	Joint Air Attack Team	TBA	Training Business Area
JTAC	Joint Terminal Attack Controller	TCM	Transmission Control Module
KS	Kansas	TCTO	Time Compliance Technical Order
		TO	Technical Order
		US	United States
		VCO	Vehicle Control Officer
		VMS	Vehicle Maintenance Shop

SUMMARY OF FACTS

1. AUTHORITY AND PURPOSE

a. Authority

On 15 June 2021, General Mark D. Kelly, Commander, Air Combat Command (ACC), appointed Brigadier General Bradley L. Pyburn as Board President of a Ground Accident Investigation Board (GAIB) to investigate the death of the mishap Airman during a High Mobility Multipurpose Wheeled Vehicle (HMMWV) accident on Smoky Hill Air National Guard Range (SHANGR), Salina, Kansas (KS), on 08 June 2021 (Tab Y-2 to Y-3). The GAIB convened at SHANGR from 28 July 2021 to 23 August 2021, and was conducted in accordance with Air Force Instruction (AFI) 51-307, *Aerospace and Ground Accident Investigation*, dated 18 March 2019 (Tab Y-2). Additional members of the GAIB included a Medical Member (Colonel), Legal Advisor (Lieutenant Colonel), Vehicle Maintenance Expert (Staff Sergeant (SSgt)), and a Recorder (SSgt) (Tab Y-2). A Traffic Investigator (Technical Sergeant) was detailed to advise the GAIB as a Subject Matter Expert (Tab Y-4).

b. Purpose

In accordance with AFI 51-307, *Aerospace and Ground Accident Investigations*, this GAIB conducted a legal investigation to inquire into all the facts and circumstances surrounding this Air Force (AF) ground 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 08 June 2021, three Tactical Air Control Party (TACP) Specialists from the 284th Air Support Operations Squadron (284 ASOS) were conducting Close Air Support (CAS) training missions at SHANGR (Tabs R-62, T-10 to T-13, and CC-145). The Mishap Team (MT) (call sign Viking) used an M1165A1 HMMWV (the Mishap Vehicle - MV) to move between range Observation Points (OPs) (Tabs R-20, U-85, BB-19, and GG-6). MT consisted of the Mishap Vehicle Operator (MVO), Mishap Airman 1 (MA1) in the rear passenger (right) seat, and Mishap Airman 2 (MA2)

in the front passenger (right) seat (Tabs R-5 and V-3.13). At approximately 1355 local time (L) while traveling on Parsons Road from the Range Control Tower (RCT) toward an OP called Soldier's Cap (SC), MV rolled over and came to rest on its roof, facing the opposite direction from which it had been traveling (see Figure 1) (Tabs R-5, R-60, R-62, and DD-31 to DD-32). During the rollover, all three MT members were ejected from MV (Tabs R-5, V-3.17, V-7.24, X-2 to X-4, GG-4, and GG-6). MVO and MA2 survived and MA1 died from mishap injuries (Tab X-2 to X-4).



Figure 1 - Mishap Vehicle at Mishap Site (Tab Z-2)

3. BACKGROUND

a. Air Combat Command (ACC)

ACC, headquartered at Joint Base Langley-Eustis, Virginia, is one of ten major commands in the AF (Tab CC-152). ACC's primary mission is to organize, train, and equip Airmen who fight in and from multiple domains to control the air, space, and cyberspace (Tab CC-152). 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 the combat support that assures mission success to America's warfighting commands (Tab CC-152).



b. Air National Guard (ANG)

The ANG is administered by the National Guard Bureau, a joint bureau of the departments of the Army and AF, located in the Pentagon, Washington, DC (Tab CC-126). It is one of the seven Reserve components of the United States (US) armed forces that augments the active components in the performance of their missions (Tab CC-126). ANG has both a federal and state mission (Tab CC-126).



c. Kansas Air National Guard (KANG)

Headquartered in the State Defense Building in Topeka, KS, KANG is approximately 2,300 airmen strong (Tab CC-128). It has two main units: the 184th Wing in Wichita, KS, and the 190th Air Refueling Wing in Topeka, KS (Tab CC-128). Additionally, a detachment of the 184th Wing operates SHANGR near Salina, KS (Tab CC-128).

d. 184th Wing (184 WG)

184 WG develops and deploys strategic and tactical strength to the US military around the world (Tab CC-136). Its main components include mission support, battlefield intelligence, command and control, and cyberspace operations (Tab CC-136). It responds to natural and manmade disasters in 19 counties throughout KS when requested by civilian authorities (Tab CC-136).



e. Detachment 1 (Det 1)

Det 1, subordinate to 184 WG, manages and maintains SHANGR (Tab CC-140 to CC-145). Combat aircraft from all US military branches, but primarily AF, use the range to practice air-to-ground attack maneuvers (Tab CC-128 and CC-145).

f. 284th Air Support Operations Squadron (284 ASOS)

284 ASOS, subordinate to 184 WG, includes Airmen who integrate into Army units during combat operations (Tab CC-140 to CC-145). These Airmen speak directly to pilots and aircrews, but instead of managing an entire airspace battlefield, they coordinate pin-point, close air attacks as directed by the Army unit's commander (Tab CC-145). 284 ASOS is located at SHANGR (Tab CC-145).



g. Smoky Hill Air National Guard Range (SHANGR)

SHANGR is a 34,000-acre target range located 10 miles southwest of Salina, KS (Tabs V-11.4 and CC-130). It is one of three ANG air-to-ground training ranges in the Midwest and the busiest and largest bombing range in the ANG (Tab CC-130). It includes approximately 50 miles of gravel roads (Tab V-1.2). The range control officer is responsible for all range operations and is the release authority for weapons delivery with participating aircraft (Tab EE-16). SC is an OP approximately three to four miles east of RCT (Tabs R-62, V-7.16, and Z-3).

h. Tactical Air Control Party (TACP) Specialist

TACP is the principal AF Command and Control liaison element aligned with Army maneuver units from battalion through corps (Tab BB-28). TACP provides the primary terminal attack control and liaison of CAS in support of ground forces (Tab BB-28). Additionally, TACP advises its respective ground commanders on the capabilities and limitations of aerospace power and assists with integrating air power in order to accomplish mission objectives (Tab BB-28). CAS is air action by aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces (Tab BB-3). A TACP Specialist is a highly mobile member of TACP and can control aircraft while on foot or while transiting in vehicles (Tab V-3.37).

i. Joint Terminal Attack Controller (JTAC)

A joint terminal attack controller (JTAC) is a qualified service member who, from a forward position, directs the action of combat aircraft engaged in CAS and other air operations (Tab BB-5).

j. High Mobility Multipurpose Wheeled Vehicle (HMMWV)

The HMMWV is a four-wheel drive vehicle that is used to transport personnel (see Figure 2) (Tab BB-24). It can be equipped with integrated armor protection which provides added ballistic protection for armament components, crew, and ammunition (Tab BB-19). The M1165A1 vehicles are capable of transporting a four-man crew (Tab BB-19).



Figure 2 - High Mobility Multipurpose Wheeled Vehicle (Tab Z-2)

k. Air Force Specialty Code (AFSC) Skill Levels

The 3-skill level (3-Level), or apprentice, identifies enlisted personnel who have obtained basic knowledge within an Air Force Specialty Code (AFSC) through completion of an initial skills course (Tab BB-17). Apprentices gain duty position experience and, upon completion, enter a structured apprenticeship program to gain qualification and experience required of a 5-skill level (5-Level), or journeyman (Tab BB-17). The 5-skill level identifies enlisted personnel who, through experience and training, have demonstrated skilled proficiency in their AFSC (Tab BB-17). The 7-skill level (7-Level), or craftsman, identifies enlisted personnel who have gained a high degree of technical knowledge in their AFSC and who have additionally acquired supervisory capability through training and experience (Tab BB-17).

4. SEQUENCE OF EVENTS

a. Narrative

On 08 June 2021, MT planned to conduct a series of CAS training missions at SHANGR (Tabs V-3.11, V-3.13, and V-7.11). From 1300L to 1500L, all three members of MT planned to conduct CAS training with a single B-52 from the 23rd Bomb Squadron from Minot Air Force Base, North Dakota (Tabs R-62, V-3.11, V-7.11 to V-7.13, and CC-112 to CC-117). Additionally, from 1500L to 1600L, MA1 planned to conduct CAS training with two F-16s from the 175th Fighter Squadron (Tabs R-62, V-3.13, and CC-116). The CAS training consisted of controlling aircraft as they drop inert munitions on range targets by communicating with the aircraft and directing the munitions from the aircraft to the ground target (Tabs R-62, V-7.4, V-7.7, V-7.31, V-11.34, BB-3, CC-112 to CC-113, and CC-131). All MT members were qualified TACP Specialists with experience at SHANGR (Tabs R-13, T-10 to T-13, V-2.2, and V-3.1 to V-3.2).

At approximately 1120L, MT entered the 284 ASOS vehicle yard and selected MV, an M1165A1 HMMWV, Serial Number 337321, for use during the missions (Tabs U-85, V-3.11, V-3.34 to V-3.35, V-5.5, V-6.6, and V-8.14). AF Form 1800, *Operators Inspection Guide and Trouble Report*, is required to document vehicle inspection and discrepancies prior to each use (or monthly if the vehicle had not been used) (Tabs V-2.17, V-8.13, V-8.53, V-11.22, and BB-8 to BB-9). The AF Form 1800 was not completed for MV on 08 June 2021, but multiple witnesses and MV's maintenance records indicated MV was in good working order on 08 June 2021 (Tabs U-3, V-2.17, and V-3.32). From approximately 1120L to 1150L, MT validated targets, confirmed aircraft approaches, and conducted equipment checks (Tabs V-3.34 and V-3.35). At approximately 1150L, MVO drove the other members of MT



Figure 3 - Parsons Road Facing West (Tab Z-4)

10 minutes west from the vehicle yard to RCT, arriving at approximately 1200L (see Figures 3 and 4) (Tabs V-3.35 and Z-3 to Z-4). After entering RCT, MT validated targets and aircraft flight profiles with RCO (Tabs V-3.34 to V-3.35 and V-7.31 to V-7.32).

From approximately 1300L to 1345L, MVO and MA2 conducted the planned CAS training mission from RCT with the B-52 (Tabs R-62, V-2.5 to V-2.6, V-3.13, and V-7.32 to V-7.33). MA1 was coordinating with RCO to move MT to SC in order to finish the B-52 mission and prepare for the F-16s' arrival at 1500L (Tabs R-62, V-2.5, V-3.13, and V-7.12 to V-7.13). Movement between OPs during a mission is normal for TACP operations (Tabs R-62 and V-3.37). The movement to SC was not urgent, and the drive from RCT to SC was approximately three miles (Tabs V-2.6 and V-7.16). MT departed for SC in MV at approximately 1345L, traveling east on Parsons Road (Tabs R-60, R-62, V-3.13, V-7.33, and DD-32).

In the MV, MVO was driving, MA2 was in the front passenger (right) seat controlling the final leg of the B-52 mission, and MA1 was in the rear passenger (right) seat (Tabs R-5, V-3.13, and GG-6). None of the members of MT were wearing their seatbelts in accordance with Air Force and SHANGR policy (meaning they had not fastened both the chest harness and the lap belt, although they might have latched only the chest harness) (Tabs V-3.26, V-6.3, V-8.3, X-2, X-3, X-4, BB-11, EE-3, and GG-4). All of the members of MT were wearing their Individual Body Armor (IBA), and all of them were either wearing their helmets

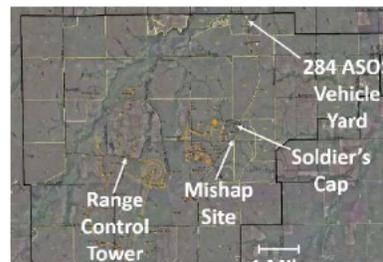


Figure 4 - Location of RCT, MS, SC, and 284 ASOS Vehicle Yard (Tab Z-3)

unclashed, or were not wearing their helmets at all (Tabs V-3.4, V-3.14, V-3.17, V-3.24 to V-3.25, V-3.29 to V-3.30, V-4.8 to V-4.11, V-7.18 to V-7.21, X-2 to X-4). TACP Specialists are required to wear their IBA and helmets during active missions on the range (Tab BB-6).

At approximately 1355L, MT approached the intersection of Parsons Road and Main Road (see Figure 5) (Tabs R-5, R-60, V-3.15, DD-32, GG-2 to GG-3, and GG-6). This portion of Parsons Road is slightly uphill (heading northeast), with a broad, sweeping left turn to the north approaching SC (Tabs V-3.6, V-4.2 to V-4.3, V-7.17, V-7.26, V-10.12, V-11.5, Z-4 to Z-5, and GG-2 to GG-3). Contrary to local safety guidance, MV entered the turn on the left side of Parsons Road and began to skid sideways for approximately 100 feet (see Figure 5) while rotating

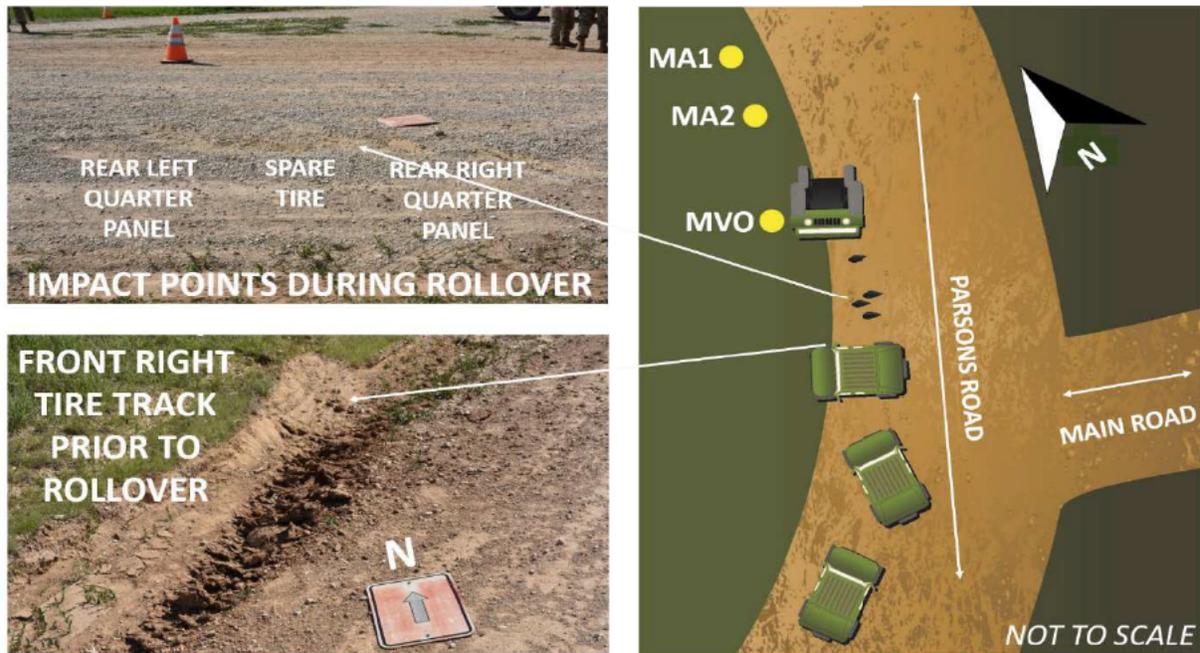


Figure 5 - Mishap Reconstruction (Tabs Z-5, GG-5 to GG-6, and GG-13 to GG-14)

counterclockwise (Tabs R-5, V-3.15 to V-3.17, V-7.7, V-11.33, CC-9, GG-5 to GG-6, and GG-13 to GG-14). As MV became perpendicular to the road, the front right tire furrowed in the dirt north of the road surface (see Figure 5), causing MV to roll over one and one half times (Tabs R-5, V-3.15 to V-3.17, GG-5 to GG-6, and GG-13 to GG-14). During the rollover, all four passenger doors detached from MV (Tabs V-3.21, V-3.31, V-4.11, and V-7.23). MV contacted the road surface four times during the rollover (see Figure 5), first hitting the rear right quarter panel, then the spare tire, then the rear left quarter panel, and finally the roof before coming to rest (see Figure 6) (Tabs GG-5 to GG-6, and GG-13 to GG-14). MV became partially airborne during the rollover, coming to rest facing the opposite direction (southwest) from which it had been traveling (Tabs EE-7, GG-5 to GG-6, and GG-13 to GG-14). The speed limit on Parsons Road is 45 miles per hour (mph) (Tab V-4.2). There is insufficient evidence to determine the speed MV was traveling at the time of the mishap (Tabs EE-3 and EE-7 to EE-8).



Figure 6 - Mishap Vehicle at Mishap Site (Tab Z-5)

The drive from RCT to SC was approximately three to four miles, and MT should have arrived by approximately 1355L (Tabs R-62, V-4.6, V-7.16, Z-3, and DD-32). Because MT had not checked in with RCO via radio per operating procedures, RCO attempted to contact MT via radio and personal cell phone from approximately 1359L to 1409L (Tabs R-11, R-20, R-32, R-60, R-62, V-4.6, V-7.16, and DD-32). At approximately 1409L, RCO dispatched OC via vehicle to determine if MV experienced a mechanical failure en route to SC (Tabs R-20, R-32, R-60, R-62, V-4.6, V-7.16, and DD-32).

b. Search and Rescue (SAR)

OC approached MS in a vehicle and noticed MV was on its roof (Tabs R-20 and V-4.6). Then, OC approached MV on foot, found MVO injured a few feet outside of MV, and contacted RM via radio requesting emergency medical help at approximately 1418L (Tabs R-11, R-20, R-60, R-62, V-4.6 to V-4.7, V-7.16, Z-8, and DD-32). At approximately 1419L, RM contacted 911, which dispatched the Saline County Police Department and the Saline County Fire Department EMS (Tabs V-12.2, Z-8, DD-32, EE-12, GG-2, and GG-6). RCO drove to MS, and while en route, directed RM to execute the vehicle accident checklist (Tabs R-60 and R-62). While RCO was in transit, OC noticed MV doors and MT gear strewn across MS, then located the other two members of MT injured and outside of MV (Tabs R-20 and V-4.7). MA1 was approximately 90 feet north of MV and MA2 was approximately 58 feet north of MV (Tab GG-13 to GG-14). OC assessed MT's injuries and provided self aid buddy care (SABC) (Tab X-2 to X-4). At approximately 1425L, RCO arrived at MS, took control, and continued to administer SABC to MT (Tabs R-21, R-60, V-7.17 to V-7.18, and DD-32). Shortly after RCO's arrival, additional members from 284 ASOS and Det 1 arrived at MS and assisted with SABC (Tabs R-9, R-15, R-31, R-33, R-61, V-4.11, and V-7.21).

EMS dispatched three ground ambulances (Tabs EE-12 and GG-6). In preparation for EMS, personnel from 284 ASOS and Det 1 deployed along the roadways and entrance to SHANGR to escort and direct EMS personnel to MS (Tabs R-11 and R-15). The first ground ambulance arrived at 1435L (Tabs R-11 and EE-12). EMS personnel triaged MA1, applied life support protocols, and determined MA1 was in critical condition, requiring air ambulance to rapidly reach advanced emergency trauma care (Tabs X-2 and GG-6). EMS personnel also triaged and prepared MVO and MA2 for ground transport to emergency care (Tabs X-3 and X-4). The air ambulance arrived at MS at 1502L to transport MA1 (Tabs R-61 and GG-6). Two ground ambulances departed SHANGR with MVO at 1505L and MA2 at 1507L for Salina Regional Health Center (Tabs P-10, P-17, and EE-12). At 1519L, the air ambulance departed SHANGR with MA1, transporting him to the nearest emergency department (ED), which was McPherson Hospital (Tab EE-12). MA1 arrived at McPherson ED at 1535L and received advanced emergency care, but was unresponsive

to intervention (Tab X-2). Despite heroic efforts by both SHANGR and medical personnel, MA1's injuries were fatal and MA1 was declared deceased at 1559L (Tab X-2).

c. Recovery of Remains

Not applicable.

5. MAINTENANCE

284 ASOS and Det 1 have a consolidated vehicle maintenance shop (VMS) at SHANGR (Tabs V-10.14 and V-11.3).

a. Maintenance Documents

Defense Property Accountability System (DPAS) is the database in which MV's maintenance records have been stored since late 2017, when AF switched to using this new records database system (Tab U-5). The maintenance documents for MV in DPAS showed that all required scheduled and unscheduled maintenance from December 2017 until September 2020 (MV's last annual inspection) was completed (Tab U-61 to U-85). Annual inspections are preventative and include an examination of the powertrain (e.g., engine, transmission, and transfer case), tires, seatbelts and all other safety related items, body (e.g., glass, mirrors, doors), chassis, suspension, steering components, brake system and braking components, lights and warning devices, fluid levels, battery, and charging system (Tabs U-5 and U-58 to U-59).

b. Maintenance Forms

A review of all relevant maintenance forms and logs from December 2017 to September 2020 showed no discrepancies (Tabs U-3 to U-4 and U-61 to U-84). VMS completed three significant maintenance actions on MV since December 2017 (Tabs U-10, U-28 to U-29, U-31, U-35, and U-39). One action involved the replacement of the Transmission Control Module on MV, and MV was returned to service in July 2019 (Tab U-37 to U-39). Another action involved a safety message from June 2018 outlining a tire design fault in the Goodyear Wrangler Maximum Traction/Reinforced (MT/R) tires (Tabs U-10 and U-28). MV's MT/R tires, including the spare tire, were replaced, and MV was returned to service in September 2019 (Tab U-29). A third action involved a safety message from June 2019 referencing unapproved brake pads (Tab U-31). In June 2019, VMS inspected MV's brake pads and found that the safety message did not apply, and MV was returned to service (Tab U-35).

c. Scheduled Inspections

All scheduled inspections from December 2017 through September 2020 were completed as required (Tabs U-61 to U-84). No discrepancies were noted (Tabs U-3 to U-4).

d. Maintenance Procedures

Not applicable.

e. Unscheduled Maintenance

VMS conducted MV's last scheduled annual inspection on 2 September 2020, performing normal preventative maintenance with no discrepancies (Tabs U-81 and U-83). VMS conducted no unscheduled maintenance since 2 September 2020 (Tab U-83).

f. Maintenance Personnel

All VMS technicians who handled MV for the above-referenced scheduled and unscheduled maintenance procedures were qualified and experienced technicians (Tab U-60). Training records showed no deficiencies or de-certifications for any maintenance personnel who handled MV for these procedures (Tab U-60).

6. EQUIPMENT, VEHICLES, FACILITIES, AND SYSTEMS

a. Functional Status

MV was functioning properly on 08 June 2021, prior to the mishap (Tabs U-3 to U-4, V-2.17, and V-3.32). From 01 June to 07 June 2021, there were at least three documented spot inspections of MV: two on 03 June 2021 and one on 05 June 2021 (Tabs U-3 to U-4). None of the spot inspections revealed any discrepancies with MV (Tab U-4). While MT did not document a spot inspection on MV's AF Form 1800 on 08 June 2021, MVO and MA2 both testified that they observed no discrepancies or problems with MV while driving it on the day of the mishap (Tabs U-3 to U-4, V-2.5, V-2.17 to V-2.18, and V-3.32).

b. Equipment Condition Post-Mishap

MV's brake pads were normal and serviceable prior to the mishap (Tab U-35). However, as a result of the mishap, MV sustained significant structural damage to its rear quarter panels, B-pillars (support posts connecting the roof to the body of the vehicle), cab assembly, and roof (Tabs Z-2, Z-5, and GG-5 to GG-6).

During the mishap, MV's tire bead on its front right tire broke (Tabs U-47, U-49, and Z-6). The term "bead" is used to describe where the edge of the tire sidewall and the inner lip of the rim seal the pressurized air in the tire (Tabs U-47 and U-49). Once MV entered the turn and began to skid, the weight and momentum of MV bore down on the front right tire, driving it into the ground perpendicular to the road, briefly breaking the bead (Tabs U-47, U-49, and Z-6). Once the bead broke, air in the tire was released allowing debris, rocks, grass, and dirt to lodge between the rim and tire during the skid (see Figures 7 and 8) (Tabs U-47, U-49, and Z-6). Gravel also lodged in the rear right tire during the skid (see Figure 7) (Tabs U-49 and Z-6).

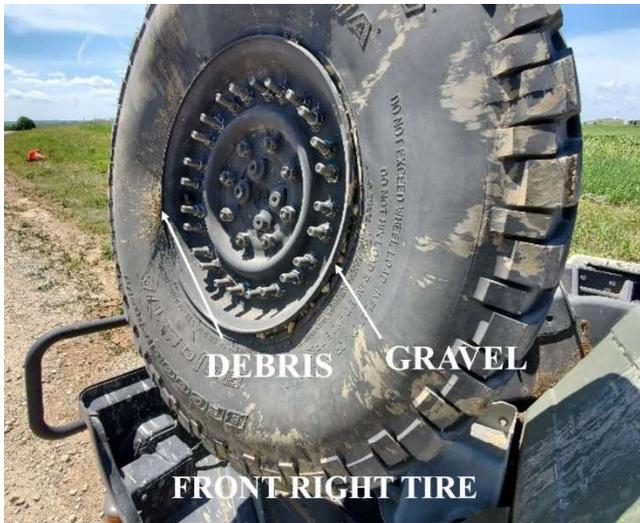


Figure 7 – Front Right Tire with Broken Bead and Rear Right Tire with No Broken Bead (Tab Z-6)

c. Track Analysis

Saline County Sheriff's Office conducted a tire track analysis of Parsons Road at MS and produced a report (Tabs Z-6 and GG-2 to GG-14). The report showed that the rear left tire track crossed the front right tire track during the mishap sequence (see Figures 9 and 10) (Tabs Z-6 to Z-7 and GG-12 to GG-14). This indicated MV skidded sideways and rotated counterclockwise for approximately 100 feet on the left side of Parsons Road at MS (Tabs Z-6 to Z-7, GG-3, GG-6, and GG-13 to GG-14). The report and photographs showed no evidence of heavy braking and documented three tire tracks in the road (Tabs Z-6 to Z-7, GG-5 to GG-6, and GG-13 to GG-14). Once MV began its initial skid and rotation, MVO would not have regained control of MV through any braking (Tab EE-4).



Figure 8 - Flat Front Right Tire with Broken Bead (Tab Z-6)

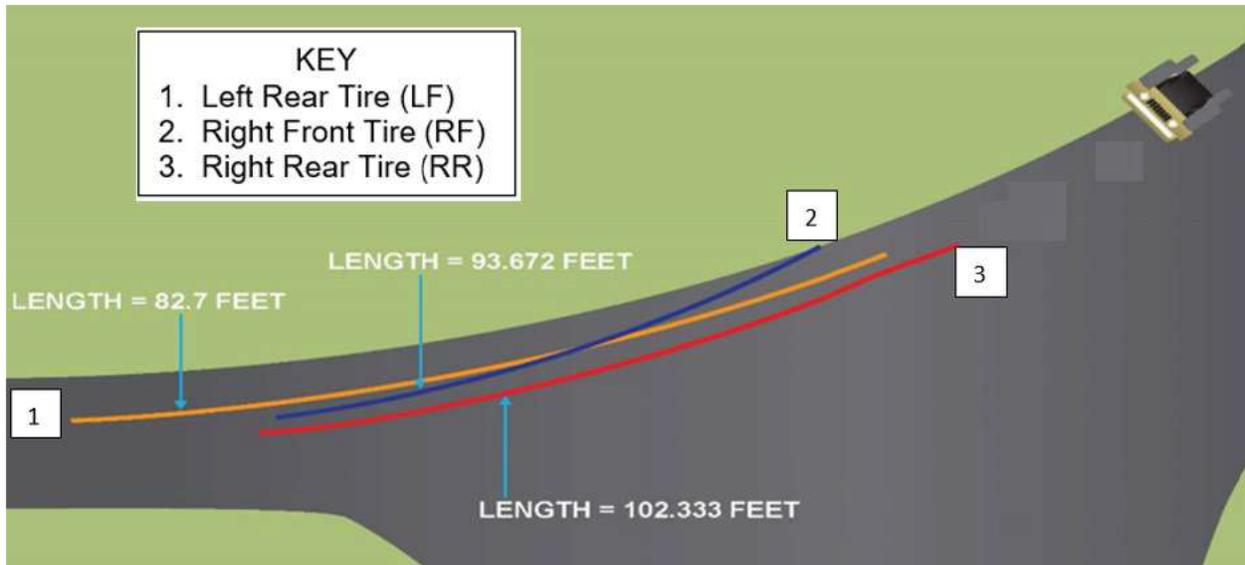


Figure 9 – Illustration of Tire Tracks at Mishap Site (Not to Scale) (Tabs Z-6, GG-5 to GG-6, and GG-13 to GG-14)

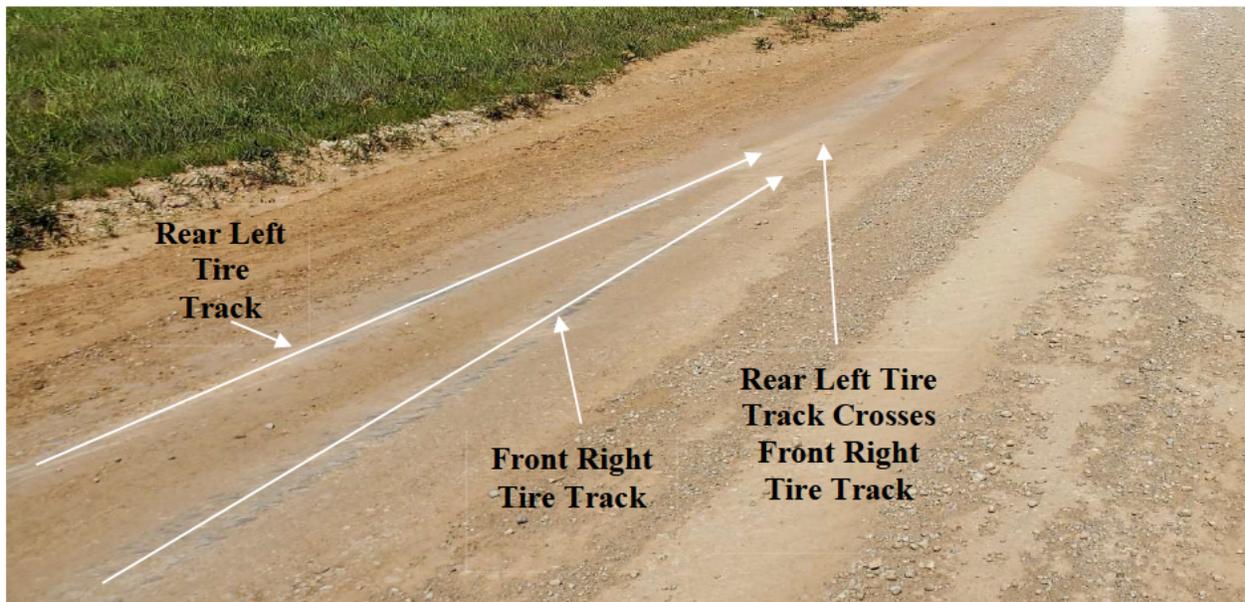


Figure 10 - Photograph of Tire Tracks at Mishap Site (Tab Z-7)

7. ENVIRONMENTAL CONDITIONS

a. Forecasted Weather

The forecast on 08 June 2021 was for the weather to be partly to mostly cloudy with good visibility and with warm temperatures (Tab W-3).

b. Observed Weather

The observed weather at the time of the mishap was consistent with the forecasted weather described above (Tab GG-2). There was no precipitation from 05 June 2021 through 08 June 2021 (Tab W-4).

c. Post-Accident Weather

The post-accident weather was similar to the observed weather (Tab W-3).

d. Environmental Conditions

Parsons Road is a gravel road (Tabs V-1.2, V-1.13, and GG-2). In accordance with SHANGR policy, the roads had been graded twice in April 2021 and twice in May 2021, with the most recent grading having occurred approximately six to nine days prior to the mishap (Tabs R-3 and EE-2). Approaching MS while traveling east, Parsons Road slightly banks to the left prior to a broad, sweeping turn north (Tabs V-2.9, V-7.26, V-11.5, and GG-2). Witnesses stated they would reduce their driving speed significantly below the posted speed limit of 45 mph when approaching MS (Tabs V-2.9, V-4.3, and V-7.26). There was no precipitation at SHANGR from 05 June 2021 to 08 June 2021, and the roads were normal and dry on 08 June 2021 (Tabs V-7.15, W-4, and GG-2).

There was no indication of any intervening cause, such as wildlife, that might have caused MVO to lose control of MV, and if wildlife had caused MVO to lose control, this would have been unusual for the time of day when the mishap occurred (Tabs V-7.24, V-10.5, and V-11.32).

8. PERSONNEL QUALIFICATIONS

a. Relevant Training

MA1 completed TACP technical training, upgrade training, on-the-job training, and specialty training, and was a 7-level (Tabs T-12 and T-13).

MVO completed TACP technical training, upgrade training, on-the-job training, and specialty training, and was upgraded to 5-level in July 2019 (Tabs T-11 and T-13).

MA2 completed TACP technical training, upgrade training, on-the-job training, and specialty training, and was upgraded to 7-level in May 2019 (Tabs T-10 and T-13).

b. Training Currency

MA1, MVO, and MA2 met currency requirements for CAS procedures on the range (Tabs V-10.9 and DD-28 to DD-30). MVO possessed a valid Government Vehicle (GOV) Driver's License (Tab T-4).

9. MEDICAL

a. Qualifications

MA1, MVO, and MA2 were medically qualified for duty (Tab X-2 to X-4).

b. Health

MA1, MVO, and MA2 were in normal health for duty at the time of the mishap (Tab X-2 to X-4).

c. Pathology

MA1 was fatally injured, and MVO and MA2 were both injured in the mishap (Tab X-2 to X-4). At approximately 1355L, MV rolled over and came to rest on its roof (Tabs DD-32 and GG-5 to GG-6). SHANGR personnel activated EMS and provided SABC to MA1, MA2, and MVO (Tabs X-2 to X-4, DD-32, EE-12 to EE-13, and GG-6). At 1435L, ground EMS arrived at MS to provide emergency care for injured members (Tabs X-2 to X-4, EE-12 to EE-13, and GG-6).

MA1 was found ejected approximately 90 feet north of MV, injured, and unconscious (Tabs R-20 to R-21, GG-4 and GG-13 to GG-14). Due to MA1's critical condition, MA1 was transported by air ambulance to the nearest ED for emergent care (Tab GG-6). At 1535L, MA1 arrived at McPherson Hospital ED and was provided emergent care (Tab X-2). MA1 was unresponsive to intervention and was declared deceased due to cardiac arrest at 1559L on 08 June 2021 (Tab X-2).

MVO was found ejected a few feet outside of MV, injured, and disoriented (Tabs R-20, X-4, GG-3, GG-6, and GG-8). At 1505L, MVO was transported by EMS via ground ambulance to the Salina Regional Health Center for emergent care (Tab X-4).

MA2 was found ejected approximately 58 feet north of MV, injured, and conscious (Tabs X-3, GG-4, GG-6, and GG-14). At 1507L, MA2 was transported by EMS via ground ambulance to the Salina Regional Health Center for emergent care (Tab X-3).

The state of MA1's, MVO's, and MA2's injuries is consistent with all three members' being ejected from MV as unrestrained occupants with unclashed helmets or no helmets used at the time of the mishap (Tabs X-2 to X-4, GG-4, GG-6, and GG-8).

d. Toxicology

Toxicology results were normal and there was no evidence to suggest it was a factor in this mishap (Tabs X-2 to X-4, GG-4, and GG-8).

e. Crew rest and crew duty time

There is no evidence to suggest crew rest was a factor in this mishap (Tab X-2 to X-4).

10. OPERATIONS AND SUPERVISION

a. Operations

284 ASOS is a high-demand, low-density force required to balance currency training and operational demands across a unit comprised of traditional and full-time KANG members (Tab V-11.4). There was nothing unusual about the operational tempo for 284 ASOS or Det 1 on 08 June 2021 (Tabs R-13, V-2.6, and V-7.11). Specifically, RCO, MVO, and MA2 all stated the CAS training and associated movements between OPs were similar to other CAS training conducted at SHANGR (Tabs R-62, V-2.6, V-3.36 to V-3.37, V-7.11, and V-7.33).

Det 1 oversees operational safety on SHANGR through various methods, including an annual safety briefing (Tabs V-7.3 to V-7.4, V-11.7 and V-11.10). Det 1, 284 ASOS, and visiting aircraft share mission planning and operational risk management (ORM) as a combination of verbal and written communication (Tabs V-7.2 to V-7.5, CC-112 to CC-125, and CC-156). To execute the mission on 08 June 2021, MT, Det 1, and the flight crews developed and used a Concept of Operations (CONOP), ORM, and FRAG Sheet (a daily operational order) in accordance with local commander guidance (Tabs V-2.6, V-3.35 to V-3.36, V-7.4, V-11.8, CC-112, CC-113, CC-118, and CC-156).

b. Vehicle Oversight

284 ASOS VCO provided oversight for unit GOVs through education, training, licensing, and allocation for range use (Tabs V-8.7 to V-8.8 and V-8.11 to V-8.12). There is no evidence to indicate that supervisory oversight of vehicle operations was relevant to the mishap.

11. GOVERNING DIRECTIVES AND PUBLICATIONS

a. Publicly Available Directives and Publications Relevant to the Mishap

(1) AFI 13-112 Vol. 1, *Joint Terminal Attack Controller (JTAC) Training Program*, 29 September 2017

(2) AF Manual (AFMAN) 13-212 Vol. 1, *Range Planning and Operations*, 22 June 2018

(3) AFI 24-302, *Vehicle Management*, 21 February 2020

(4) AFMAN 24-306, *Operation of Air Force Government Motor Vehicles*, 30 July 2020

(5) AFMAN 36-2100, *Military Utilization and Classification*, dated 7 April 2021

(6) AFI 51-307, Air Combat Command Supplement, *Aerospace and Ground Accident Investigations*, 3 December 2019

(7) AFI 91-207, *The US Air Force Traffic Safety Program*, 26 July 2019

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

- Qualification Training Package 24-3-L350, *Aircraft Tow*, 14 January 2019

c. Known or Suspected Deviations from Directives or Publications

All deviations previously discussed.

15 OCTOBER 2021

BRADLEY L. PYBURN
Brigadier General, USAF
President, Ground Accident Investigation Board

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