UNITED STATES AIR FORCE
AIRCRAFT ACCIDENT INVESTIGATION
BOARD REPORT

F-22A, T/N AK 07-0137
90TH FIGHTER GENERATION SQUADRON
3RD WING
JOINT BASE ELMENDORF-RICHARDSON, ALASKA

LOCATION: JOINT BASE ELMENDORF-RICHARDSON, ALASKA

DATE OF ACCIDENT: 15 MARCH 2024

BOARD PRESIDENT: BRIGADIER GENERAL WILLIAM R. DAVIS

Conducted IAW Air Force Instruction 51-307

EXECUTIVE SUMMARY
UNITED STATES AIR FORCE
AIRCRAFT ACCIDENT INVESTIGATION

F-22A, T/N AK 07-0137
JOINT BASE ELMENDORF-RICHARDSON, ALASKA
15 MARCH 2024

At 1155 a.m. local time (L) on 15 March 2024, an Airman, Mishap Member (MM), of the 90th Fighter Generation Squadron (90 FGS), Joint Base Elmendorf-Richardson (JBER), Alaska suffered a fatal injury while performing maintenance on the Mishap Aircraft (MA), an F-22A, tail number (T/N) AK 07-0137, operated by the Third Wing (3 WG), JBER, AK. The mishap occurred in Building 16670, Bay Five. The Mishap Team (MT) consisted of six maintenance personnel, all assigned to the 90 FGS. MM was killed when the MA's Configurable Rail Launcher (CRL) retracted into the MA's weapons bay while MM's upper torso was inside the bay, resulting in a fatal injury.

MM was assigned to the 90 FGS in February 2024 and had previous experience maintaining A-10 and F-15 aircraft but had completed only academic training on the F-22A and was working with a team to learn the hands-on portion of his duties. To complete the maintenance on the MA, a series of extensions and retractions of the CRL in the left and right weapons bays were required.

Standard practice is to use a Portable Maintenance Aid (PMA) for this maintenance task. In contravention of standard practice, the multi-functional display (MFD) in the cockpit was used to actuate the desired functions. There is no line-of-sight between the cockpit ladder and the right-side weapons bay, and the maintenance team chief retracted the CRL when all personnel were not clear; MM was in the bay and his head was impinged between the plume deflector and the bulkhead, causing fatal head trauma. Emergency services were called immediately, and Cardiopulmonary Resuscitation (CPR) was administered while they were enroute; responding paramedics rendered aid until a physician declared time of death at 1209L.

The Accident Investigation Board (AIB) Board President (BP) found by a preponderance of the evidence, two causes of the mishap: (1) failure to follow prescribed procedures, and (2) failure to maintain awareness and supervisory direction. The BP also found by a preponderance of the evidence three factors that substantially contributed to the mishap: (1) performing multiple tasks simultaneously; (2) proficiency level challenge; and (3) a false sense of security by some team members.

SUMMARY OF FACTS AND STATEMENT OF OPINION
F-22A, T/N AK 07-0137
JOINT BASE ELMENDORF-RICHARDSON, ALASKA
15 MARCH 2024

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ACRONYMS AND ABBREVIATIONS

3 WG	3rd Wing
11 AF	11th Air Force
90 FGS	90th Fighter Generation Squadron
AFI	Air Force Instruction
AFSC	Air Force Specialty Code
AGE	Aerospace Ground Equipment
AIB	Accident Investigation Board
AIM	Air Intercept Missile
AK	Alaska
AMRAAM	Advanced Medium Range Air-to Air Missile
APU	Auxiliary Power Unit
AVEL	AMRAAM Vertical Eject Launcher
BP	Board President
CCTV	Closed Circuit Television
CPR	Cardiopulmonary Resuscitation
CRL	Configurable Rail Launcher
CSMU	Crash Survivable Memory Unit
DAFI	Department of the Air Force Instruction
DEPOT	Depot Level Maintenance
DoD	Department of Defense
DoD HFACS	Department of Defense Human Factors and Classification System
FIMP	Fiber Infrastructure Maturation Program
IAW	In Accordance With
IMDS	Integrated Maintenance Database System
IMIS	Integrated Maintenance Information System
JBER	Joint Base Elmendorf-Richardson
JCN	Job Control Number
L	Local Time
LAU	Launcher
LO	Low Observable
MA	Mishap Aircraft
Maj	Major
MAJCOM	Major Command
MFD	Multi-Functional Display
MM	Mishap Member
MM2-7	Maintenance Member
MSgt	Master Sergeant
MT	Mishap Team
PACAF	Pacific Air Forces
PMA	Portable Maintenance Aid
PMP	Packaged Maintenance Plan
QA	Quality Assurance
SAR	Search and Rescue
SMD	Stores Management Display
SME	Subject Matter Expert
SMS	Stores Management System
SWAT	SMS Wrap Around Test
TCTO	Time Compliance Technical Order
T/N	Tail Number
TO	Technical Order
TOD	Technical Order Data
USAF	United States Air Force
WCE	Work Center Event

SUMMARY OF FACTS

1. AUTHORITY AND PURPOSE

a. Authority

On 4 April 2024, Lieutenant General Laura L. Lenderman, Deputy Commander, Pacific Air Forces (PACAF), appointed Brigadier General William R. Davis to conduct an accident investigation of a mishap involving an F-22A aircraft, which occurred on 15 March 2024, at JBER, Alaska (Tab Y-3). On 22 May 2024, The PACAF Deputy Staff Judge Advocate, acting as the Staff Judge Advocate amended the convening order to include a Lieutenant Colonel pilot member (Tab Y-5). The investigation was conducted pursuant to the provisions of Air Force Instruction (AFI) 51-307, Aerospace and Ground Accident Investigations, and took place at JBER from 30 April 2024 through 30 May 2024. Board members included a Legal Advisor (Major), and a Recorder (Technical Sergeant). (Tabs Y-3 and Y-5).

b. Purpose

In accordance with AFI 51-307, *Aerospace and Ground Accident Investigations*, this Accident Investigation Board conducted a legal investigation to inquire into the facts and circumstances surrounding this Air Force aerospace accident, prepare a publicly-releasable report, and obtain and preserve all available evidence for use in litigation, claims, disciplinary action, and adverse administrative action.

2. ACCIDENT SUMMARY

At 1155 a.m. local time on 15 March 2024, the Mishap Member (MM), JBER, Alaska was killed while performing maintenance on the MA, an F-22A, T/N 07-0137 located in Bay Five of Building 16670, operated by the 3 WG, JBER, Alaska. (Tab A-3 and J-6 and R-96). The Mishap Team (MT) consisted of six Airmen all assigned to the 90 FGS (Tab R-99 and R-114 and V-6.5). MM was killed when the Mishap Aircraft's (MA) Configurable Rail Launcher (CRL) retracted into the MA's weapons bay while MM's head was inside the bay, resulting in fatal head trauma (Tab CC-3 and CC-11). The CRL retracted due to a command input via the cockpit's MFD by a member of the MT (Tab J-6 and V-6.3). Responding paramedics rendered aid until a physician pronounced MM dead. (Tab R-92).

3. BACKGROUND

a. Pacific Air Forces (PACAF)

Pacific Air Forces, headquartered at Joint Base Pearl Harbor-Hickam, Hawaii, is one of nine U. S. Air Force major commands and the air component of U.S. Indo-Pacific Command (Tab AA-3). PACAF's primary mission is to provide ready air and space power to promote U.S. interests in the Indo-Pacific region

(Tab AA-3). It consists of 46,000 members, including active duty, Air National Guard, Reserve and civilians (Tab AA-3). PACAF's area of responsibility is home to 60 percent of the world's population across 38 nations, 52 percent of the Earth's surface and 16 time zones, with more than 1,000 languages spoken (Tab AA-3). PACAF, in coordination with other components, allies, and partners, provides USINDOPACOM with continuous unrivaled air, space, and cyberspace capabilities to ensure regional stability and security (Tab AA-4). The command's vision is an agile, accurately postured, undeterred, and lethal force capable of dedicating peerless effects from cooperation to conflict (Tab AA-4).

b. 11th Air Force (11 AF)

11th Air Force, provides combat ready forces for COMPACAF (Tab AA-5). Defends Alaska, Hawaii, and Guam and key strategic nodes against all threats (Tab AA-5). Deploys service component forces worldwide in response to major regional contingencies (Tab AA-5). Supports vital Pacific air bridge operation for throughput of strategic movement by contingency forces during crisis response (Tab AA-5). Provides support to federal and state authorities during civil emergencies, search and rescue operations & counternarcotics interdictions (Tab AA-5).

c. 3rd Wing (3 WG)

3rd Wing is the largest and principal unit within 11th Air Force (Tab AA-6). A composite organization, it provides air supremacy, surveillance, worldwide airlift, and agile combat support forces to project power and reach (Tab AA-6). The Wing supports and defends U.S. interests in the Asia Pacific region and around the world by providing units ready for worldwide air-power projection and a base capable of meeting PACOM's theater-staging and throughput requirements (Tab AA-6).

d. 90th Fighter Generation Squadron (90 FGS)

No official squadron emblem

The 90 FGS provides direct mission generation support by consolidating and executing on-equipment activities necessary to produce properly configured, mission ready weapon systems to meet contingency or training mission requirements. 90 FGS personnel service, inspect, maintain, launch, and recover assigned and transient aircraft. (Tab BB-6)

e. F-22A – Raptor

The F-22 Raptor is a single seat, tactical fighter with air-to-air and air-to ground weapons delivery capability (Tab BB-8). Incorporation of stealth technology makes the aircraft invisible to enemy defenses and increases the lethality and survivability of this weapon system (Tab BB-8).

f. Maintenance Skill Levels

AFMAN 36-2100, Military Utilization and Classification, dated 7 April 2021, identifies duties and tasks for every position needed to accomplish the Air Force mission (Tab BB-9 to BB-12). 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-10 to BB-11). 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-10 to BB-11). The 5-skill level identifies enlisted personnel who, through experience and training, have demonstrated skilled proficiency in their AFSC (Tab BB-10 to BB-11). 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-11 to BB-12).

4. SEQUENCE OF EVENTS

a. Mission

The mishap occurred while the MT was performing adjustment of LAU-141 Restraint Fittings. (Tab R-96). This routine missile launch system maintenance task is outlined in the TO as F7137881144/F744898144, Adjust Right/Left LAU-141 Restraint Fittings (Tabs J-36 and CC-9). The LAU-141 is also referred to as a CRL. (Tab CC-10).

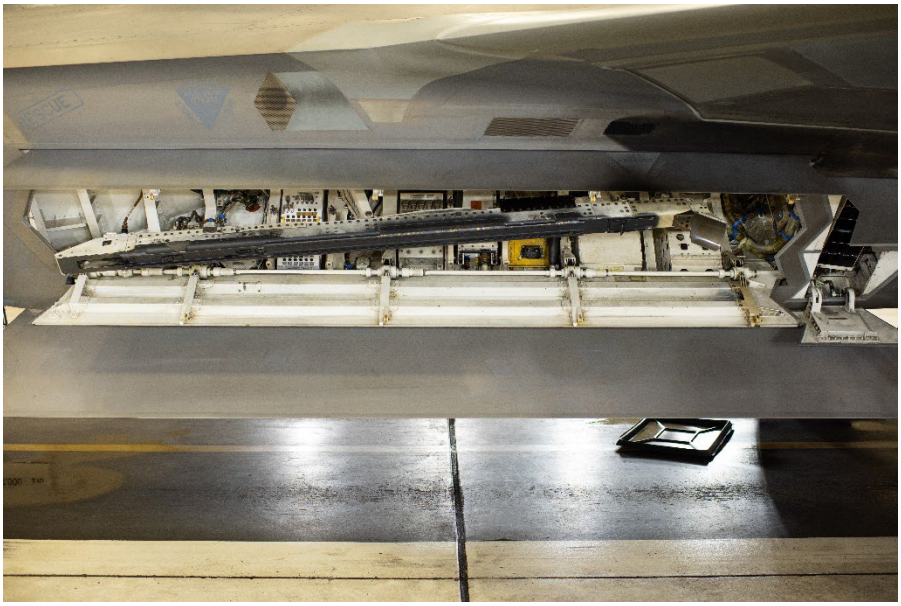


Figure 2 - CRL in extended position. Image not associated with MA. (Tab Z-11)

Figure 1 - CRL in retracted position. View is looking forward. Image not associated with MA. (Tab Z-12)

b. Planning

Maintenance Member 7 (MM7), the expeditor, assigned Maintenance Member 2 (MM2) the maintenance task for the MA during the 0700L roll call on 15 March 2024. (Tabs R-114 and V-6.2). MM2 was the lead for a crew consisting of Maintenance Member 3 (MM3) and Maintenance Member 5 (MM5). (Tab V3.5). The task required four personnel to execute, and MM3 was not present at roll call due to a pre-existing appointment. (Tabs R-119 and V-3.5 to V-3.6). MM7 assigned Maintenance Member 4 (MM4) to the maintenance task with his crew member Maintenance Member 6 (MM6). (Tabs R-119 and V-3.5 to V-3.6). MM7 attached MM to MM4 for training. (Tab V-6.6). MM arrived to the unit in February 2024, and while he had previous experience as a maintainer on F-15 and A-10 aircraft, he had just completed academic training on the F-22A platform. (Tabs T-4, V-3.5, V-5.11 and V-6.5). MM2 and MM4 briefed MM, MM3, MM5, and MM6 about how to perform the adjust right/left LAU-141 restraint fittings task. (Tab V-3.3 and V-5.3).

c. Preflight

Not Applicable.

d. Summary of Accident

MM2 started the MA's Auxiliary Power Unit (APU) at 1145L using the Portable Maintenance Aid (PMA) (Tabs R-96 and J-51). MM2 retracted the left CRL using the MFD at 1150L (Tab J-23 and J-51). MM2 retracted the right side CRL at 1151L using the MFD (Tab J-23 and J-51). MM2 and MM6 adjusted the restraint fittings on the left CRL while MM, MM3, MM4 and MM5 adjusted the restraint fittings on the right CRL (Tab CC-11). MM2 extended the left CRL at 1153:45L using the MFD (Tab J-23 and J-51). MM, MM3, MM4 and MM5 performed adjustments to the right CRL during the left CRL extension (Tab R-96 and R-100).

At 1155L MM4 extended the right CRL using the MFD (Tabs J-23, J-51 and Z-3). MM6 made adjustments to the left CRL while the right CRL extended (Tabs R-96 and Z-2 to Z-3). MM4 descended the cockpit ladder and used hand signals to show MM and MM3 how many turns to apply to the aft restraint fitting on the right CRL (Tabs R-104 and Z-4). MM performed the adjustment to the right CRL's aft restraint fitting while MM3 and MM4 observed (Tab R-104 and Z-5). MM2 showed MM5 how to perform adjustments to the right CRL's front restraint fitting (Tabs R-104 and Z-6) The MT stepped back from the MA (Tabs S-14, R-100 to R-101 and Z-7). MM2 gave a thumbs up and walked over to the cockpit ladder (Tabs R-96 and Z-7 to Z-8).

MM4 picked up a lock pin from the lower weapons bay door and showed it to MM (Tabs R-100 to R-101 and S-15). MM picked up the lock pin MM4 had placed back on the lower weapons bay door, and MM3 picked up another lock pin and both approached the weapons bay to replace the respective lock pins (Tabs S-16 and V-3.10). MM2 ascended the ladder and used the MFD to retract the right CRL at 1155:41L, and then the left CRL at 1155L (Tabs J-23, J-51, R-96 and Z-9). When the right CRL retracted, MM's head was between the CRL's plume deflector and the weapons bay bulkhead (Tab S-17). The right CRL caused fatal head trauma. (Tabs S-17, CC-3 and CC-9).

After the MT saw the CRL close on MA, MM4 waved his arms as a signal to MM2, who was standing on the cockpit ladder, and MM2 extended the left CRL at 1155:57L then extended the right CRL at 1156L using the MFD. (Tabs J-51, R-96, R-104 and Z-10). MM4 called MM7's expeditor phone telling MM7 to call emergency services (Tab R-104, R-116 and R-164). MM7 called 9-1-1 and was connected with Anchorage dispatch, who then connected MM7 to JBER dispatch (Tab R-116 and R-164). MM7 drove from the 90FGS to the mishap site while on the phone with emergency services to provide and receive information (Tab R-164). Upon arrival at 1159:57, MM7 administered CPR until emergency services arrived at 1202L (Tab R-91 to R-92, and R-116). Paramedics administered aid, but MM did not respond (Tab R-92). Paramedics called a physician who pronounced time of death (Tab R-92).

e. Impact

Not Applicable.

f. Egress and Aircrew Flight Equipment (AFE)

Not Applicable.

g. Search and Rescue (SAR)

Not Applicable.

h. Recovery of Remains

MM's remains were transferred from mishap site at JBER, Alaska to the State of Alaska's Coroner's Office in Anchorage where an autopsy was performed. (Tab CC-3).

5. MAINTENANCE

a. Forms Documentation

F-22 aircraft maintenance is managed via an electronic management database referred to as the Integrated Maintenance Information System (IMIS) (Tab CC-9). IMIS tracks scheduled and unscheduled maintenance activities, scheduled and unscheduled engine maintenance activities, repairs, aircraft flying hours, maintenance personnel activity, and Technical Order Data (TOD) (Tab CC-9). The Integrated Maintenance Database System (IMDS) is an additional management information system used by the USAF, which contains F-22A data transferred from IMIS. (Tab CC-9). A thorough review of the MA's IMIS, IMDS and DEPOT records from 2 January 2023 through 15 March 2024 disclosed no evidence to indicate any recurring maintenance problem was relevant to the mishap (Tab CC-9).

The AIB also reviewed the status of all Time Compliance Technical Orders (TCTO) and noted no discrepancies (Tab CC-9). The MA was in the process of an extensive modification rebuild, which required several follow-on operational checks (Tab CC-9). The MA completed a Fiber Infrastructure Maturation Program (FIMP) modification for various avionics upgrades (Tab CC-

9). FIMP includes sensor enhancements and antenna modifications for combat flying missions (Tab CC-9). IMIS and IMDS records contained 119 additional Work Center Events (WCE) including 31 non-flyable conditions (Tab CC-9). After careful review of all maintenance actions and inspections, the AIB found no evidence to indicate any of the non-flyable discrepancies were relevant contributed to the mishap (Tab CC-9).

On the day of the mishap, there was one warning open to prevent maintenance crews from turning on the APU. (Tab R-115). MM7 confirmed with MM2 that the warning was2 verified a safe condition due to the aircraft being in a hangar. (Tab R-96 and Tab R-115). After verifying forms documentation, the MT started the APU (Tab R-96 and R-115).

b. Inspections

The MA last flew on 15 December 2023 and a basic post-operation inspection followed (Tab D-98). Several scheduled and unscheduled inspections occurred between the last flight and the mishap date (Tab D-3 to D-8). These included inspections of the CRLs, egress system, uninstalled engine, engine bay, ammunition container, and gun port (Tab D-4, D-8,D-34, D-49 and D-51). One of the inspections included a right CRL restraint fitting adjustment, which the members were working on the day of the mishap (Tab D-5).

c. Maintenance Procedures

The AIB reviewed all maintenance procedures conducted on the MA in accordance with (IAW) Technical Order (TO) Procedural Task F7137881144/F744898144 (Tab CC-9).

TO Procedural Task F7137881144/F744898144, Adjust Right/Left LAU-141 Restraint Fittings, does not allow maintainers to option of control the CRL extend/retract movements from the MFD located in the cockpit (Tabs J-53 and CC-9). Maintainers are required to conduct all CRL movements using the PMA (Tabs J-53 and CC-9). If viewing the TO, the MT would have seen the following warning:

“Warning: Ensure personnel and equipment are clear of weapons bay during launcher ground operation. Failure to comply may result in death or injury to personnel and/or damage to aircraft or equipment.” (Tab CC-12).

Figure 3 - Location of PMA during normal maintenance of right-side weapons bay. Image not associated with MA. Tab Z-13

The MT performed both the left and right side adjust LAU-141 restraint fitting tasks simultaneously while having the wrong task guidance, perform SMS Wrap Around Test, open on the PMA (Tab J-53). The APU was started and set the aircraft to the correct power mode using the PMA. (Tab J-47). MM2 retracted both CRL's using the cockpit's MFD and made the initial restraint fit adjustments (Tab CC-11). MM2 proceeded up the ladder to the cockpit and extended the CRL in station 3 (left side weapons bay) and the CRL in station 10 (right-side weapons bay) CRL movement using the MFD (Tab CC-11). The MT proceeded with the maintenance tasks on both sides of the MA without referencing the technical data. (Tabs V5.3 and CC-11). MM2 and MM6 adjusted the left side forward and aft fit restraints on the CRL while the remaining maintenance members adjusted the right-side fit restraints (Tab V5.4). On completion of the adjustment of the fit restraints, MM2 went to the cockpit to retract the CRL's while MM4 used a hand gesture to signal the MT that the lock pins needed to be installed (Tabs R-101 to R-111 and Z-9). While MM was installing the right CRL's aft lock pin, MM2 initiated the CRL retract using the MFD (Tabs J-51 and Z-8 to Z-9). MM's head was stuck between the aft of the CRL launcher and aircraft side weapons bay and was fatally injured. (Tabs R-101, S-17 and Z-9).

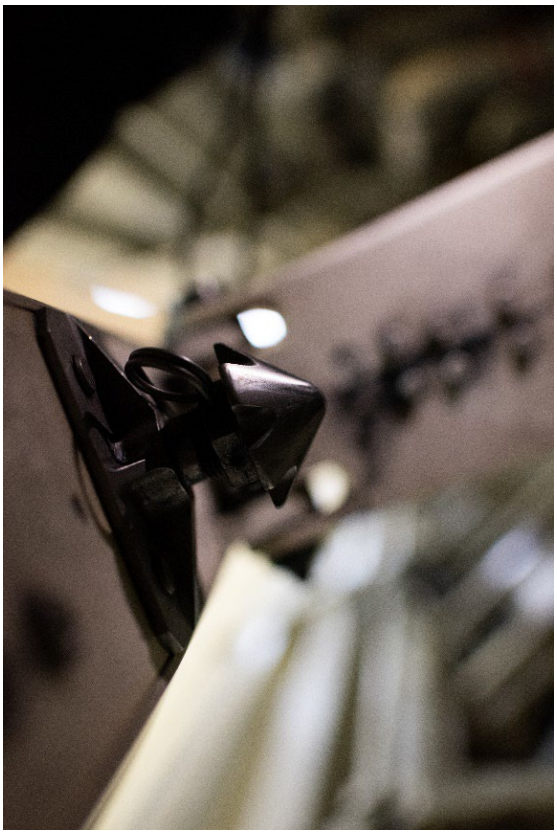


Figure 4 - Aft CRL restraint fitting with lock pin inserted. Image not associated with MA. (Tab Z-14)

IAW DAFI 21-101 1.6.2. *Use of TOs and TO Supplements*, all personnel will enforce compliance with technical data (Tab BB-5). Use of prescribed technical data to maintain aircraft and equipment is mandatory and will be conducted and managed IAW TO 00-5-1, Air Force Technical Order System (Tab BB-5). The MT was not using technical data (F7137881144/F744898144) when performing the LAU-141 restraint fit task (Tab J-53). It is the responsibility of the 7-level leading the task to ensure proper procedures are being followed when performing maintenance task (Tab CC-9). TOD used by the maintainers will direct all LAU-141 movements from the PMA (Tabs J-33, J-36 and CC-9). No maintainer, TOD task commands allow for LAU-141 movements from the cockpit (Tab J-36). Based on interviews with the MT, this was not the first time some MT members had heard of or seen the practice of using the cockpit to move the LAU-141 (Tabs J-53, R-25, R-138, R-151 to R-152, and CC-8 to CC-9). Recorded CSMU and PMA data collectively indicate CRL extend and retract commands were not initiated from the PMA (Tab J-25). When commanding CRL movement from the cockpit, there is no visibility of the right-side weapons bay area (Tab CC-8 to CC-9) Reference Figure 5.

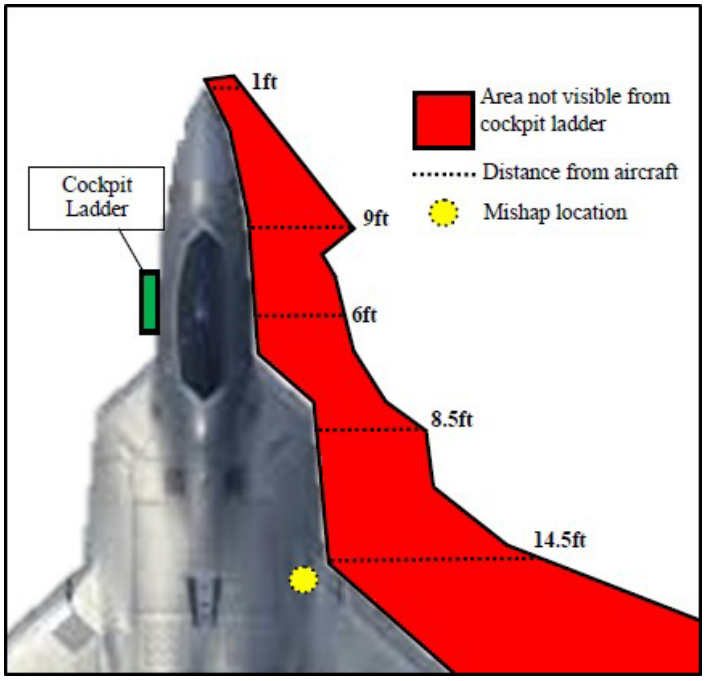


Figure 5 - Diagram of area not visible while standing on cockpit ladder. (Tab Z-15)

Figure 6 - View from cockpit ladder to right side of aircraft. Image not associated with MA. (Tab Z-16)

The MT was performing both right and left side CRL fit restraint checks at the same time (Tabs J-6, J-53 to J-54, CC-11). The PMA maintenance mode will only allow you to perform one maintenance action at a time (Tab CC-9). Operating the CRL movements from the MFD allows the maintainers the ability to work both CRLs simultaneously; however, the danger areas are completely obscured by the body of the aircraft (Tab CC-8 to CC-9). MM2 could not see if the

right-side weapons bay was clear before actuating the CRL retraction. Reference Figure 5 (Tabs S-17, CC-8 to CC-9).

Figure 7 - View of CRL plume deflector looking towards aft of weapons bay. CRL is fully retracted. Image not associated with MA. (Tab Z-17)

Seconds into Retraction	CRL Plume Deflector Distance to Bulkhead
0	16.7 inches
1	10.6 inches
2	5.9 inches
3	4.3 inches
4	1.8 inches
5	1 inch

Table 1 - Distance between CRL plume deflector and aircraft bulkhead during retraction. (Tab Z-18)

d. Maintenance Personnel and Supervision

A review of maintenance personnel, supervision, and training records relevant to the mishap validated that all but two of the maintainers who performed the LAU-141 restraint fit task were fully trained and qualified on the airframe. (Tabs G-4 to G-294 and Tab V-6.6). There is not a specific training task for adjust fit restraint. (Tab CC-9).

The information below is current as of the day of the mishap:

(1) MM: 7-Level F-22 Weapons Team Chief (Tab G-4)
Time in service: 8 years (Tab T-6)
Time at JBER: 5 weeks (Tab T-4)
Part in mishap: Mishap Member (Tab R-115)

Training Status: F-22 specific training requirements (CFETP) not loaded to individual. (Tab G-4).

(2) MM2: 7-Level F-22 Weapons Team Chief (Tab G-41)
Time in service: 9 years (Tab V-1.1)
Time at JBER: 3 years (Tab V-1.1)
Part in mishap: Activated right CRL retraction (Tab R-96)
Training Status: Fully qualified on all tasks performed (Tab G-41)

(3) MM3: 5-Level F-22 Weapons Team Member (Tab G-87)
Time in service: 4 years (Tab V-2.1)
Time at JBER: 3 years (Tab V-2.1)
Part in mishap: Performed fit restraint adjustment. (Tab R-101)
Training Status: Fully qualified on all tasks performed (Tab G-87)

(4) MM4: 7-Level F-22 Weapons Team Chief (Tab G-129)
Time in service: 9 years (Tab V-4.1)
Time at JBER: 7 years (Tab V-4.1)
Part in mishap: Trainer (Tab V-6.6)
Training Status: Fully qualified on all tasks performed (Tab G-129)

(5) MM5: 5-Level F-22 Weapons Team Member (Tab G-175)
Time in service: 3 years (Tab T-7)
Time at JBER: 3 months (Tab T-7)
Part in mishap: Performed fit restraint adjustment. (Tab R-108
Training Status: Fully qualified on all tasks performed (Tab G-175)

(6) MM6: 5-Level F-22 Weapons Team Member (Tab G-236)
Time in service: 3 years (Tab V5.2)
Time at JBER: 10 months (Tab V5.2)
Part in mishap: Performed fit restraint adjustment. (Tab R-111)
Training Status: Not qualified on all task performed (Tab G-236)

(7) MM7: 7-Level F-22 Weapons Expediter (Tab G-294)
Time in service: 12 years (Tab V6.2)
Time at JBER: 8 months (Tab V6.2)
Part in mishap: Dispatched MT to perform maintenance. (Tab R-114)
Training Status: Fully qualified on all tasks performed (Tab G-294)

e. Fuel, hydraulic, oil and oxygen inspection analysis

The six liquid samples taken from the MA or associated servicing carts were submitted to the Air Force Research Laboratory for analysis, and there was no evidence to suggest that there was contamination that contributed to the mishap. (Tab D-157 to D-172).

f. Unscheduled Maintenance

The AIB reviewed maintenance records, including unscheduled maintenance performed on the MA (Tab CC-9). The MA underwent extensive maintenance for a modification in the weeks leading up to the mishap (Tab CC-9). On 15 March 2024, the MA was towed into the hangar for follow-on maintenance procedures that the MT was tasked to perform (Tab R-114 to R-115). During this time, Low Observable (LO) personnel had priority on the MA to remedy an issue with the flush port so it could be replaced (Tab R-115). After two hours, MM7 asked the Production Superintendent the MT could have priority on the MA because LO personnel were taking longer than expected (Tab R-115). After the Production Superintendent super gave permission, the MT started their operational checks (Tab R-115).

g. Communications

While the APU is running it greatly reduces the ability for vocal communication (Tab CC-11). Noise exposure for maintenance members working with APU running measured as high as 122 decibels (dBA) (Tab CC-5). This is above the occupational exposure limit of 85 dBA and ear plugs and ear protectors are worn (Tab BB-48 and V-3.8). Quality of person-to-person voice communication is extremely difficult at dBA ranges above 90 (Tabs BB-48, R-100 and V-5.9). There are no standard hand signals while performing maintenance with APU running that would identify what maintenance action will be performed at that moment (Tabs R-152 and CC-11). After adjusting the right-side CRL forward fit restraint, MM2 gave a "thumbs up" which MM2 understood to mean the right-side weapons bay was clear. (Tab R-96). MM2 proceeded up the ladder to retract the CRL. (Tabs R-96 and S-16). At the same time, MM4 showed the lock pins indicating that they needed to be installed. (Tabs R-100, R-111 and S-17). Having given the direction to install the pins, MM4 thought the adjust restraint fit task had been completed and went to look for MM2 to see what maintenance task they were going to do next. (Tab R-104).

6. AIRFRAME, MISSILE, OR SPACE VEHICLE SYSTEMS

a. Structures and Systems

(1) Portable Maintenance Aid

The PMA is a rugged laptop computer that replaces the traditional paper TOs and allows maintainers to navigate via links to other TOs referred to in the current procedure and parts information for the F-22A (Tab CC-9 to CC-10). A PMA can command certain systems on the aircraft. (Tab CC-9 to CC-10). A PMA utilizes IMIS, where the user can view aircraft forms, warnings, JCNs, and WCEs (Tab CC-9 to CC-10). The PMA has the capability to record maintenance actions as they occur. (Tab CC-9 to CC-10). The PMA interfaces directly with the aircraft via connection ports that access to aircraft status and control of data uploads and downloads (Tab CC-9 to CC-10). For reference, see Figure 3 of this report.

A PMA CRL retract request operates on a failsafe basis (Tab J-14). In other words, the maintainer must continuously depress a PMA keyboard function button for the Stores Management Systems Controller (SMSC) to continue commanding the CRL to retract (Tab J-21). When the maintainer releases the function button, the SMSC stops commanding the launcher to retract within ~250ms.

(Tab J-21). The retract command remains active as long as the function button is depressed, even when the launcher has reached a retracted position (Tab J-21). If the function button is released while the launcher is in-transit, the launcher will gradually extend due to actuator hardware characteristics (Tab J-21).

(2) Stores Management Display (SMD)

The SMD is a page that can be displayed on the MFD in the cockpit and shows the user the status of, and allows control of all weapons bay doors and CRLs (Tab J-3). CRL and weapon bay door actuation from the MFD does not have the same safety feature (failsafe switch) as the PMA (Tab CC-7). CRLs commanded to retract from the SMD cannot be halted or reversed, rather the CRL will complete its movement (Tabs J-14, J-20 to J-21 and CC-7). The SMD can command CRLs and any bay doors, that have not had their "safe" switch activated, individually or simultaneously (Tabs J-20 to J-21, R-167 and CC-7). The side weapons bay door safe switches have no impact on the CRL movement (Tab CC-7). Therefore, a command to retract a single CRL, or an "All Close" command (retract all CRLs and close all bay doors) with weapons bay door safe switches enabled will still result in CRL retraction. Tabs J-20 to J-21 and CC-7). The distance between the buttons on the MFD to command individual versus all CRL and bay door movements are approximately one inch apart (Tab CC-7).

(3) Auxiliary Power Unit (APU)

The APU is a jet engine capable of providing the entire aircraft with limited electrical and hydraulic power for maintenance operations on the ground (Tab CC-10).

(4) Configurable Rail Launcher (CRL)

The CRL is a rail launcher designed to carry and launch an air-to-air missile from the side weapons bays (Tab J-13). The launcher body consists of a graphite composite structural beam, an upper aluminum beam and includes pivots for the trapeze arms and actuator (Tab J-13). The launcher includes: steel/aluminum launcher rail, rocket motor plume deflector, detent/snubber assembly, air-to-air missile power supply, forward umbilical cover/retainer, aft dampener, forward and aft restraint fittings, launch interlock switch, plume deflector safety switch, and midbody umbilical retract mechanism (Tab J-13). The only way to prevent the movement of a CRL when it is commanded to move from the MFD is to set the plume deflector to the "Load" position (Tab J-13). For reference, see Figure 1 and Figure 2 of this report.

b. Evaluation and Analysis

Lockhead Martin performed a review of the aircraft systems and found all were functioning within parameters and there was no evidence to indicate any a factor in the mishap (Tab J-53 to J-54).

7. WEATHER

a. Forecast Weather

The mishap occurred in an enclosed hangar with doors closed. Weather was not relevant to the mishap.

b. Observed Weather

Not applicable.

c. Space Environment

Not applicable.

d. Operations

Not applicable.

8. CREW QUALIFICATIONS

Not applicable.

9. MEDICAL

a. Mishap Member (MM)

(1) Qualifications

MM's medical records revealed no disqualifying medical conditions or limitations that would prevent MM's performance of aircraft maintenance duties (Tab CC-3).

(2) Health

MM's pre-accident medical examination records were reviewed. There were no indications of illness or other symptoms leading up to the mishap (Tab CC-3).

(3) Pathology

Records including the autopsy report from the State of Alaska Medical Examiners Office were reviewed. The cause of death for MM was determined to be blunt force trauma to the head sustained in the mishap from the CRL retraction (Tab CC-3).

(4) Toxicology

Post-mortem fluid analysis of MM conducted by NMS Labs, Horsham, PA, as ordered by the State of Alaska Medical Examiners' Office, revealed no evidence of ethanol, methanol, isopropanol,

acetone, screened drugs of abuse, or medications (Tab CC-3).Toxicology screen was positive for caffeine though there is no evidence this was a factor in the mishap (Tab CC-3).

(5) Lifestyle, Crew Rest, and Crew Duty Time

Due to the nature of the mishap, there were no 72-hour and 7-day histories available to evaluate activities, behaviors, or sleep and nutritional habits of MM (Tab CC-3). However, there is no evidence to suggest lifestyle factors contributed to the mishap (Tab CC-3).

b. Other Crew Members (MM2-MM7)

(1) Qualifications

In addition to MM's records, the board reviewed the records of MM2-MM7 (Tab CC-3 to CC-4). These maintainers' medical records revealed no disqualifying medical conditions or limitations and indicated that they were medically ready to perform aircraft maintenance duties (Tab CC-3 CC-4).

(2) Health

The medical review of the records for the six maintainers revealed no evidence of medical conditions or medications that could have contributed to the mishap (Tab CC-3 to CC-4).

(3) Toxicology

The results of the toxicology reports from the Defense Health Agency, Forensic Toxicology Lab, Dover AFB, Delaware were "None Detected" for drugs of abuse, ethanol, methanol, isopropanol, acetone, and carbon monoxide spectroscopy (Tab CC-3 to CC-4).

(4) Lifestyle

There is no evidence that lifestyle factors contributed to the mishap (Tab CC-3 to CC-4).

(5) Crew Rest and Crew Duty Time

A review of the 72-hour and 7-day histories revealed no evidence that abnormalities contributed to the mishap (Tab CC-3).

10. OPERATIONS AND SUPERVISION

a. Operations

There is no evidence to indicate the operational tempo at the 90 FGS contributed to the mishap (Tab V-6.4). While the execution of multiple tasks simultaneously could be construed as indicative

of time pressure, there was no identifiable reason or motivation to complete the job in a hurried manner (Tab V-6.4).

b. Supervision

The MT did not have clear guidance on whether MM2 or MM4 would lead the task (Tab V-3.6). This created confusion about who was performing what task at what time (TabV-3.6). MM7 considered MM2, the original team chief dispatched to the job, to be the leader (Tab V-6.6). CCTV footage and a review of MT interviews indicate MM2 gave direction on what was going to be performed on the aircraft while MM4 explained how the job is going to be performed (Tabs V-3.3, V-3.6, V-5.4 and CC-11). The rest of the MT did not have a shared understanding of who was directing the maintenance flow (Tabs V-3.6 and CC-11).

11. HUMAN FACTORS ANALYSIS

a. Introduction

The Department of Defense Human Factors Analysis and Classification System 8.0. (DoD HFACS) lists potential human factors that can play a role in aircraft mishaps and identifies potential areas of assessment during an accident investigation (Tab BB-14). Having this systematic approach enables investigation boards to better classify variables that could affect human performance (Tab BB-14). The taxonomy classifies potential factors into either active failures or latent failures (Tab BB-14). Active failures are actions (or inactions) by the individual that are causative to the mishap (Tab BB-17). Latent failures are conditions that exist within a supervisory or organizational level that affected the sequence of events leading up to the active failure (Tab BB-31) A factor is any deviation, out-of-the-ordinary or deficient action, or condition discovered during a mishap investigation that, in the board's opinion, contributed to the eventual outcome (Tab BB-11). The DoD HFACS 8.0 model was used to identify human factors relevant to this mishap and are described below (Tab BB-14).

b. Relevant Human Factors Identified by the AIB

(1) AE201 Inadequate Real-Time Risk Assessment/Action

HFACS Code AE201 is when the mishap individual, through inexperience, faulty logic, poor judgment, or insufficient information, selected or proceeded with the wrong course of action based on an ineffective real-time assessment of immediate hazards during execution of a task/mission/activity, which resulted in the near-miss or mishap (Tabs BB-19 and CC-7 to CC-8).

(2) AE205 Ignored a Caution/Warning

HFACS Code AE205 is a factor when the mishap individual disregarded an accurately perceived and understood caution or warning in favor of addressing what they perceive to be a greater immediate threat, which resulted in the near-miss or mishap (Tabs BB -19 and CC-12).

(3) AD002 Commits Routine/Widespread Known Deviation (Normalization of Deviance)

HFACS Code AD002 is a factor when the mishap individual violated a published standard, procedure or policy based on unofficial accepted practices of the unit or community that are routine, ongoing, or widespread and resulted in the near-miss or mishap (Tabs BB-20, J-6, J-54, R-178, and V-6.2).

(4) PC101 Inattention

HFACS Code PC101 is a factor when the mishap individual did not maintain a state of readiness or alertness/situational awareness to properly act upon available information, resulting in a hazardous condition or unsafe act (Tabs BB-21 and CC-11).

(5) PC104 Confusion

HFACS Code PC104 is a factor when the mishap individual was unable to maintain a cohesive, orderly awareness of events and required actions and experienced a state characterized by a lack of understanding, clear thinking or sometimes a misperception of the situation, which resulted in the hazardous condition or unsafe act (Tabs BB-21 to BB-22, CC-7, R-95, V-3.10, and V-5.10).

(6) PP101 Ineffective Team Resource Management (Crew, Bridge, Fighter, Maintenance, etc.)

HFACS Code PP101 is a factor when crew/team members failed to actively maintain an accurate and shared understanding of the evolving task, or manage their distribution of tasks, which resulted in a hazardous condition or unsafe act (Tabs BB-29, CC-5, C-11, R-95, V-3.10, and V-5.10).

(7) PP109 Task/Mission Planning and/or Briefing Inadequate

HFACS Code PP109 is a factor when an individual, crew or team failed to complete all preparatory tasks associated with planning the mission and/or effective briefing the tasks, which resulted in a hazardous condition or unsafe act (Tab BB-29).

(8) PT101 Untrained Operator/Worker

HFACS Code PT101 is a factor when the mishap individual did not receive adequate/sufficient training (formal, just-in-time, on the job, etc.) or received no training for a specific task, which resulted in a hazardous condition or unsafe act (Tabs BB-30, V-3.4, CC-7, CC-8).

(9) PT104 Lack of Proficiency/Experience

HFACS Code PT104 is a factor when an individual's level of fluency or expertise did not match skills required for safe execution, regardless of his or her familiarity with the process, task, system or mission, which resulted in a hazardous condition or unsafe act (Tabs BB-30, V-5.11 to V-5.12).

(10) SD001 Failure to Enforce Published Rules/Guidance

HFACS SD001 is when a supervisor/leader failed to ensure that personnel adhered to published rules/policy/guidance/procedure or knowingly allowed an untrained, inexperienced, non-proficient or non-current individual to perform a task, which resulted in a hazardous conditions or unsafe acts (Tabs BB-33, CC-9).

(11) SI001 Ineffective Supervisory or Command Oversight

HFACS SI001 is when the availability, competency, quality or timeliness of supervisor/leader oversight did not meet task or mission demands, which resulted in hazardous conditions or unsafe acts (Tabs BB-33 and CC-11).

(12) SI007 Failed to Identify or Correct Hazardous Practices, Conditions or Guidance

HFACS SI007 is when any supervisor/leader in the unit failed to identify or correct known hazardous conditions of equipment, facilities, or written procedures/guidance, or correct unsafe work practices of personnel within his/her scope, which resulted in hazardous conditions or unsafe acts (Tabs BB-34, CC-7, and CC-11).

12. GOVERNING DIRECTIVES AND PUBLICATIONS

a. Publicly Available Directives and Publications Relevant to the Mishap

(1) DAFI 21-101, *Aircraft and Equipment Maintenance Management*, dated 16 January 2020

(2) AFMAN 36-2100, *Military Utilization and Classification*, dated 07 April 2021

(3) AFI 36-2650, *Maintenance Training*, dated 22 June 2022

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, or Department of Defense Websites at either http://www.dtic.mil/whs/directives/index.html, or https://etims.cce.af.mil/ETIMS/ATOMS/catalog/aftoxcat.jsp

b. Other Directives and Publications Relevant to the Mishap

(1) DoD Human Factors Analysis and Classification System (HFACS) 8.0, dated 25 May 2022

(2) TO 00-20-1, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures*, dated 19 December 2023

(3) TO 1F-22A-2-00GV-00-1, *General Vehicle Description*, 20 July 2020

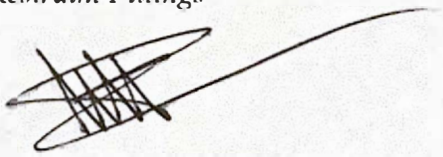
(4) TO 1F-22A-1, F-22A Raptor (current as of 24 November 2020)

(5) F-22A IMIS TO Procedural Tasks (TOD Version 105.01.00) (current as of 01 May 2024):
(a) A943111MP2, *Adjust Right LAU-141 Restraint Fittings*

c. Known or Suspected Deviations from Directives or Publications

The AIB identified the following known or suspected deviations from directives or publications:

F-22A IMIS TO Procedural Tasks (TOD Version 105.01.00) (current as of 01 May 2024):
(a) A943111MP2, *Adjust Right LAU-141 Restraint Fittings*



06 NOVEMBER 2025

WILLIAM R. DAVIS
Brigadier General, USAF
President, Accident Investigation Board

STATEMENT OF OPINION

F-22, T/N AK 07-0137
JOINT BASE ELMENDORF RICHARDSON, ALASKA (AK)
15 MARCH 2024

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 the 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

At 1155 local (L) on 15 March 2024 during aircraft maintenance, a United States Air Force member was fatally injured by the retractation of a Configurable Rail Launcher (CRL) on an F-22A, T/N AK 07-0137, at Joint Base Elmendorf-Richardson (JBER), Alaska. The Mishap Aircraft (MA) was in Building 16670, Bay Five and was being serviced by six members of the 90 FGS assigned to the 3rd Wing, 11th Air Force, Pacific Air Forces, Indo-Pacific Command.

The Maintenance Team's (MT) purpose was to accomplish maintenance on the MA, including the right and left CRLs, while simultaneously conducting a training opportunity. Auxiliary Power Unit (APU) operation was required to perform the mishap task; the enclosed workspace exacerbated APU decibel levels that require double hearing protection as a standard practice. This limited MT members to rely primarily on nonverbal communication.

The mishap occurred while the MT performed an adjustment to restraint fittings on the right CRL. After making adjustments, MM2 made a "thumbs up" gesture to the MT assembled at the right-side weapons bay. MM2 then moved to the left-side of the aircraft and ascended the cockpit ladder; however, based on the fact MM4 directed MM and MM3 to re-enter the weapons bay it is clear that the MT did not interpret the "thumbs up" gesture's intended meaning, if it was seen, to mean MM2 intended to retract the CRL. At 1155L MM's upper torso was inside the right-side weapons bay when MM2 commanded retraction of the CRL from the Multi-Function Display (MFD), entrapping MM and resulting in immediate fatal head trauma.

I find, by a preponderance of the evidence, there are two causes of the mishap: (1) MM2, as team lead, did not follow prescribed maintenance procedures for service of the CRL which would have ensured visibility of the mishap site and enabled the possibility of MM2 to immediately halt and reverse CRL retraction; and (2) failure to maintain awareness and supervisory direction which would have ensured a shared mental model, effective communication and team cohesion. Team cohesion appeared to degrade throughout the maintenance task.

I also find, by a preponderance of the evidence, three factors substantially contributed to the mishap: (1) performance of multiple jobs simultaneously resulting in task confusion and lack of coordination (2) an infrequency of the job performed that made it difficult to develop proficiency;

and (3) a false sense of security engendered by an incorrect belief on the scope of function of the safe switch for the side weapons bay.

Human Factors played a significant role in both of the Causes and all three of the Substantially Contributing Factors; analysis identified 12 categories that either directly impacted the incident or exacerbated it; many of them affected more than one Cause and/or Substantially Contributing Factor.

2. CAUSES

a. Failure to follow prescribed procedures

The sole prescribed method for performing maintenance on the CRL is through use of the Portable Maintenance Aid (PMA). In the mishap, using the MFD to activate the CRL is not in accordance with (IAW) Technical Order (TO) guidance nor does it provide necessary safeguards. MFD operation of the CRL prevents line-of-sight observation of the work being performed and only complete retract and extend operations are available. PMA use ensures direct observation of the work area and if the CRL activation switch is released, it reverses retraction of the mechanism in 250 milliseconds; direct observation makes it unlikely that CRL retraction would have been actuated since MM2 would have sight of MM in an unsafe position. In the unlikely event that retraction of the CRL had been actuated, release of the button would have immediately reversed the retraction, potentially in time to avoid injury. Also, the TO task on the PMA has a statement warning of the hazards of CRL movement. By MM2 substituting unauthorized MFD actuation from the cockpit in lieu of the PMA, two impediments were introduced (visual and safety) thereby increasing the danger and reducing situational awareness for the task. Had MM2 used the PMA, he would not have had visual impediment to MM and could have rapidly halted the hazardous action.

Human Factors present: Reference 1, 2, 3, 7, 12 in Section 11 and Notes below

b. Failure to maintain awareness and supervisory direction

Prior to the incident, video shows a team that is synchronized and performing their tasks in a coordinated manner with clear signaling. During the incident task, that synchronization seems to erode with MM2 making motion to accomplish one task while the remainder of the group, directed by MM4, worked a different and conflicting task – thereby placing MM in a position to be fatally injured. Although MM7 considered MM2 as the lead for the task, video indicates that direction came from two different individuals. While performing a previous task that morning, the group seemed to work in a coordinated fashion with eye contact and hand gestures prior to actions. Leading up to the mishap task, these communication procedures broke down, culminating with MM2 moving to the cockpit without getting positive confirmation from all members of the team that they were clear of the weapons bay. MM4 seemingly did not recognize this as he subsequently directed two team members to perform a function inside the weapons bay; placing them in a hazardous position when the CRL was retracted.

Human Factors present: Reference 4, 5, 7, 8, 11 in Section 11 and Notes below

3. SUBSTANTIALLY CONTRIBUTING FACTORS

a. Performing multiple tasks simultaneously

Preceding the mishap, the MT was performing four tasks simultaneously: (1) 90-day LAU 142 Air Launched Medium Range Air to Air missile (AARAM) Vertical Ejection Launch (AVEL), (2 & 3) left and right LAU 141 CRL fit restraint adjustment and (4) SMS Wraparound Tester (SWAT). This likely contributed to the lack of coordination of the group's performance. Since PMA use directs sequential accomplishment of tasks, this situation would have been prevented.

Human Factors present: Reference 4, 5, 6, 7, 8, 11 in Section 11 and Notes below

b. Proficiency level challenge

The MT did not develop proficiency because they did not perform this task frequently, reinforcing the importance of utilizing the PMA/TO to ensure standardization, safety, and accuracy. The MT did not use the PMA and the MT had three members who were in training.

Human Factors present: Reference 5, 6, 7, 8, 9, 11 in Section 11 and Notes below

c. False sense of security

Two witness interviews coupled with one unsolicited comment by a 9-level maintainer from a different maintenance squadron led us to conclude that there is a common misunderstanding regarding the function of the safe switch. It seems widely believed that the "safe switch" inactivates the operation of both the bay doors as well as the CRL itself when it specifically only secures the doors. This could engender an inaccurate sense of security in a maintainer and prompt them to take an unwarranted risk.

Human Factors present: Reference 5. 7, 8. 11 in Section 11 and Notes below

NOTES on Human Factors:

1) MM2 and MM4 made incorrect decisions/actions regarding immediate hazardous conditions, misjudging changes in the surrounding environment. When MM2 went to the cockpit, using the MFD, to perform the adjustment of LAU-141 restraint fittings (CRL extend/retract procedure), the MA obstructed the view of other MT members in the immediate area of the side weapons bay (Tab R-96 and Z-9).

   Additionally, with the APU running, most of the flight control surfaces of the jet are powered and active; therefore, the risk of an unintended action is increased. (Tab CC-7).

   Finally, MM3 and other members of the crew mistakenly believed that enabling "safe" on the side weapons bay doors immobilized the CRL.

2) While the specific job being performed did not automatically bring up this warning in the TO, MM2 did not give appropriate attention to the TO warning attached to the extend/retract task.

   "Warning: Ensure personnel and equipment are clear of weapons bay during launcher ground operation. Failure to comply may result in death or injury to personnel and/or damage to aircraft or equipment."

3) By performing the adjustment of LAU-141 restraint fittings procedure from the cockpit, MM2 did not follow the TO, which states the procedure should be conducted from the PMA. Given that multiple individuals interviewed for this investigation stated that they had heard this deviation was occurring, it appears to be routine at the mishap location (Tabs J-53, R-25, R-138, R-151 to R-152, and CC-8 to CC-9).

4) MM2 and MM4 also did not maintain a state of situational awareness during the incident.

5) Inexperienced MT members did not understand the process for the adjustment of LAU-141 restraint fittings; coupled with fragmented communication, conditions for an accident resulted.

   MM2 focused his attention on the fact that he had given a "thumbs up" sign as an indicator that it was safe to perform the adjustment of LAU-141 restraint fittings procedure, evidence indicated that members of the MT did not notice this hand signal or misinterpreted it.

6) Multiple crew members failed to maintain an accurate understanding of the adjustment of LAU-141 restraint fittings procedure task and their specific roles/responsibilities for the task.

   The noise level from the APU negatively affected the mishap members' communication during the incident and contributed to it. Hand signals were not sufficient for understanding the upcoming task actions.

7) While not required and considering that this was a training event, the crew brief given by MM2 and MM4 was inadequate to discuss the safety aspects (warnings/caution notes) of the adjustment of LAU-141 restraint fittings. Interviews indicated that multiple team members did not fully understand the risks involved.

8) MM, MM3, and MM5 did not receive sufficient training for the adjustment of LAU-141 restraint fittings task.

9) The crew (other than MM2 and MM4) did not regularly perform the adjustment of LAU-141 restraint fittings. This resulted in a lack of familiarity with the task, which contributed to the incident.

10) By virtue of both supervisory members using the MFD located in the cockpit and/or allowing use of the MFD rather than the PMA while training their members on the day of

the incident, MM2 and MM4 failed to ensure that personnel adhered to the TO for adjustment of LAU-141 restraint fittings.

11) MM2 and MM4 mismanaged emerging risks in the oversight of his crew and this resulted in the mishap.

12) When both MM2 and MM4 used the MFD in the cockpit rather than the PMA, they failed to identify hazardous conditions and demonstrated unsafe work practices to personnel they were training. These actions contributed to the mishap.

4. CONCLUSION

After a comprehensive investigation, I find, by a preponderance of the evidence, there are two causes of the mishap: (1) MM2, as team lead, did not follow prescribed maintenance procedures for service of the CRL which would have ensured visibility of the mishap site and ability to immediately halt and reverse CRL retraction; and (2) failure to maintain supervisory direction and awareness which would have ensured a shared mental model and communication.

I also find, by a preponderance of the evidence, three factors substantially contributed to the mishap: (1) performance of multiple jobs simultaneously resulting in task confusion and lack of coordination (2) an infrequency of the job performed that made it difficult to develop proficiency; and (3) a false sense of security engendered by an incorrect belief on the scope of function of the safe switch for the side weapons bay.

06 NOVEMBER 2025

WILLIAM R. DAVIS
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