


## ACTION OF THE CONVENING AUTHORITY

The report of the accident investigation board, conducted under the provisions of AFI 51-307, that investigated the 17 August 2023 mishap near Inyokern Airfield, California, involving CV-22B, T/N 08-0039, assigned to the 27th Special Operations Wing, Cannon Air Force Base, New Mexico, complies with applicable regulatory and statutory guidance and on that basis is approved.

  
\_\_\_\_\_  
MICHAEL E. CONLEY  
Lieutenant General, USAF  
Commander

13 AUG 24  
\_\_\_\_\_  
Date

**UNITED STATES AIR FORCE**  
**AIRCRAFT ACCIDENT INVESTIGATION**  
**BOARD REPORT**



**CV-22B Osprey/ T/N: 08-000039**  
**27TH SPECIAL OPERATIONS WING**  
**CANNON AIR FORCE BASE (AFB), NEW MEXICO**



**LOCATION: INYOKERN AIRFIELD, CA**  
**DATE OF ACCIDENT: 17 AUGUST 2023**  
**BOARD PRESIDENT: COLONEL JEFF D. MCMASTER**  
**Conducted IAW Air Force Instruction 51-307**

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

**CV-22B, TN 08-000039  
INYOKERN AIRFIELD, CALIFORNIA  
17 AUGUST 2023**

On 17 August 2023, at approximately 0945 local time (L), while taxiing into park, the spinning prop rotor of a taxiing CV-22B, tail number (T/N) 08-000039 (MA), struck the stationary prop rotor of a parked CV-22B, T/N 09-000046. The incident occurred on a parking apron at Inyokern Airfield, CA. Both aircraft were assigned to the 27 Special Operations Wing (SOW) at Cannon AFB, New Mexico. The mishap crew (MC) was assigned to the 20 Special Operations Squadron (SOS). The MC consisted of the mishap pilot (MP), the mishap copilot (MCP), and the mishap flight engineer (MFE). There were no fatalities or damage to civilian property. One mishap maintenance member (MM1) assigned to the 727<sup>th</sup> Special Operations Aircraft Maintenance Squadron (SOAMXS) was injured while taking cover from flying debris, transported to a local civilian hospital for treatment, and subsequently released the same day.

The MC was completing a Functional Check Flight (FCF) mission in advance of the unit's redeployment to Cannon AFB at the conclusion of a two-week unilateral exercise in the vicinity of Naval Air Weapons Station (NAWS) China Lake. The purpose for the FCF was to ensure aircraft functionality following maintenance actions which were unrelated to the mishap. During return to parking following completion of the FCF and while maneuvering the MA into its parking spot, the MCP initiated a premature turn and subsequently taxied too close to a parked aircraft. The MA's rotating blades struck a stationary prop rotor blade of the parked CV-22B resulting in significant damage to both aircraft. The loss of United States Government property was valued at approximately \$2,508,148.00.

The Accident Investigation Board (AIB) President found by a preponderance of the evidence two causes for the mishap. First, the MC failed to ensure adequate taxi clearance during ground operations which resulted in collision with a parked aircraft. Second, there was inadequate real-time risk assessment by the MP to identify the closing proximity with the parked aircraft and the MP's subsequent failure to take corrective action to avoid the collision. Additionally, the AIB President found by a preponderance of the evidence the following factors which substantially contributed to the mishap: (1) complacency by both maintenance and aircrew during non-standard ground operations (2) inadequate risk management during pre-deployment mission planning by failing to identify hazards associated with the aircraft parking ramp, (3) lack of standard terminology and signals during ground operations, and (4) inadequate command and supervisor oversight.

*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.*



**United States Air Force Accident Investigation Board Report**

**Class A Mishap, Inyokern Airfield, California**

**SUMMARY OF FACTS AND STATEMENT OF OPINION**

**CV-22B, T/N 08-000039**

**17 AUGUST 2023**

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## ACRONYMS AND ABBREVIATIONS

<b>14 WPS</b> – 14th Weapons Squadron	<b>FORGEN</b> – Force Generation
<b>20 AMU</b> – 20th Aircraft Maintenance Unit	<b>FS</b> – Flight Surgeon
<b>20 SOS</b> – 20th Special Operations Squadron	<b>ISU</b> – Internal Stability Unit
<b>27 SOG</b> – 27th Special Operations Group	<b>Lt</b> – Lieutenant
<b>27 SOW</b> – 27th Special Operations Wing	<b>Lt Col</b> – Lieutenant Colonel
<b>727 SOAMXS</b> – 727th Special Operations Aircraft Maintenance Squadron	<b>MA</b> – Mishap Aircraft
<b>A1C</b> – Airman First Class	<b>Maj</b> – Major
<b>AIB</b> – Accident Investigation Board	<b>MC</b> – Mishap Crew
<b>ADC</b> – Area Defense Counsel	<b>MCC</b> – Mission Commander
<b>AFB</b> – Air Force Base	<b>MCP</b> – Mishap Co-Pilot
<b>AFETS</b> – Air Force Engineering Technical Service	<b>MFE</b> – Mishap Flight Engineer
<b>AFI</b> – Air Force Instruction	<b>MP</b> – Mishap Pilot
<b>AFMAN</b> – Air Force Manual	<b>MM</b> – Maintenance Member
<b>AFSOC</b> – Air Force Special Operations Command	<b>MST</b> – Mountain Standard Time
<b>AFTO</b> – Air Force Technical Order	<b>MX</b> - Maintenance
<b>AGE</b> – Aircraft Ground Equipment	<b>NAWS</b> – Naval Air Weapons Station
<b>APU</b> – Auxiliary Power Unit	<b>NCO</b> – Non-Commissioned Officer
<b>CAFBI</b> – Cannon Air Force Base Instruction	<b>NOTAM</b> – Notices to Airmen
<b>Capt</b> – Captain	<b>Ops Sup</b> – Operations Supervisor
<b>CC</b> – Commander	<b>ORM</b> – Operational Risk Management
<b>CRM</b> – Crew Resource Management	<b>PPE</b> - Personal Protective Equipment
<b>DO</b> – Director of Operations	<b>PRTF</b> – Personnel Recovery Task Force
<b>DoD</b> – Department of Defense	<b>SIB</b> – Safety Investigation Board
<b>FCF</b> – Functional Check Flight	<b>SOG</b> – Special Operations Group
	<b>SOAMXS</b> – Special Operations Aircraft Maintenance Squadron



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**SOMXG** – Special Operations Maintenance Group

**SOS** – Special Operations Squadron

**SOTU** – Special Operations Task Unit

**SOW** – Special Operations Wing

**SUP** – Superintendent

**TCTO** – Time Compliance Technical Order

**TDY** – Temporary Duty Assignment

**T/N** – Tail Number

**TO** – Technical Order

**TOC** – Tactical Operations Center

**UCMJ** – Uniform Code of Military Justice

**USAF** – United States Air Force

**VALEX** – Validation Exercise

# United States Air Force Accident Investigation Board Report

## SUMMARY OF FACTS UNITED STATES AIR FORCE AIRCRAFT ACCIDENT INVESTIGATION

CV-22B, TN 08-000039  
INYOKERN AIRFIELD, CALIFORNIA  
17 AUGUST 2023

### 1. AUTHORITY AND PURPOSE

#### a. Authority

On 7 September 2023, Lieutenant General Tony D. Bauernfeind, Commander, Air Force Special Operations Command (AFSOC), appointed Colonel Jeff McMaster as the Accident Investigation Board (AIB) President to investigate a 17 August 2023 CV-22B Osprey aircraft accident involving two CV-22B aircraft, tail numbers (T/N) 08-000039 and 09-000046 (Tab CC-1). The AIB conducted their investigation at Cannon Air Force Base (AFB), New Mexico, and Hurlburt Field, Florida, from 18 September 2023 to 13 October 2023, in accordance with Air Force Instruction (AFI) 51-307, *Aerospace and Ground Accident Investigations*, Chapter 12 (Tab BB-1). The following board members were appointed: Legal Advisor (Captain), Medical Member (Major), Pilot Member (Lieutenant Colonel), Maintenance Member (Master Sergeant), and Recorder (Technical Sergeant) (Tab CC-1 and CC-3).

#### b. Purpose

In accordance with Air Force Instruction (AFI) 51-307, *Aerospace and Ground Accident Investigations*, 18 March 2019, this Accident Investigation Board (AIB) 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-1). This investigation was an accident investigation, conducted pursuant to Chapter 4 of AFI 51-307 (Tab BB-1).

### 2. ACCIDENT SUMMARY

On 17 August 2023, at approximately 0945 Mountain Standard Time (MST), Mishap Aircraft (MA), a CV-22B, tail number (T/N) 08-000039, assigned to the 27th Special Operations Wing, Cannon Air Force Base, New Mexico, while taxiing back into parking at Inyokern Airport, Inyokern, California, struck the proprotor of T/N 09-000046, another CV-22B parked on the ramp (Tab A-3). At the time of the incident, the 20th Special Operations Squadron (SOS) was deployed to Inyokern Airport to conduct defensive systems training in the vicinity of Naval Air Weapons Station (NAWS) China Lake (V-19). The Mishap Crew (MC) was completing a Functional Check Flight (FCF) mission to ensure the functionality of the aircraft following maintenance repairs (Tab A-4). *CV-22B, T/N 08-000039, 17 August 2023*

*CV-22B, T/N 08-000039, 17 August 2023*

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During the MC's taxi back into parking, the proprotor of the mishap aircraft struck the proprotor of the parked aircraft (Tab A-4). Corrective guidance was not provided in time to prevent the MA's proprotors from striking the proprotor of the parked aircraft (Tabs A-3 to A-4, Tabs V-1 to V-2, and Tabs V-4 to V-8). One maintenance member (MM1), assigned to the 727th Special Operations Maintenance Squadron (SOAMXS) was injured by flying debris, transported to a local civilian hospital, and released (Tabs A-3 to A-4).

### 3. BACKGROUND

#### a. Air Force Special Operations Command (AFSOC)



AFSOC provides Air Force special operations forces (SOF) for worldwide deployment and assignment to regional unified commands (AA-1). The command's SOF are composed of highly trained, rapidly deployable Airmen, conducting global special operations missions ranging from precision application of firepower to infiltration, exfiltration, resupply and refueling of SOF operational elements (AA-1). The command's core missions include battlefield air operations; agile combat support; aviation foreign internal defense; information operations/military support operations; precision strike; specialized air mobility; command and control; and intelligence, surveillance, and reconnaissance (Tab AA-1).

#### b. 27<sup>th</sup> Special Operations Wing (27 SOW)



The 27th Special Operations Wing's core missions include close air support, agile combat support, information operations, precision strike, forward presence and engagement, intelligence surveillance and reconnaissance operations, and specialized mobility (AA-2). The wing is made up of four groups, 26 squadrons, four Aircraft Maintenance Units, one group-level detachment and several wing staff and support agencies (AA-2). As the owning unit at Cannon Air Force Base, New Mexico, the 27 SOW also supports several tenet units on the base (Tab AA-2). *CV-22B, T/N 08-000039, 17 August 2023*



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### c. 27<sup>th</sup> Special Operations Group (27 SOG)



The 27th Special Operations Group, located at Cannon Air Force Base, New Mexico, accomplishes global special operations taskings as an Air Force component member of the United States Special Operations Command (AA-3). The 27 SOG conducts infiltration/exfiltration, combat support, tilt-rotor operations, helicopter aerial refueling, close air support, unmanned aerial vehicle operations, non-standard aviation, and other special missions (AA-3). The group directs the deployment, employment, training, and planning for Cannon's operational and operational support squadrons (Tab AA-3).

### d. 27<sup>th</sup> Special Operations Maintenance Group (27 SOMXG)



The 27th Special Operations Maintenance Group, is responsible for all flight line, back shop and ammunition maintenance in support of the 27th Special Operations Group's mission (AA-4). The 27th SOMXG conducts quality maintenance for five different types of aircraft across four squadrons, seven defense contractor groups, and 1,400 Air Commando maintainers (AA-4). The group manages over 90 facilities while also providing contract oversight of civilian maintenance on three Non-Standard Aviation program aircraft types (Tab AA-4).

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### e. 20<sup>th</sup> Special Operations Squadron (20 SOS)



The 20th Special Operations Squadron, assigned to the 27th Special Operations Group, Cannon Air Force Base, New Mexico, provides flexible vertical lift for United States Special Operations Command (Tab AA-5).

### f. 727<sup>th</sup> Special Operations Aircraft Maintenance Squadron (727 SOAMXS)



The 727th Special Operations Aircraft Maintenance Squadron, assigned to the 27th Special Operations Maintenance Group, executes global Special Operations taskings as an Air Force component member of United States Special Operations Command (AA-6). The squadron organizes, trains, and equips personnel in the maintenance and sustainment of CV-22 Osprey tilt-rotor aircraft as well as the MQ-9 Reaper remotely piloted aircraft (Tab AA-6).

### g. CV-22B Osprey



The CV-22 Osprey is a tilt-rotor aircraft that combines the vertical takeoff, hover, and vertical landing qualities of a helicopter with the long-range, fuel efficiency and speed characteristics of a turboprop aircraft (AA-7). The mission of the CV-22 is to conduct long-range infiltration, exfiltration, and resupply missions for special operations forces (Tab AA-7).

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## 4. SEQUENCE OF EVENTS

### a. Mission

The MC was completing a two-week long unilateral Defensive System Training (DST) exercise and was preparing the aircraft for redeployment to Cannon AFB on the day of the incident (V-10 and V-19). The mission for the MA, callsign ABRAM 13, on the day of the incident was to perform a FCF in the local traffic pattern, following maintenance procedures performed on the flight control systems (A-4). These maintenance procedures required completion of the “C” Card profile in which the flight controls were checked for proper functionality prior to the aircraft’s redeployment to Cannon AFB, New Mexico (Tab D-2). The profile would have required a single iteration of the air traffic pattern with a normal return to landing (Tabs V-1 to V-3). The flight authorization for the mission was signed by the Mission Commander 2 (MCC2) under direction of the 27 SOW (Tab K-2).

Prior to the DST, the 20 SOS deployed four CV-22s to Inyokern from 24 July – 3 August, for a Personnel Recovery Task Force (PRTF) validation exercise (VALEX) (V-19). The aircrew participating in the PRTF VALEX were replaced by other 20 SOS aircrew arriving via CV-22 on 3 August for the DST (V-10 and V-19). Aircraft parking, Tactical Operations Center (TOC), and maintenance operations remained the same between the VALEX and DST missions (Tabs V-11 to V-12).

### b. Inyokern Airfield Description

Inyokern Airfield is a small general aviation airport located in Inyokern, a small Southeastern California town in the vicinity of Naval Air Weapons Station (NAWS) China Lake. Inyokern Airfield has three runways (RWY15/33, RWY10/28, & RWY02/20) configured in a triangular pattern (Tab O-2). There are two parking aprons for transient general aircraft, one at the airport terminal on the Southeast side of the airfield and another alternate apron on the Eastern side (Tab O-2). Both parking aprons are lighted for nighttime operations (Tab O-2).

Inyokern also has a large concrete apron located on the Northern end of the airfield off the approach end of RWY10 (Figure 1.0) (Tab Z-1). This parking location is not used during normal airfield operations. No taxi lines or airfield markings are present, and no airfield lighting is available for nighttime operations (Figure 2.3). The apron’s concrete surface is deteriorating with loose gravel, uneven surfaces, large cracks, and chunks of concrete prevalent throughout (Tab Z-1). Additionally, an approximately two-inch deep trench separates the parking apron from the approach end of RWY10 (Tab Z-1). On the south side of this transition is a larger hole requiring aircrew to offset to the north side of the taxiway to avoid (Tab Z-1). This trench exceeds the 1.5-inch taxi obstacle height restriction listed in the 1V-22(C)B-1 aircraft technical orders; “traversing or taxi over obstacles greater than 1.5 inches in height is prohibited” (Tab BB). Parking apron conditions are shown in Figure 2.1 below (Tab Z-1).

The parking apron in use during the mishap was the Northern apron (Tab Z-1). The apron measures 900 feet by 150 feet which is sufficient to park four or more CV-22s (Tab Z-1). When parked in their designated parking spots, one-hundred feet of space was provided between the aircraft nose and taxiway edge (Tab Z-1). The CV-22’s wingspan—proprotor-tip to proprotor-tip—measures eighty-four feet (Tab Z-1).



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The aircraft width measures sixty-seven feet when measured from the outer edge of one nacelle to the opposite proprotor-tip (Figure 2.2). Maintenance equipment was positioned as indicated in Figure 2.3, approximately two-hundred feet from the western end of the ramp (Tab Z-1).

AFMAN 11-218 *AIRCRAFT OPERATIONS AND MOVEMENT ON THE GROUND* mandates twenty-five feet of horizontal clearance from a hazard when operating an aircraft on the ground. Wing walkers are required if an aircraft is operated on the ground within twenty-five feet of a hazard (Tab BB-3). However, at no point is an aircraft permitted to be operated within ten feet of a hazard even with wing walkers (Tab BB-4).

For taxiing purposes at Inyokern, aircrew would align the aircraft between two clearly identifiable seams in the concrete, placing one of the nacelles over the Northern edge of the concrete (Tab V-1, Tab V-2, Tab V-3, Tab V-4, Tab V-5, Tab V-6, Tab V-7, & Tab V-8). The required minimum taxiway width, with wing walkers, at Inyokern's Northern ramp is seventy-seven feet. Without wing walkers, the taxiway width requirement is ninety-two feet. With one-hundred feet available between the nose of the parked aircraft and the edge of the ramp, there was sufficient space available for aircraft to taxi (Tab Z-1).

CV-22s have operated from both the Northern and Eastern parking aprons on previous deployments to Inyokern (Tab V-10). As recently as April 2023, five-months prior to the mishap, the 20 SOS used the Northern apron in support of a Multilateral Exercise in the vicinity of NAWS China Lake (Tab V-10). The same aircraft parking configuration was used during previous deployments to Inyokern (Tabs V-1 to V-3, Tab V-10, Tab V-16, & Tab V-19).

**Figure 1.0 – Inyokern Airfield Diagram**

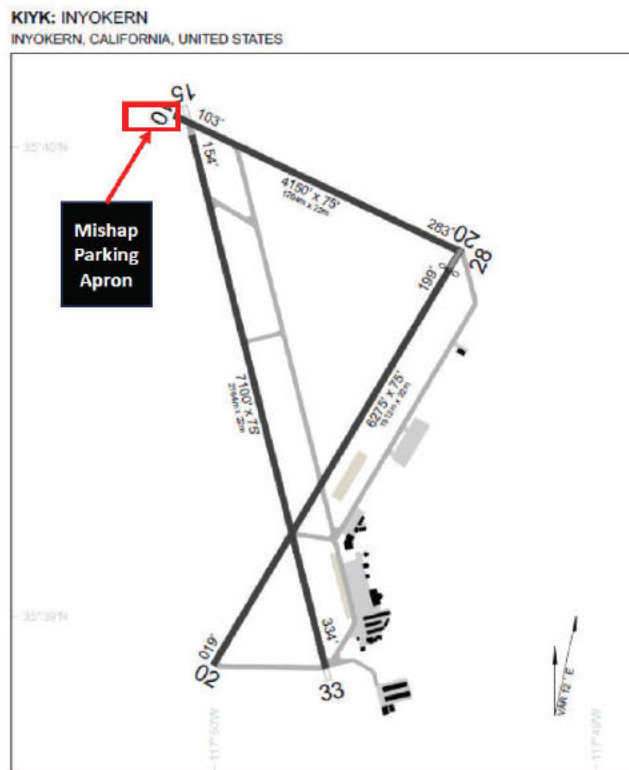


Figure 2.1 – Ramp Conditions

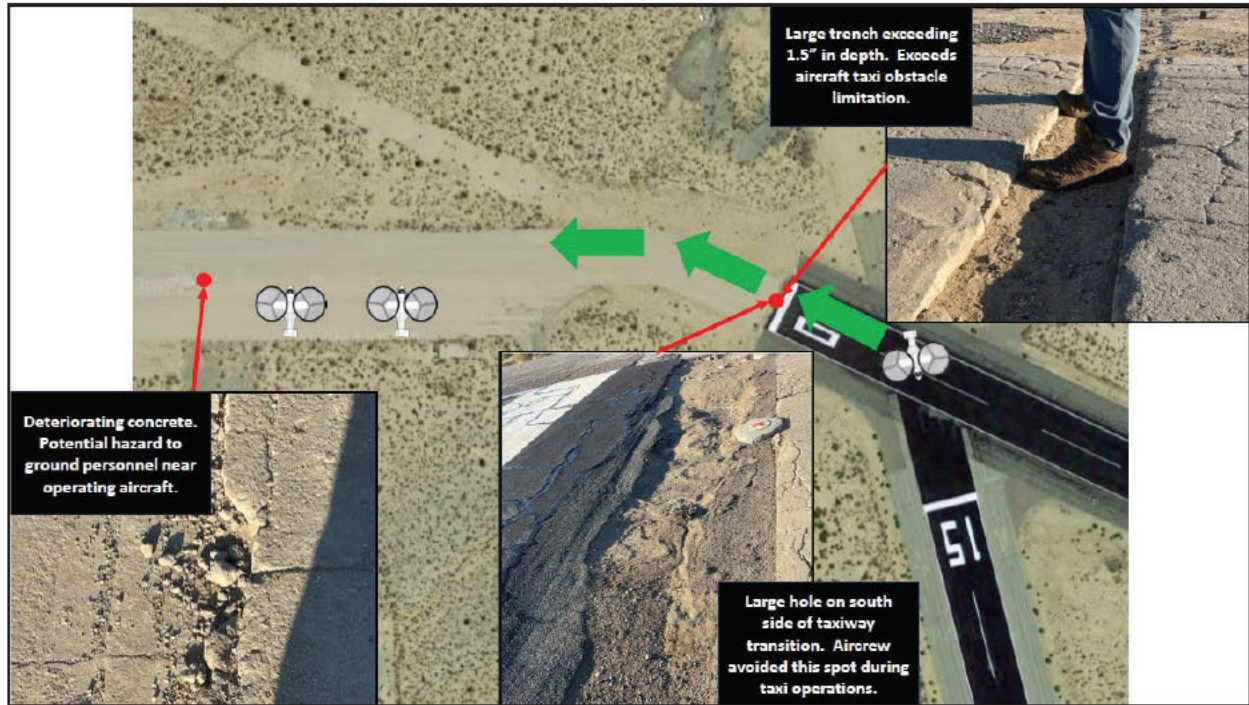


Figure 2.2 Mishap Overview Diagram

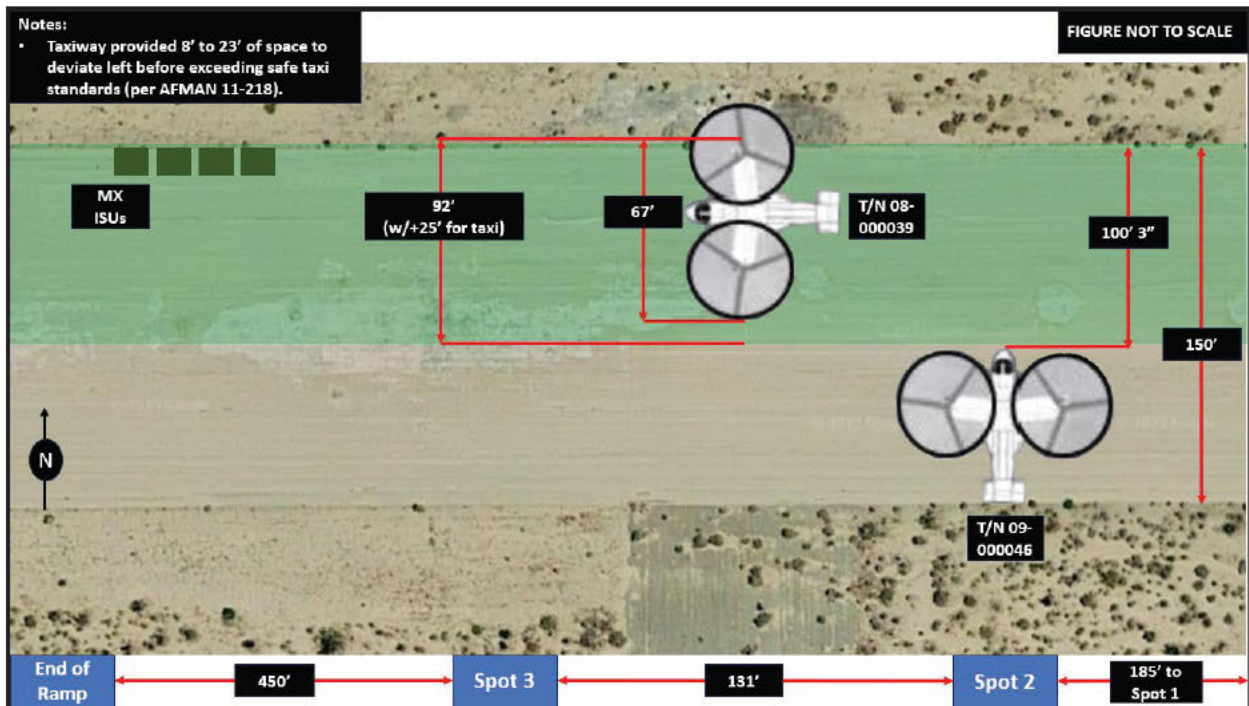




Figure 2.3 – Mishap Overview



### c. Planning

Mission planning for the FCF included standard procedures consisting of checking the weather and Notices to Airmen (NOTAM) for any factors affecting the safe conduct of the flight as well as a review of the FCF “C” Card profile (Tab V-10). The crew briefing occurred in the temporary TOC and was executed in accordance with squadron standard operating procedures (SOP) (Tabs V-1 to V-3). The MC completed an Operational Risk Management (ORM) form, which is used to assess the level of risk for the particular mission and was signed off by the MCC2 on the day of the mishap (Tab V-10). The ORM was rated as low risk however, a single ORM form was generated for both the FCF mission and subsequent redeployment flight to Cannon AFB. The ORM assessment did not individually assess risk for the MC’s FCF and did not include ground operations as a potential risk factor (Tab K-2).

### d. Preflight

The MC arrived at the MA at approximately 0830L. All pre-flight checks to include the walk around and maintenance forms review were completed per applicable technical orders with no aircraft maintenance issues noted apart from the requirement for the FCF. The maintenance production superintendent testified that the aircraft maintenance forms were reviewed and FCF profile requirements were briefed to the MC prior to departure; paper copies of the FCF checklist were not used and no evidence exists to corroborate witness testimony (Tab V-1, Tab V-2, Tab V-3, & Tab V-11). The MC consisted of the MP sitting in the left seat, MCP sitting in the right seat, and MFE sitting in the designated flight engineer seat. The MC completed all ground operations in accordance with the applicable checklist, with no evidence of anything out of the ordinary (Tab V-2).



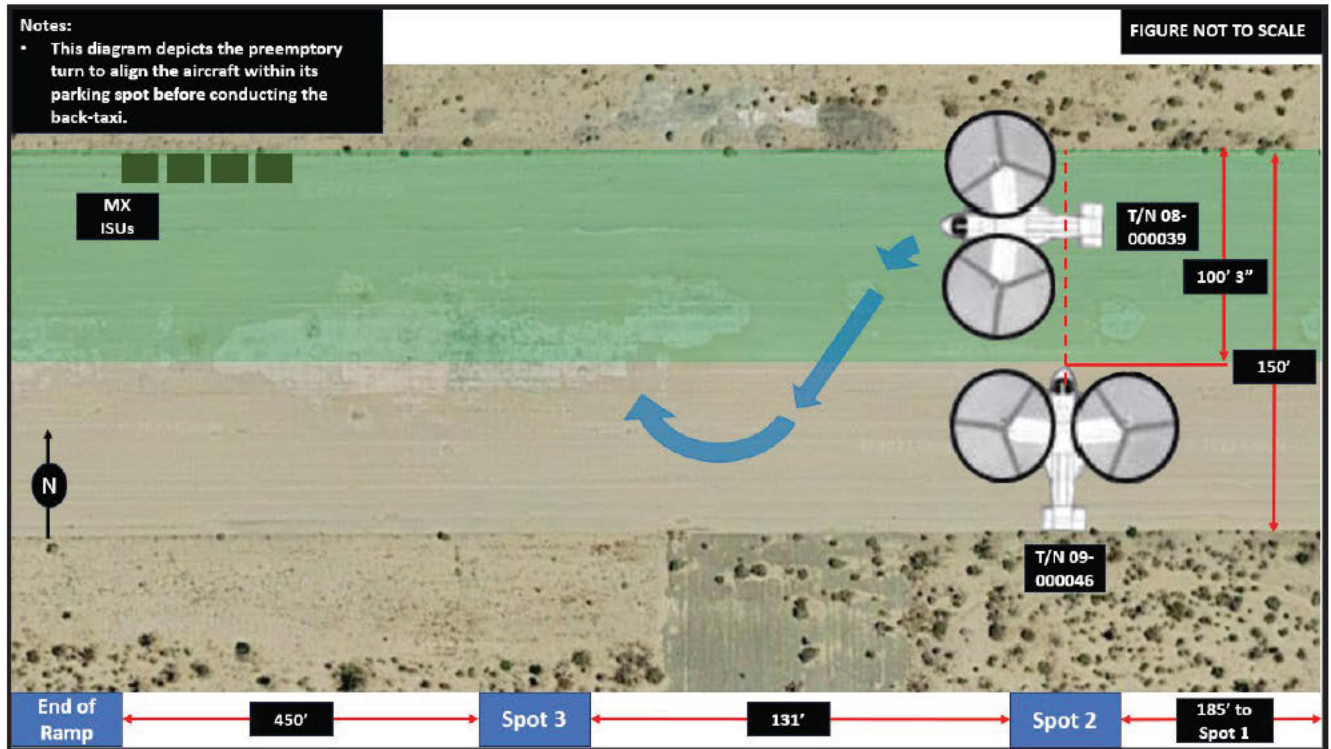
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### e. Summary of Accident

At approximately 0920L, the MC taxied to Runway 15 and completed all applicable checklists and associated procedures in preparation for takeoff (Tab N-1, and Tabs V-1 to V-3). The functional check flight was conducted in the Visual Flight Rules (VFR) pattern with a normal return to landing on the approach end of Runway 15 (Tab N-1 and Tabs V-1 to V-3). While clearing the runway and proceeding to the parking ramp, the MCP announced a deviation to the right side of the taxi way to avoid a large hole in the concrete (Tab N-1, and Tabs V-1 to V-3). The MC also completed the After Landing Checklist while taxiing off the runway (Tab N-1, and Tabs V-1 to V-3).

Taxiing west to park, the MC offset to the northside of the parking ramp to provide sufficient taxi clearance from the two parked aircraft on the southern side of the parking apron (Tab N-1 and Tabs V-1 to V-2). After passing abeam T/N 09-000046, the aircraft parked in Spot 2, the MCP executed a left-hand turn—towards the south—to position the aircraft for reverse taxi into park, as shown in Figure 3.0 (Tab V-1 to V-3, and Tabs V-6 to V-8). Prior to initiating the left-hand turn, the MCP announced “left turn” (Tab N-1). The MP, sitting in the left seat, responded with “Roger” but never confirmed that the aircraft was clear of the adjacent aircraft (Tab N-1 & Tab V-1). The MP also remembered feeling “uncomfortable” during the execution of this maneuver (Tab V-1). The aircraft’s proprotors contacted the proprotor of T/N 09-000046, resulting in significant damage to both aircraft (A-3). Debris from the MA’s spinning proprotors was thrown toward MM1, positioned on the south side of parking Spot 3 (Tab A-3 and V-6). MM1 dove for cover hitting his head on the ground, was transported to the hospital, and was diagnosed with a right shoulder injury and a concussion (Tabs V-6 and V-11).

Figure 3.0 – Parking Ramp w/Preemptory Turn



**f. Impact**

The incident occurred on the parking ramp located on the northwest corner of the airfield, just north of the approach end of Runway 15 at 0945 local time (A-4). The MA was in ground operation configuration and taxiing at approximately 5 knots when it's proprotors contacted the proprotors of a parked CV-22B, T/N 09-000046 (Tabs V-1 to V-3).

**g. Egress and Aircrew Flight Equipment**

The MC conducted a normal egress from the aircraft after the proprotors stopped movement. (Tabs V-1 to V-3). Aircrew flight equipment was not a factor in this mishap.

**h. Search and Rescue**

Not applicable.

**i. Recovery of Remains**

Not applicable.

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## 5. MAINTENANCE

### a. Forms Documentation

A review of both the MA's and T/N 09-000046's forms and Integrated Maintenance Data System (IMDS) showed only one minor discrepancy and no overdue Time Compliance Technical Orders (TCTOs), time change items or special inspections (Tabs D-1 & D-2). The maintenance production superintendent testified that the aircraft maintenance forms were reviewed and FCF profile requirements were briefed to the MC prior to departure; paper copies of the FCF checklist were not used and no evidence exists to corroborate witness testimony (Tab V-1, Tab V-2, Tab V-3, & Tab V-11). Prior to the takeoff, the exceptional release was complied with, and the MA had up-to-date basic post- and pre-flight inspections. T/N 09-000046, the parked aircraft, was awaiting a ground run to perform a gearbox oil leak check prior to receiving exceptional release for its FCF (Tab D-2). Exceptional release is the maintenance supervisor's approval of the aircraft for flight operations.

### b. Inspections

At the time of the mishap, the MA's total accumulated flight hours were 2,857.5 (Tabs D-1 & D-2). The MA required a 91-day gearbox oil sample and 56-day inspection that were intended to be completed upon return to Cannon AFB, New Mexico (Tabs D-1 & D-2). These inspections are minor maintenance procedures and were not contributory to the mishap. Maintenance personnel performed all required post-flight inspections following the MA's last flight on 16 Aug 2023 as indicated by Air Force Technical Order (AFTO) Form 781Hs in the aircraft maintenance records (Tab D-2).

### c. Maintenance Procedures

Maintenance personnel were familiar with all applicable Technical Orders (TOs), Air Force Manuals (AFMAN), and Air Force Instructions (AFIs). 27 SOMXG Quality Assurance personnel were not available for this deployment, therefore these duties were performed by the lead Maintenance Production Supervisor in accordance with AFI 21-101 (Tab BB-3).

Standard aircraft pull-through parking procedures were not used due to the width of the parking apron; therefore, aircraft were required to back taxi into their assigned parking locations (Tabs V-4 to V-5). This is a non-standard parking process for the unit (Tabs V-4 to V-5). Although sufficient taxiway clearance was available (Figure 4.0), wing walkers were posted at the nose of each parked aircraft to ensure the safety of taxiing aircraft. When returning to park, aircrew would taxi past the preceding aircraft, make a left forty-five degree turn into the parking spot, then a sharp right turn to align with a tire placed on the north side of the ramp signifying the center of the parking spot. Once aligned within the lateral boundaries of the parking spot, the aircrew would back taxi, following the commands of the Tail Scanner and ground marshaller, into the aircraft's parking spot. During this maneuver, one aircraft marshaller was positioned off the tail and one off the nose to provide alignment guidance as the crew positioned the aircraft in its parking spot. At night, a taxiway marshaller was provided that was not used during the daytime (Tabs V1 to V3).



## United States Air Force Accident Investigation Board Report

During this deployment to Inyokern Airfield, several maintenance members reported getting hit by loose pieces of concrete and rocks while serving as the front marshaller during back taxi operations (Tabs V6 to V8). The taxiing aircraft's rotor wash would blow the loose concrete, rocks, and large amounts of dust toward the front marshaller, restricting visibility and decreasing their ability to provide marshalling instructions (Tabs V6 to V8). Approximately halfway through the deployment, the front marshaller position was abandoned due to the hazards associated with taxiing aircraft (Tabs V1 to V3). Neither the hazards, or the subsequent change to taxiing without a front marshaller were communicated to the Mission Commander or the flight crews (Tab V10).

This new marshalling configuration placed the aircraft marshaller (MM1) in the parking spot at the tail position, MM2 was performing wing walker duties and posted under T/N 09-000046's proprotor blades, and MM3 was stationed with the fire extinguisher near the maintenance Internal Stability Unit (ISU) as shown in Figure 4.0 (Tab V1, Tab V2 and Tab V3).

Per AFMAN 11-218, wing walkers are required when taxiing, or towing, an aircraft within 25 horizontal feet of an obstacle. Aircraft are prohibited from taxiing within 10 horizontal feet of an obstacle even with wing walkers present. When performing wing walker duties, maintenance members are to monitor the clearance between the taxiing aircraft and the hazard. Wing Walkers should indicate the Affirmative (All Clear) signal when sufficient clearance is available, a Negative (Not Clear) when sufficient clearances are not available, or a Stop "when in their judgement an immediate turn is required to provide the necessary 10 foot clearance" (Tab AB-4.9). MM2 understood the responsibilities of the Wing Walker but was not familiar with the Affirmative (All Clear) or Negative (Not Clear) signals listed in AFMAN 11-218 (Tab AB-4, Tab V-7, & Tab Z-1). At the time of the mishap, maintenance members involved in aircraft marshalling were not using daytime florescent wands per AFMAN 11-218 (Tab V-6, Tab V-7, & Tab V-8). Daytime florescent wands were not included in the deployed maintenance inventory (Tab U-1 & Tab U-2). The only aircraft marshal signaling devices available were battery operated green, or red, light sticks (Figure 6.0).

Figure 4.0 – Mishap Overview Diagram

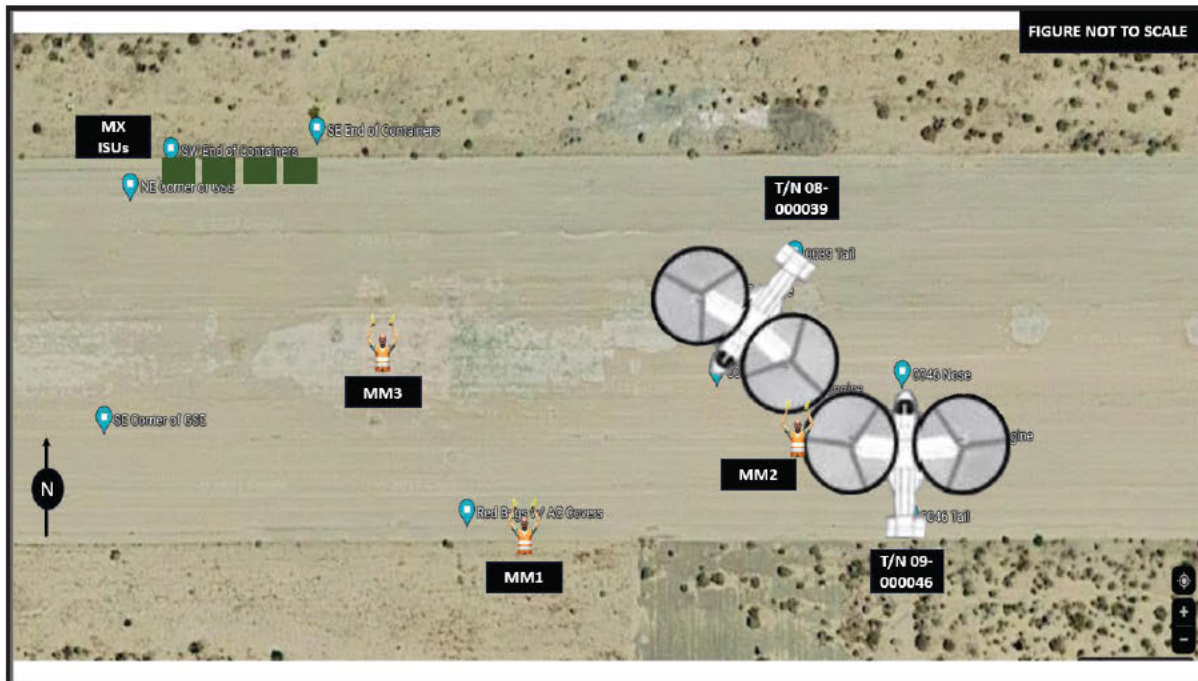


Figure 5.1 – Ground Marshalling Procedures

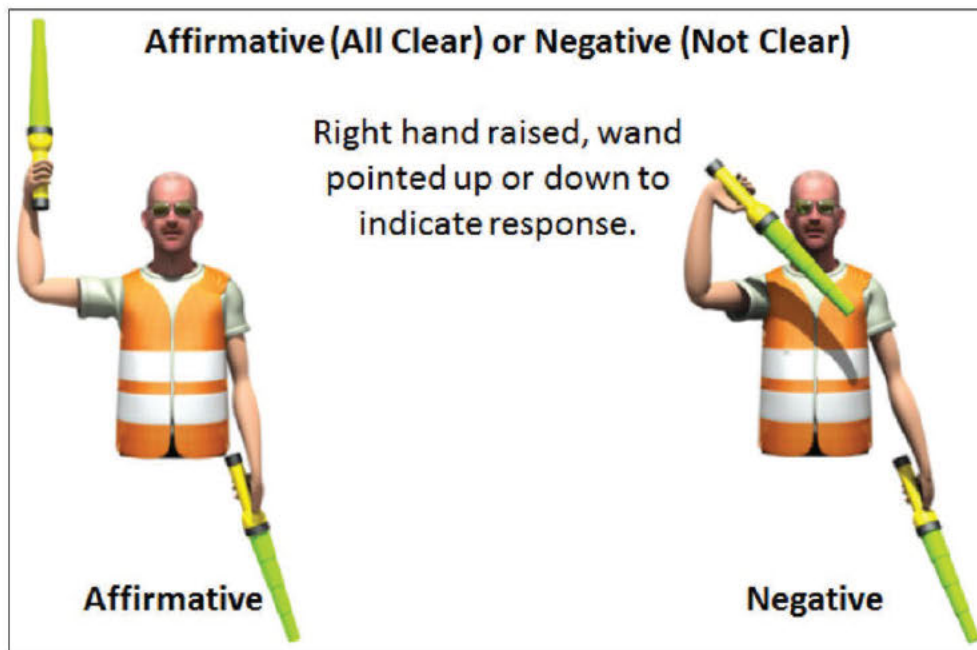


Figure 5.2 – Aircraft Marshalling Procedures

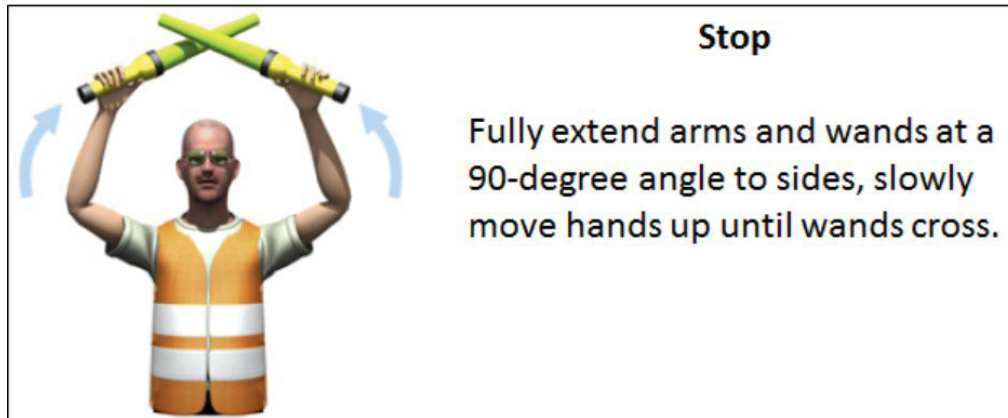


Figure 6.0 – Nighttime Aircraft Marshall Signaling Devices



#### d. Maintenance Personnel and Supervision

The MA's maintenance team was qualified to perform their assigned duties (Tab G-4, Tab G-5, & Tab G-6). Adequate maintenance supervision was present prior to and at the time of the mishap (Tab V-6, Tab V-7, Tab V-8, Tab V-11, Tab V-12, Tab V-13, Tab V-14, & Tab V-15). Aircraft maintenance forms and Integrated Maintenance Data System (IMDS) were documented appropriately in accordance with AFI 21-101 (Tab D-1 & Tab D-2).

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

The MA and the parked aircraft fluid levels were inspected and adequate to conduct operations (Tab D-2). Of note, aircraft fluid samples were not taken following the mishap, however both aircraft were functioning properly and not deemed a casual factor in the mishap.



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## f. Unscheduled Maintenance

A comprehensive review of the IMDS history and archived 781A forms revealed the following unscheduled maintenance actions were performed since the last scheduled inspection:

**T/N 08-000039 (MA):** Serviced the Multi-Mode Radar 11 August 2023, Replaced Right hand Anti-Ice Valve 11 August 2023, replaced the Right hand oil filter and cleaned the chip detector 12 August 2023, Replaced the Left and Right Nose Landing gear tires 12 August 2023, Replaced the Left Nacelle Blower Differential Pressure Switch Assembly 14 August 2023, Repaired the Pilots Communication Cord 15 August 23, Serviced the Right Proprotor Gearbox 15 August 2023, Reseated the integrated Avionics Processor 15 August 2023, Retorqued System 2 Local Switching Isolation Valve Module Pressure Tube 15 August 2023, Replaced Cockpit interface unit 1 and 2 16 August 2023 (Tab D-2).

**T/N 09-000046:** Swapped the Right Torque #2 Sensor to the Spare Sensor 08 August 2023, Replaced a screws on the Right Slip Ring 08 August 2023, Replaced 2 screws on LRU-1 Exhaust Mount 09 August 2023, Installed LRU 1 after CANN 11 August 2023, Installed Chaff and Flare 11 August 2023, Replaced Left and Right Nose landing gear tires 12 August 2023, Replaced Copilots Oxygen Hose 14 August 2023, Replaced left Control Display Unit Keyboard 15 August 2023, Replaced the Frequency synthesizer distribution module (Tab A1) 14 August 2023, replaced processor support module (Tab A17) 14 August 2023, Replaced Left back SIRFC Receive Antenna 15 August 2023, Replaced Right White trailing edge Blade Fairing Assembly 16 August 2023, Replaced Right White Upper Center Grip Fairing Assembly 16 August 2023, Replaced Cockpit interface Unit #2 16 August 2023, Replaced Right Proprotor Gearbox Oil Pressure Regulator Valve 16 August 2023, Replaced Right White Trailing Edge Shear Pin Monitor 16 August 2023 (Tab D-2).

## 6. AIRFRAME

### a. Structures and Systems

Two of the MA's left-hand proprotor blades were damaged beyond repairable limits (Tab P-1). The parked aircraft's left-hand green proprotor blade was damaged beyond repairable limits (Tab P-1). No other airframe structures were affected by the incident. All aircraft systems were operating within allowable limits at the time of the mishap; no further checks were conducted (Tab D-1).

Figure 7.0 – MA's and Parked Aircraft's Proprotor Blade Damage



**b. Evaluation and Analysis**

Following the mishap, the Flight Data Recorder was removed, and all data was recovered by Navy Air Program Management Aviation 275 (PMA-275) and submitted to the boards and CV-22 Program Engineers for analysis (Tab D-2). All aircraft equipment and systems were operating as expected.

**7. WEATHER**

**a. Forecast Weather**

The forecast weather for the mishap site (MS) predicted clear conditions with visibility of 10 statute miles with winds 190 degrees at eight knots, temperature of twenty-nine degrees Celsius with a dew point of nine degrees Celsius (Tab F-1).

**b. Observed Weather**

Observed weather at the MS prior to the mishap was clear conditions and within operational limits (Tab F-2). Tower transcripts indicated landing weather at 0955L was as follows: temperature thirty-three degrees Celsius, winds zero knots, visibility was clear at forty statute miles (Tab F-2).



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## c. Space Environment

Not applicable.

## d. Operations

Based on the forecast and actual observations, the weather was within operational limits for the MS (Tabs F-1, Tab F-2). No evidence suggests weather was a factor in this mishap.

## 8. CREW QUALIFICATIONS

### a. Mishap Pilot (MP)

The MP was current and qualified to conduct FCF duties (Tabs G-1, G-2 & G-3). At the time of the mishap, the MP was a qualified Mission Aircraft Commander (MAC) with 139.9 hours of CV-22B flight time (Tab G-4). The MP also had 1,433.5 hours of Other U.S. Military flight time primarily in the United States Marine Corps MV-22 (Tab G-4). Recent hours were as follows (Tab T-1 & T-2):

	Flight Hours	Flight Sorties
Last 30 Days	8.9	3
Last 60 Days	42.0	14
Last 90 Days	56.0	24

### b. Mishap Co-Pilot (MCP)

The MCP was current and qualified to conduct FCF duties (Tabs G-1, G-2, & G-3). At the time of the mishap, the MCP was a qualified Mission Pilot with 182.4 hours of CV-22 B flight time (Tab G-2). Recent hours were as follows (Tabs T-1 & T-2):

	Flight Hours	Flight Sorties
Last 30 Days	18.6	7
Last 60 Days	38.5	19
Last 90 Days	55.7	29



# United States Air Force Accident Investigation Board Report

## c. Mishap Flight Engineer (MFE)

The MFE was current and qualified to conduct FCF duties (Tabs G-1, G-2, & G-3). At the time of the mishap, the MFE was a qualified Special Missions Aviator with 476.4 hours of CV-22 B flight time (Tab G-4). Recent hours were as follows (Tabs T-1 & T-2):

	Flight Hours	Flight Sorties
Last 30 Days	26.4	8
Last 60 Days	44.2	20
Last 90 Days	44.2	25

## 9. MEDICAL

### a. Qualifications

All members involved in the incident were medically qualified for their specific duties at the time of the mishap. All aircrew had current annual physical flight examinations and were medically qualified for worldwide flight duty without restrictions (Tab DD-1).

### b. Health

The MP reported broken sleep the night prior to the incident. The MP also reported having increased fatigue due to the broken sleep but did not feel as though this impacted his ability to perform flying duties. There is no additional evidence that suggests that any health conditions contributed to the mishap (Tab DD-2 & Tab DD-3).

### c. Pathology

The medical clinic collected toxicology test samples from members after the mishap (Tab DD-4). The reports indicated toxicology was not a factor in the mishap (Tab DD-4).

### d. Lifestyle

There was no evidence to suggest lifestyle factors were relevant in the mishap (Tabs DD-2 & DD-3).

### e. Crew Rest and Crew Duty Time

At the time of the mishap, AFMAN 11-202, Volume (V) 3, *Flight Operations*, 10 January 2022, indicated aircrew members must have proper crew rest prior to beginning the flight duty period (Tab AB-2.3.1). Paragraph 3.2.1 defines the flight duty period as beginning when an aircrew member first reports for official duty and ends at final engine shutdown after the final flight of the completed mission. Paragraph 3.1 of the applicable version of AFMAN 11-202 V3 defines crew rest periods as a minimum 12-hour non-duty period before the flight duty period begins

## United States Air Force Accident Investigation Board Report

(Tab B-2). Its purpose was to ensure the aircrew member adequately rests before performing flight duties or flight related duties (Tab E-2). Crew rest is defined as free time that includes time for meals, transportation, and the opportunity for at least 8 hours of uninterrupted rest (Tab E-2). All aircrew verified they received proper crew rest before the mishap (Tabs E-2 & E-3).

### 10. OPERATIONS AND SUPERVISION

#### a. Operations

The operations tempo at the 20<sup>th</sup> SOS was relatively high with the unit supporting 49 above wing level events between January and August 2023 (Tab O-1). Additionally, the unit had recently been tasked to deploy a Special Operations Task Unit (SOTU) requiring approximately one-third of the unit (Tab V-19). The SOTU began their deployment spin-up training in April with a Multilateral (MLAT) exercise at Inyokern, a Weapons School Trainer at Nellis AFB, NV in May, and Flight Deck Landing qualifications on US Naval ships in June (Tab V-19). The SOTU deployed to Inyokern Airfield on 24 July 2023 to conduct their pre-deployment validation exercise (VALEX) (Tab V-19). The SOTU VALEX was added onto a previously tasked 14 Weapons Squadron Defensive Systems Trainer (DST) exercise starting on 3 August 2023 (Tab V-19). The SOTU VALEX crews were replaced by other 20 SOS aircrews on 3 August 2023 (Tabs V-1 to V-3 and Tab V-10). The MC was one of the replacement crews (Tabs V-1 to V-3 and Tab V-10). Following the MC's deployment, the MP flew one day sortie, the MCP flew three sorties, and the MFE flew five sorties (Tabs V-1 to V-3, & Tab V-10).

#### b. Supervision

The mission was authorized by the unit's mission commander (MCC) and a review of flight training records showed the MP, MCP, and MFE were current and qualified to participate in the scheduled sortie (Tab G-1 to G-3). Of note, the 20 SOS MCC had not been certified by the 27 SOG Commander in accordance with Cannon Air Force Base Instruction 11-201-O dated March 16, 2022 (Tab B-5). Additionally, the MCC did not provide the required pre-departure mission commander brief to the 27 SOG Commander as directed by CAFBI 11-201-O and 27 SOG Mission Commander Policy (Tab V-10, Tab B-5, & Tab B-6).

### 11. HUMAN FACTORS ANALYSIS

#### a. Introduction

Human Factors describe how our interaction with tools, tasks, working environments, and other people influence human performance. This report includes an analysis of the human performance variables that contributed to this mishap. A review of all documents and plans obtained as well as interviews with personnel involved in aircraft taxing, the maintenance personnel, squadron leadership, and other witness' to the incident were entered into the Department of Defense (DoD) Human Factors Analysis and Classification System (HFACS) model and utilized to present a systematic, multidimensional approach to mishap analysis.



## United States Air Force Accident Investigation Board Report

The AIB found elements of each of the following human factors across operations and maintenance personnel throughout the investigation:

### b. Relevant human factors identified by the AIB

- (1) **Complacency (DoD HFACS PC208)** When the individual has a false sense of security, is unaware of, or ignores hazards, and is inattentive to risks. The frequency with which CV-22 units have performed flying operations out of Inyokern Airfield set conditions for a false sense of security regarding potentially hazardous conditions on the host airfield ramp to include lack of measured taxi lines, congested taxi routes, uneven surfaces, and poor lighting conditions (Tab S-1, Tab S-2, Tab P-1).
- (2) **Inadequate Real-Time Assessment (DoD HFACS AE201)** Is a factor when an individual fails to adequately evaluate the risks associated with a particular course of action and this faulty evaluation leads to inappropriate decision-making and subsequent unsafe situations. The MP observed the MA approaching the static propotor of the parked aircraft, however failed to adequately evaluate the likelihood of contact being made (Tab V-1).
- (3) **Standard/Proper Terminology Not Used (DoD HFACS PP107)** When clear and concise term, phrases, hand signals, etc. per service standards and training were not used. MM2 did not use established hand signals while performing wing walker duties as directed by AFMAN 11-218. (Tab V-1, Tab V-6, Tab V-7, & Tab V-8).
- (4) **Task/Mission Planning/Briefing Inadequate (DoD HFACS PP109)** When an individual, crew, or team fails to complete all preparatory tasks associated with planning/briefing the task/mission. Mission planning and the mission commander brief failed to identify the inherent hazards in the parking area such as deteriorated ramp conditions, poor lighting, or non-standard parking procedures as a potential risk to operations (Tab V-11 & Tab V-19). Additionally, the MC failed to identify and address the hazards associated with the parking apron in their pre-mission aircrew briefing (Tab V-1, Tab V-2, Tab V-3, & Tab K-2)
- (5) **Supervisory/Command Oversight Inadequate (DoD HFACS SI001)** When the availability, competency, quality, or timeliness of leadership, supervision, or oversight does not meet task demands. Squadron and group leadership did not evaluate the MCC's risk assessment prior to departure for the TDY. (Tab V-11 & Tab V-17).

## 12. GOVERNING DIRECTIVES AND PUBLICATIONS

### a. Publicly Available Directives and Publications Relevant to the Mishap

- (1) AFI 51-307, *Aerospace and Ground Accident Investigations*, 18 March 2019
- (2) DAFI 91-204, *Safety Investigations and Reports*, 10 March 2021



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- (3) AFI 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*, 3 May 2022
- (4) AFMAN 11-2CV-22, Volume 3, *CV-22 Operations Procedures*, 13 September 2021
- (5) AFI 21-101, *Aircraft and Equipment Maintenance Management*, 16 January 2020, Air Force Special Operations Command, *Supplement*, 24 November 2020
- (6) AFI 90-802, *Risk Management*, 1 April 2019
- (7) AF Handbook 11-203, Volume 2/Army Training Circular 3-04.14-2, *Weather for Aircrews - Products and Services*, 13 August 2015, *Incorporating Change 5*, 13 December 2022
- (8) AFMAN 11-217, *Flight Operations*, 10 June 2019
- (9) AFMAN 11-218, *Aircraft Operations and Movement on the Ground*, 5 April 2019

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

### **b. Other Directives and Publications Relevant to the Mishap**

- (1) TO 00-20-1, *Equipment Maintenance Inspection, Documentation, Policies and Procedures*, 6 September 2019
- (2) TO 00-20-2, *Technical Manual Maintenance Data Documentation*, 15 March 2016
- (3) TO 00-5-1, *AF Technical Order System*, 30 August 2022
- (4) TO 00-5-15, *Air Force Time Compliance Technical Order Process*, 31 March 2022
- (5) Cannon AFBI 11-201-O, *Fixed-Wing and Vertical-Lift Aircraft Operations*, 16 March 2022
- (6) AT 10, *27 Special Operations Group Mission Commander Policy*, 12 August 2019
- (7) AFSOC Above Wing Level (AWL) Operations Order (OPORD) MOD 1
- (8) A1-V22AC-AFM-000/1V-22© B-1, *NATOPS Flight Manual, CV-22 Tiltrotor*, 15 December 2019

### **c. Known or Suspected Deviations from Directives or Publications**

- (1) AFMAN 11-218, *Aircraft Operations and Movement on the Ground*, 5 April 2019, paragraph 2.3.3
- (2) AFMAN 11-218, *Aircraft Operations and Movement on the Ground*, 5 April 2019, paragraph 3.7

## United States Air Force Accident Investigation Board Report

- (3) AT 10, *27 Special Operations Group Mission Commander Policy*, 12 August 2019, paragraph 2 c.
- (4) Cannon AFBI 11-201-O, *Fixed-Wing and Vertical-Lift Aircraft Operations*, 16 March 2022, paragraph 2.8.3

Neither MM1, nor MM2, used daylight fluorescent wands, as described in AFMAN 11-218, to signal to the MAC on the morning of the mishap. MM2 did not use standard aircraft marshalling signals as described in AFMAN 11-218 Tab V1, Tab V2 and Tab V3). The MC allowed the MA to be taxied within 10 horizontal feet of T/N 09-000046 while maneuvering into their parking spot (Tab V2). Contributing factors to this mishap include, (1) the MCC was a new commander who did not meet with the 27 Special Operations Group (SOG) Commander prior to performing Mission Commander duties, and (2) the MCC did not complete a Before Action Review (BAR) of previous After Action Reports (AAR) and Lessons Learned (LL) prior to the mission, nor did he complete a Mission Commander Brief to the 27 SOG/CC prior to the TDY (Tab V10).

17 October 2023

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JEFF D. MCMaster, Colonel, USAF  
President, Accident Investigation Board

# United States Air Force Accident Investigation Board Report

## United States Air Force Accident Investigation Board Report Class A Mishap, Inyokern Airfield, CA

### STATEMENT OF OPINION

CV-22B, T/N 08-000039

INYOKERN AIRFIELD, CA

17 AUGUST 2023

*Under 10 U.S.C. § 2254(d) the opinion of the accident investigator as to the cause of, or the factors contributing to, the accident set forth in the accident investigation report, if any, may not be considered as evidence in any civil or criminal proceeding arising from the accident, nor may such information be considered an admission of liability of the United States or by any person referred to in those conclusions or statements.*

#### 1. OPINION SUMMARY

On 17 August 2023, at approximately 0945 local time (L), while taxiing into parking, the spinning proprotor of a taxiing CV-22B, tail number (T/N) 08-000039 Mishap Aircraft (MA), struck the stationary proprotor of a parked CV-22B, T/N 09-000046. The incident occurred on a parking apron at Inyokern Airfield, CA. Both aircraft were assigned to the 27th Special Operations Wing (27 SOW) at Cannon AFB, New Mexico. The mishap crew (MC) was assigned to the 20<sup>th</sup> Special Operations Squadron. The MC consisted of the mishap pilot (MP), the mishap copilot (MCP), and a mishap flight engineer (MFE). There were no fatalities or damage to civilian property. One aircraft maintenance member assigned to the 727<sup>th</sup> Special Operations Aircraft Maintenance Squadron (SOAMXS) was injured by flying debris, transported to a local civilian hospital for treatment and released.

The MC was completing a Functional Check Flight (FCF) mission to ensure the functionality of the aircraft following maintenance repairs prior to redeployment to Cannon AFB, New Mexico. After the FCF, and during the MC's return to parking, the MCP misjudged a turn while maneuvering the MA into its parking spot and taxied without sufficient clearance from the parked aircraft which had its engines shut down. The MA's rotating blades struck a stationary blade from the proprotor of the parked aircraft, resulting in significant damage to both aircraft. The loss of United States Government property was valued at approximately \$2,508,148.00.

By a preponderance of the evidence, I find there were two causes for the mishap. First, the MC failed to ensure adequate taxi clearance during ground operations, resulting in the collision with a parked aircraft. Second, the MP demonstrated inadequate real-time risk assessment in identifying the closing proximity with the parked aircraft and a subsequent failure to take corrective action to avoid the collision. I also find, by a preponderance of the evidence, that complacency during ground operations; inadequate risk assessment during mission planning; lack of standard terminology and signals during ground operations; and inadequate command oversight all substantially contributed to the mishap.



## 2. CAUSE

### (1) Failure To Ensure Adequate Taxi Clearance

The MC failed to ensure adequate horizontal taxi clearance with the stationary aircraft as directed by AFMAN 11-218. While maneuvering the MA into position to reverse-taxi, the MCP initiated a pre-mature left-hand turn before the MA had obtained sufficient clearance past the parked aircraft. This placed the MA on a trajectory that would penetrate the required 10 horizontal feet of taxi clearance necessary—when taxiing with wing walkers—as directed by AFMAN 11-218.

AFMAN 11-218 also states, “...taxi signalers or wing walkers will render a stop signal, in lieu of a turn signal, when in their judgment an immediate turn is required to provide the necessary 10-foot clearance.” Interviews with four ground personnel—the aircraft marshaller (MM1), two wing walkers (MM2 & MM3), and expeditor—all stated that they provided a stop signal to the MC, however this signal was neither seen nor acknowledged by the MC. The pre-mature left-hand turn by the MCP as well as the failure to heed the marshaller’s signals to stop was a direct cause for the mishap.

Figure 8.1 – Parking Ramp Dimensions

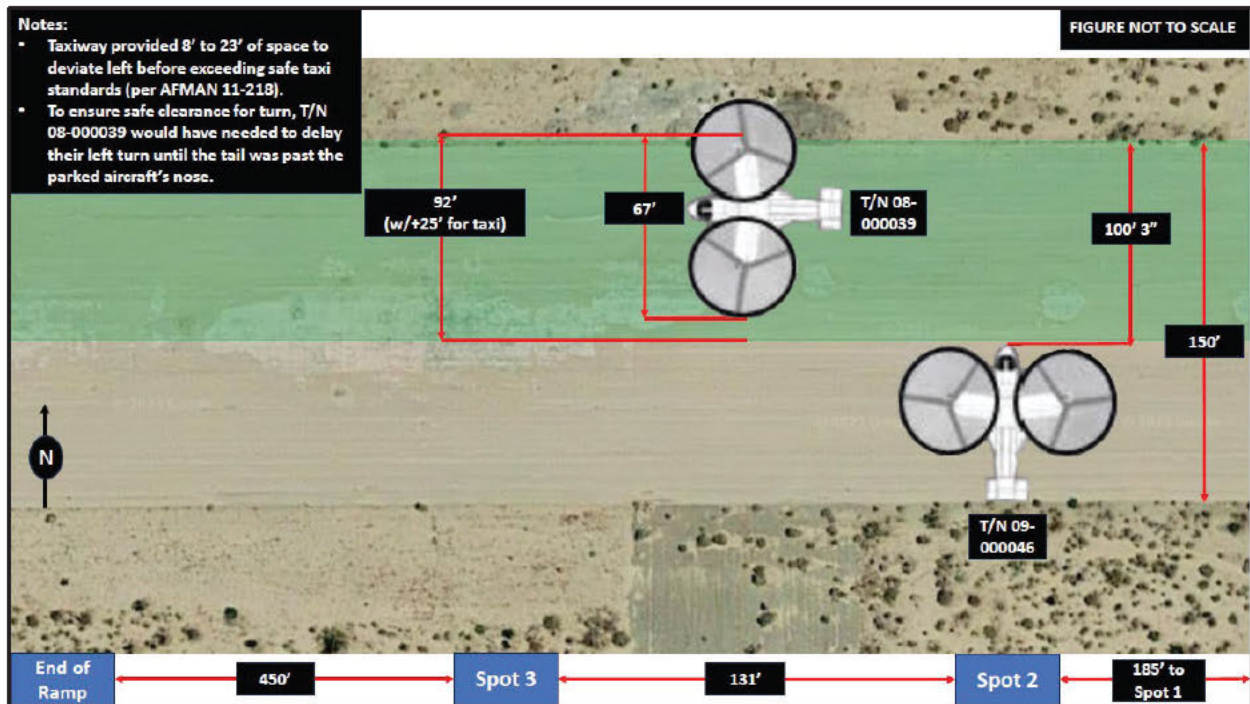


Figure 8.2 – Aircraft Taxi Procedures w/ Clearance

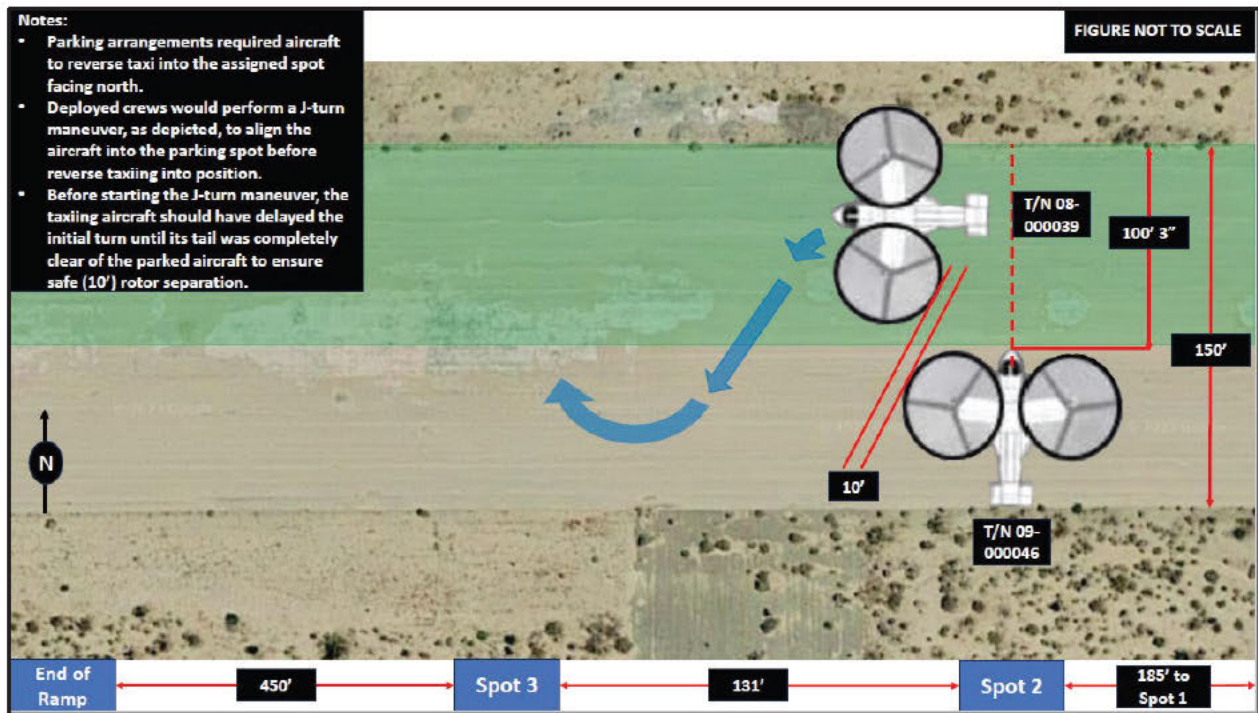
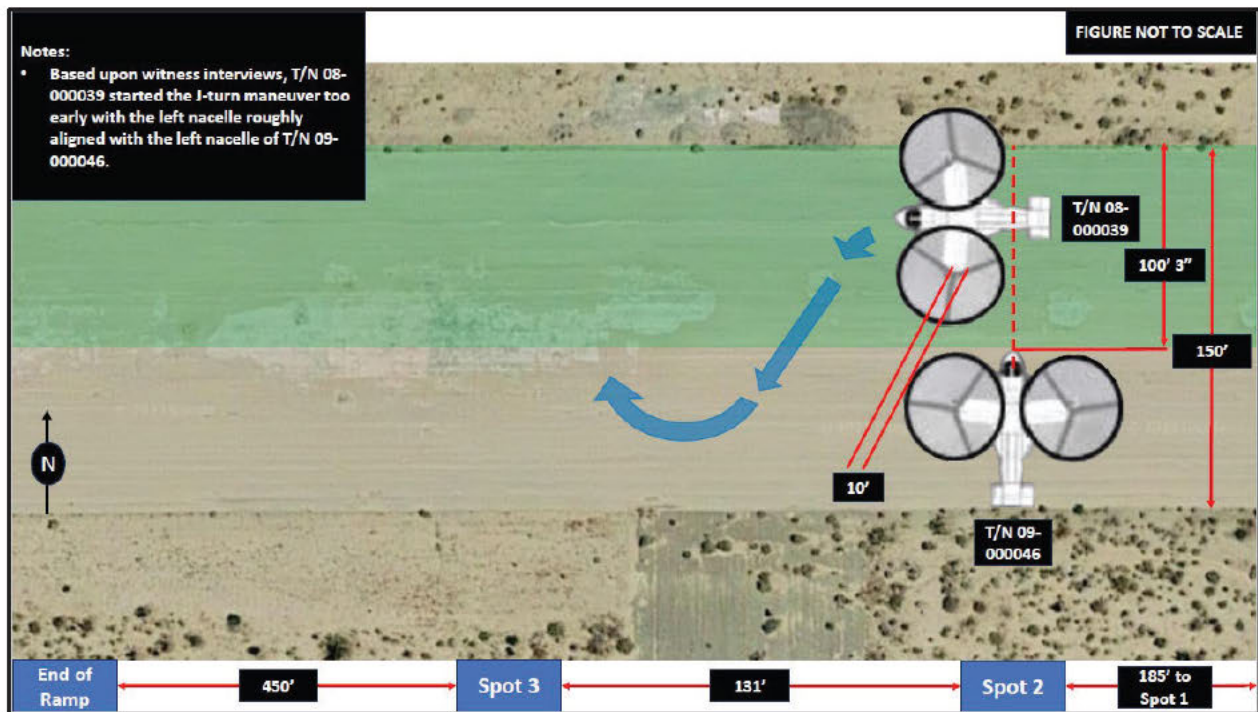


Figure 8.3 – Aircraft Alignment when MCP Started Left Turn





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## (2) Inadequate Real-Time Risk Assessment

Inadequate Real-Time Risk Assessment is a factor when an individual fails to adequately evaluate the risks associated with a particular course of action and this faulty evaluation leads to inappropriate decision-making and subsequent unsafe situations. As the pilot in command (PIC), the MP was responsible for ensuring the aircraft was not operated in a careless, reckless, or irresponsible manner that could endanger life or property. By failing to identify the closure with the parked aircraft and taking appropriate actions to prevent the collision, the MP violated duties as PIC for the aircraft.

The MP was in a position to see the parked aircraft as well as the wing walkers on the left side of the aircraft. Although the MP stated that the taxi proximity to the parked aircraft was “going to be close” and felt “uncomfortable”, he failed to verbally express this concern and took no corrective action to adjust or stop the actions of the MCP at the controls. Additionally, the MP failed to maintain visual contact with the wing walkers providing real-time proximity assessments and did not see their commands to stop the aircraft. This lack of real-time risk assessment in failing to recognize and correct a developing hazardous situation was a direct cause for the mishap.

## 3. SUBSTANTIALLY CONTRIBUTING FACTORS

### (1) Inadequate Risk Management During Mission Planning

Mission planners failed to conduct adequate risk management during predeparture planning by failing to identify hazards associated with the parking ramp and the associated non-standard ground operation requirements at Inyokern Airfield. The congested aircraft parking area, non-standard reverse taxi requirements, deteriorating concrete conditions, and lack of ramp illumination each presented a potential hazard that should have been identified during mission planning.

By failing to identify the hazards associated with the parking ramp, unit planners and the mission commander were unable to develop control measures to mitigate the associated risk. Measures such as parking diagrams depicting aircraft clearance distances, measured and marked taxi lines on the ramp, and standardized marshalling configurations were not employed for the TDY to Inyokern.

### (2) Complacency

Complacency occurs when an individual, or individuals, ignore hazards and are inattentive to risks. The frequency with which CV-22 units staged from Inyokern Airfield contributed to a complacent approach to the inherent risks associated with the reduced taxi clearances and non-standard parking at the airfield.

This complacent mindset was reflected in both the unit’s approach to pre-deployment planning by failure to include detailed ground operation procedures and appropriate risk mitigation measures. Additionally, the interplane communication between the MP and MCP—as captured by the cockpit



## United States Air Force Accident Investigation Board Report

voice recorder (CVR)—revealed a complacent attitude regarding the close proximity of the parked aircraft during the taxi process. Interplane communication between the mishap crewmembers failed to include language of affirmation such as “clear left/right”—a standard crew resource management technique—during turning movements on the ground. The preponderance of the evidence suggests that complacency was a significant contributing factor in this mishap.

### (3) Standard/Proper Terminology Not Used

Standard/Proper Terminology Not Used is a factor when clear and concise terms, phrases, hand signals, etc. per service standards and training were not used. Per witness testimony, aircraft marshaller and wing walker hand signals were inconsistent throughout the deployment and were not in compliance with the service standard directed by AFMAN 11-218.

As an example, the wing walkers typically provided either no signal or inconsistent hand signals to notify taxiing aircrew of sufficient obstacle clearance while taxiing. This is in deference to the “Affirmative” signal with the right hand raised as directed by AFMAN 11-218 to confirm adequate clearance between aircraft during taxi operations (Figure 5.1). This lack of standardization introduced a false sense of security by the crew when no signals were provided by the wing walkers. Additionally, the aircraft marshaller and wing walkers did not use the required daylight-fluorescent wands available in their deployed kits as directed by AFMAN 11-218 for signaling by all participating ground personnel during daylight hours. Figure 9.0 shows an example of daylight-fluorescent wands directed for use by AFMAN 11-218 and Figure 9.1 shows the wands available to maintenance personnel at the time of the mishap. The inconsistent hand signals by ground personnel and lack of directed marshalling equipment were significant contributing factors in this mishap.

**Figure 9.0 – Daylight Fluorescent Wands**



**Figure 9.1 – Wands Available**



### (4) Inadequate Command Oversight

Inadequate command oversight describes situations in which requisite oversight does not meet task demands. While not directly contributing to the mishap, sufficient oversight was not provided to the mission commander (MCC) by either squadron or group leadership. This lack of oversight resulted from the failure of the MCC to provide a mission commander brief to the

## United States Air Force Accident Investigation Board Report

group commander as directed by Cannon Air Force Base Instruction 11-201. The omission of a mission commander briefing to either the squadron or group commander prevented the appropriate level of leadership the opportunity to validate the operational risk assessment during mission planning and subsequently provide concurrence for mitigation measures for the mission.

### 4. CONCLUSION

I find, by a preponderance of the evidence, two causes for this mishap. The first cause of this mishap was the MC's failure to ensure sufficient taxi clearance from obstacles during ground operations which resulted in the collision with a parked aircraft. The second cause, related to the first, was the MP's inadequate real-time risk assessment to identify the closing proximity with the parked aircraft and subsequent lack of corrective action to avert the collision.

Additionally, I find, by a preponderance of the evidence, that inadequate risk assessment during mission planning, complacency, lack of standard terminology, and inadequate command oversight substantially contributed to the mishap.

17 October 2023

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JEFF D. MCMaster, Colonel, USAF  
President, Accident Investigation Board

# United States Air Force Accident Investigation Board Report

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Egress, Aircrew Flight Equipment, Impact and Crashworthy Analysis.....	H
Not Used.....	I
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Mission Records and Data.....	K
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Not Used.....	M
Transcripts of Voice Communications .....	N
Any Additional Substantiating Data and Reports .....	O
Damage Summaries.....	P
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Releasable Witness Testimony.....	R
Releasable Photographs, Videos, Diagrams, and Animations.....	S
Personnel Records Not Included in Tab G.....	T
Maintenance Report, Records and Data Not Included in Tab D.....	U
Witness Testimony and Statements.....	V



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Not Used.....W  
Not Used.....X  
Not Used.....Y  
Photographs, Videos, Diagrams, and Animations Not Included in Tab S.....Z  
Unit Fact Sheets.....AA  
Applicable Regulations, Directives, and Other Government Documents.....BB  
AIB Information.....CC  
Medical.....DD