

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



**T-38A, T/N 67-14831**

**MISSION ONE SUPPORT SERVICES**  
**49TH MAINTENANCE GROUP**  
**49TH WING**



**LOCATION: HOLLOMAN AIR FORCE BASE, NEW MEXICO**

**DATE OF ACCIDENT: 27 FEBRUARY 2023**

**BOARD PRESIDENT: MAJOR PARKER V. DODDS**

**Conducted IAW Air Force Instruction 51-307**



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS AIR COMBAT COMMAND

OFFICE OF THE DEPUTY COMMANDER  
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08 MAR 2024

ACTION OF THE CONVENING AUTHORITY

The report of the accident investigation board conducted under the provisions of Air Force Instruction 51-307, *Aerospace and Ground Accident Investigations*, that investigated the 27 February 2023 mishap at Holloman Air Force Base, New Mexico, involving a T-38, T/N 67-14831, complies with applicable regulatory and statutory guidance, and is hereby approved.

◀  
MICHAEL G. KOSCHESKI  
Lieutenant General, USAF  
Deputy Commander

*People First... Mission Always...*

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

**T-38A, T/N 67-14831  
HOLLOMAN AFB, NEW MEXICO  
27 FEBRUARY 2023**

On 27 February 2023, at approximately 1500 Local (L), the front end of the mishap aircraft (MA), a United States Air Force T-38A Talon, tail number (T/N) 67-14831, assigned to the 509th Bomb Wing at Whiteman Air Force Base (AFB), Missouri, collapsed inside of a hangar at Holloman AFB, New Mexico where it was temporarily located for routine maintenance. The collapse resulted in one civilian, the mishap maintainer (MM), an employee of M1 Support Services (M1), being hospitalized. The total value of the damages sustained by the MA was \$116,715.

Earlier that day, between 0715L and 0800L, the MA was towed to the M1 maintenance hangar from the Holloman AFB corrosion facility, where it had received a wash and fresh coat of paint over the prior 10 days. T-38A Technical Orders (TO) contain a list of post-wash maintenance procedures that are required to be accomplished before the aircraft is released for flight. The MM had been assigned to aid in the accomplishment of these tasks during his shift on 27 February 2023. While performing the lubrication task on the nose landing gear (NLG) assembly, the nose of the MA collapsed on top of the MM, pinning him underneath. After several minutes, approximately seven M1 employees were able to lift the nose section up, allowing the MM to be removed from underneath the MA. Emergency services were called by multiple members. From 1504L to 1506L, first responders arrived and performed life-preserving procedures on the MM. The MM was then transported by ambulance to a parking lot off the installation, where a Life Flight helicopter picked him up and transported him to University Medical Center in El Paso, Texas. The MM spent multiple days in the hospital while being treated for multiple bone fractures and other injuries before being released.

The Accident Investigation Board (AIB) President found, by a preponderance of the evidence, the cause of the mishap was the removal of the NLG safety pin combined with the forces exerted on the NLG assembly by the MM during the lubrication task. The purpose of the NLG safety pin is to lock the gear in the down position, preventing inadvertent gear retraction during maintenance or towing. The MM stated that he most likely removed the pin before applying lubrication to the NLG assembly. With the NLG safety pin not installed, the exertion of force during the lubrication task was sufficient to unlock the landing gear and initiate the subsequent gear retraction and collapse. Additionally, multiple actions taken by the MM leading up to the accident show a trend of divergence from applicable guidance and procedures. This reoccurring behavior culminated with the wrongful removal of the NLG safety pin during the lubrication task. Therefore, the AIB President found, by a preponderance of the evidence, that the MM's repeated deviation from standard operating procedures substantially contributed to this mishap.

*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 by the United States or by any person referred to in those conclusions or statements.*

**SUMMARY OF FACTS AND STATEMENT OF OPINION**  
**T-38A, T/N 67-14831**  
**HOLLOMAN AIR FORCE BASE, NEW MEXICO**  
**27 FEBRUARY 2023**

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## ACRONYMS AND ABBREVIATIONS

49 MDG	49th Medical Group	LOX	Liquid Oxygen
49 MXG	49th Maintenance Group	M1	M1 Support Services
49 WG	49th Wing	MA	Mishap Aircraft
13 BS	13th Bomb Squadron	Maj	Major
509 BW	509th Bomb Wing	MLG	Main Landing Gear
ACC	Air Combat Command	MO	Missouri
AETC	Air Education & Training Command	MM	Mishap Maintainer
AFGSC	Air Force Global Strike Command	MW	Mishap Witness
AFI	Air Force Instruction	NLG	Nose Landing Gear
AFRL	Air Force Research Laboratory	NM	New Mexico
AFTO	Air Force Technical Order	PH	Phase Inspection
AIB	Accident Investigation Board	PHA	Physical Health Assessment
AK	Alaska	PM	Production Manager
ARE	Ambulance Response Element	PR	Preflight Inspection
BPO	Basic Postflight Inspection	PT	Physical Therapy
DAFI	Dept. of the Air Force Instruction	T/N	Tail Number
DoD	Department of Defense	TA	Transient Alert
FCF	Functional Check Flight	TCTO	Time Compliance Technical Order
HAFB	Holloman Air Force Base	TO	Technical Order
IAW	In Accordance With	TX	Texas
IMDS	Integrated Maintenance Data System	UMCEP	University Medical Ctr at El Paso
L	Local Time	WAFB	Whiteman Air Force Base
LA	Legal Advisor		

## SUMMARY OF FACTS

### 1. AUTHORITY AND PURPOSE

#### a. Authority

On 11 May 2023, Lieutenant General Russell L. Mack, Deputy Commander, Air Combat Command (ACC), appointed Major Parker V. Dodds to conduct an aircraft Accident Investigation Board (AIB) for the 27 February 2023 mishap involving a T-38A Talon aircraft, tail number (T/N) 67-14831 (referred to as the mishap aircraft or MA), which occurred in Dock 5 of Building 578 at Holloman Air Force Base (HAFB), New Mexico (NM) (Tabs DD-39 and Y-3). The investigation was conducted pursuant to Air Force Instruction (AFI) 51-307, *Aerospace and Ground Accident Investigations*, dated 18 May 2019 (Tabs BB-113 to BB-211). The AIB convened at HAFB, NM from 19 May 2023 to 22 June 2023. Additional board members included a Legal Advisor (Captain), Recorder (Airman First Class), and a Maintenance Member (Work Supervisor 10) (Tab Y-3).

#### b. Purpose

In accordance with (IAW) AFI 51-307, this AIB conducted a legal investigation to inquire into all the facts and circumstances surrounding this Air Force 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-120).

### 2. ACCIDENT SUMMARY

On 27 February 2023, at approximately 1500 Local (L), the front end of the MA collapsed inside of a maintenance hangar at HAFB (Tabs R-19 and DD-39 to DD-40) resulting in one civilian maintenance member (referred to as mishap maintainer or MM) being hospitalized (Tabs V-9.18 to V-9.23). The MA is assigned to the 509th Bomb Wing (509 BW) at Whiteman Air Force Base (WAFB), Missouri (MO) and was temporarily stationed at HAFB for phase maintenance and a new paint job (Tabs O-3, V-2.5, and Z-21). The MM was performing routine maintenance on the nose wheel assembly of the MA before it collapsed (Tabs V-9.7 to V-9.16). Earlier that day, the MA had been towed from a paint and corrosion facility to the phase maintenance hangar (Tabs V-2.5 and V-6.3). After the move, the MM was tasked with performing a lube task and gear retraction test (Tabs O-3 and V-1.6). While performing the lube task, the nose wheel collapsed, pinning the MM under the MA (Tabs V-8.9 and V-9.7). Other maintenance members present lifted the MA off the MM and pulled him out from underneath the aircraft (Tabs V-2.14 and V-8.12). Emergency services were called by multiple members (Tabs V-2.4 and V-8.11). Upon arrival, emergency personnel performed life-preserving procedures on the MM (Tabs R-19 to R-23). The MM was then driven by ambulance to a parking lot off the installation, where a Life Flight helicopter picked him up and flew him to a hospital in El Paso, Texas (TX) (Tabs R-19 to R-23). The MM was hospitalized for approximately six days to undergo treatment for bone fractures and other trauma-related injuries (Tab V-9.21). The total value of damages sustained by the MA was \$116,715 (Tab P-3).

### 3. BACKGROUND

#### a. Air Combat Command (ACC)

ACC is headquartered at Joint Base Langley-Eustis, Virginia, and is one of the major commands in the United States Air Force (Tab CC-3). ACC is the primary force provider of combat airpower to America's warfighting commands (Tab CC-3). ACC provides conventional and information warfare forces to all unified commands to ensure air, space, and information superiority for warfighters and national decision-makers (Tab CC-3).



#### b. Air Education & Training Command (AETC)

AETC is headquartered at Joint Base San Antonio-Randolph, TX, and touches the life of nearly every Air Force member (Tab CC-5). The AETC mission is to find, recruit, train, and educate the Airmen the nation needs (Tab CC-5). The command operates 12 major installations and supports tenant units on numerous bases across the globe (Tab CC-5).



#### c. Air Force Global Strike Command (AFGSC)

AFGSC is headquartered at Barksdale Air Force Base, Louisiana, and is responsible for the nation's three intercontinental ballistic missile wings, as well as the Air Force's entire bomber force, to include B-52, B-1, and B-2 wings (Tab CC-7). The AFGSC mission is to provide strategic deterrence, global strike, and combat support (Tab CC-7).



#### d. 49th Wing (49 WG)

The 49 WG is located at HAFB, NM, and supports national security objectives worldwide by deploying to support peacetime and wartime contingencies (Tab CC-9). The unit oversees the 49th Operations Group, 49th Maintenance Group (49 MXG), 49th Medical Group (49 MDG), 49th Mission Support Group, 54th Fighter Group, 704th Test Group, and 635th Materiel Maintenance Group (Tab CC-9).



#### e. 49th Maintenance Group (49 MXG)

The 49 MXG is located at HAFB, NM, and maintains F-16 Fighting Falcon and MQ-9 Reaper aircraft along with associated Ground Control Stations in the Air Force's largest flying training operation (Tab CC-11). The 49 MXG also provides maintenance support through contracts with M1 Support Services (M1) to maintain T-38 aircraft (Tabs CC-11 and V1.3). The 49 MXG consists of approximately 2,100 Airmen, civilians, and contract personnel, managing \$2.5 billion in aircraft and equipment (Tab CC-11). Finally, the group supports flying activities, exercises, and





worldwide taskings as assigned by the Combatant Commanders and the Secretary of Defense against high value targets (Tab CC-11).

**f. 509th Bomb Wing (509 BW)**

The 509 BW is located at WAFB, MO, and serves as part of the Air Force’s conventional and strategic combat force to execute nuclear operations and global strike anytime and anywhere directed (Tab CC-14). The unit oversees the 509th Operations Group (509 OG), 509th Maintenance Group, 509th Mission Support Group, and 509th Medical Group (Tab CC-14).



**g. 509th Operations Group (509 OG)**

The 509 OG is located at WAFB, MO, and serves as the flying component of the 509 BW (Tab CC-15). The unit is equipped with 20 of the Air Force’s B-2 Spirit stealth bombers and employs a fleet of T-38 Talon trainer aircraft (Tab CC-15).



**h. 13th Bomb Squadron (13 BS)**

The 13 BS is located at WAFB, MO, and a part of the 509 OG (Tab CC-15). The 13 BS provides combat training for the B-2 Spirit aircraft, preparing aircrews and squadron personnel to support nuclear and conventional taskings from the Joint Chiefs of Staff (Tab CC-15). The unit trains for high- and low-altitude, day or night missions to ensure maximum combat readiness, while building a combat force capable of projecting B-2 global firepower at a moment’s notice anytime, anywhere (Tab CC-15).



**i. M1 Support Services, L.P. (M1)**

M1 is a Limited Partnership headquartered in Denton, TX, and provides aviation support services capability by providing customers with “Mission First” exceptional performance (Tabs CC-17 and CC-20). M1’s core business is aircraft maintenance and medication, flight support, and supply chain management for military, commercial derivative, and civil fixed- and rotary-wing aircraft (Tab CC-18). M1 Support Services Home Office holds a Certificate of Registration to AS9110C and ISO 9001:2015 used for the Maintenance, Repair, Overhaul and Program Management for Government, Military and Aerospace Equipment (Tab CC-17). This certified Quality Management System is the basis for individual program operations (Tab CC-17). Additionally, M1 operates two Federal Aviation Administration Part 145 Repair Stations to support commercial derivative aircraft operated by the military (Tab CC-18).



## j. T-38 Talon

The T-38 Talon is a twin-engine, high-altitude, supersonic jet trainer used in a variety of roles because of its design, economy of operations, ease of maintenance, high performance, and exceptional safety record (Tab CC-23). AETC is the primary user of the T-38 for joint specialized undergraduate pilot training (Tab CC-23). ACC, Air Force Materiel Command, and the National Aeronautics and Space Administration also use the T-38A in various roles (Tab CC-23).



The T-38 has swept wings, a streamlined fuselage, and tricycle landing gear with a steerable nose wheel (Tab CC-23). Two independent hydraulic systems power the ailerons, rudder, and other flight control surfaces (Tab CC-23). Critical aircraft components are waist high and can be easily reached by maintenance crews (Tab CC-23). The instructor and student pilots sit in tandem on rocket-powered ejection seats in a pressurized, air-conditioned cockpit (Tab CC-24).



## k. T-38A Talon Landing Gear Overview

The T-38A Talon is equipped with hydraulically operated, tricycle-type landing gear, which may be controlled from either of the aircraft's two cockpits (Tabs BB-244 to BB-245). The three landing gear assemblies on this aircraft include: the right main landing gear (MLG) assembly, left MLG assembly, and the nose landing gear (NLG) assembly (Tabs BB-244 to BB-245).



Figure 1, MA's NLG Day After Mishap (Tab Z-58)

The hydraulic pressure for the landing gear and nosewheel steering system is furnished by the utility hydraulic system (Tabs BB-244 to BB-245). The MLG, MLG uplocks, MLG inboard doors, and MLG inboard door locks are all operated by the hydraulic actuators, which are sequenced electrically through control panels in the aircraft's cockpits (Tabs BB-244 to BB-245). Similarly, the NLG and NLG forward door are actuated hydraulically and sequenced electrically (Tabs BB-244 to BB-245).

When necessary, the aircraft's landing gear can be mechanically released using the alternate release handle in the aircraft's front cockpit (Tabs BB-244 to BB-245). When this handle is pulled, the left vertical panel disconnects electrical power from the NLG and NLG door selector valves (Tabs BB-244 to BB-245). This triggers the mechanical release of the MLG uplocks, NLG door, and NLG (Tabs BB-244 to BB-245).

The NLG's hydraulic actuator connects to the nose landing gear strut assembly that supports the aircraft's nosewheel actuator, and thus, enables the wheel to be steered by the operator (Tabs BB-244 to BB-245). The nosewheel actuator also functions as a shimmy damper to stabilize the wheel when it is on the ground (Tabs BB-244 to BB-245). The NLG possesses a fitting to enable the attachment of a tow bar, and a steering disconnect pin allows the nose strut to swivel to either side of center during towing (Tabs BB-244 to BB-245).

The nosewheel can turn up to 52 degrees to either side of center when nosewheel steering is engaged or during the towing process (Tab BB-245). Nosewheel steering is usually engaged prior to takeoff and during taxiing while the wheels are on the ground, at which point the hydraulic actuator turns the nosewheel (Tabs BB-244 to BB-245). Nosewheel steering is disengaged when the aircraft is either airborne or being towed (Tab BB-245). The NLG includes a fitting that enables the attachment of a tow bar and a steering disconnect pin that allows the nose strut to swivel to either side of center (Tabs BB-244 to BB-245).

### **I. T-38A Talon Landing Gear General Operation**

The T-38A Talon landing gear system includes two control panels, one in each cockpit, that are connected to a mechanical linkage for each of the three landing gear assemblies (Tabs BB-244 to BB-245). The NLG assembly is powered by a hydraulic cylinder, enabling the assembly to retract by hinging forward (Tabs BB-243 to BB-248).

The NLG is contained behind a nose gear forward door that operates a door-open sequence switch, thereby controlling the action of the landing gear (Tabs BB-244 to BB-245). The nose gear forward door is operated hydraulically; the aft door is linked mechanically to and moves in tandem with the strut (Tabs BB-244 to BB-245). This allows the gear to move only after the main gear inboard doors and the nose gear forward door have reached the fully open position (Tabs BB-244 to BB-245). The nose gear door may be opened and closed while the aircraft is on the ground by actuating the landing gear switch on the front cockpit (Tabs BB-244 to BB-245).



Figure 2. MA's NLG  
Day After Mishap (Tab Z-56)

The NLG assembly, which is powered by a hydraulic cylinder, retracts by hinging forward (Tabs BB-244 to BB-245). A travel limiter system limits rudder angular movement when the landing gear is retracted (Tabs BB-244 to BB-245). Extending the nose gear disengages the limiter arm from its stops on the rear cockpit rudder quadrant, allowing full rudder travel during approach (Tabs BB-244 to BB-245). A left and right spring bungee is installed on the nose gear assembly to force the nose gear overcenter from the locked position (Tabs BB-244 to BB-245).

## 4. SEQUENCE OF EVENTS

### a. Narrative

On the morning of 27 February 2023, M1 Transient Alert (TA) personnel were tasked with retrieving the MA, a T-38A Talon, T/N 67-14831, from the corrosion facility on HAFB (Tabs V-2.6, V-3.3, and V-6.2 to V-6.4). The MA had previously been washed and repainted and was ready for post-corrosion maintenance (Tabs V-2.6 and V-3.3). Between approximately 0715L and 0800L, M1 TA personnel retrieved the MA from the corrosion facility and towed the MA down the flightline and parked the MA on the ramp outside of hangar 578, the M1 maintenance hangar (Tab V-1.10 and V-6.4). After parking the MA, TA personnel serviced the liquid oxygen (LOX) system and reconnected the MA's battery (Tabs V-6.4 to V-6.5).

At approximately 1200L, the original tow team brought the MA into Dock 5 of hangar 578 from the outside ramp with the help of additional M1 members IAW prescribed towing procedures (Tabs V-3.3, V4.6 and V-6.3). Once parked, M1 TA personnel conducted Safe for Maintenance protocols, which included chalking the tires, grounding the MA, installing wing tip and elevator guards, and verifying all three landing gear pins were properly installed (Tabs V-3.3 and V-6.5).

At approximately 1400L, about 10 M1 employees arrived at hangar 578 for their afternoon "swing" shift (Tab V-9.9). Upon their arrival, the swing shift Production Manager (PM) provided a pre-shift briefing to all personnel members, including the MM, which consisted of assigning maintenance tasks to be accomplished that day (Tabs V-1.4 and V-2.13). These tasks were formally documented on the Daily Maintenance Schedule (Tabs O-3 to O-7 and V-9.36). Per the schedule, the MM was assigned a number of tasks for the MA including a post-wash lube and landing gear retraction check (Tab O-3).

Following the pre-shift briefing, the swing shift PM directed the MM to update a preflight inspection (PR) on another aircraft, T-38A T/N 68-8185, prior to beginning his other assigned tasks (Tabs R-39 to R-40, R-64, V-1.6, V-4.20, and V-5.6). Around 1415L, the MM went to the Quality Control office within hangar 578 where he was observed reviewing and filling out forms for T/N 68-8185 before leaving two to three minutes later (Tabs R-39 to R-40 and V-4.15).

After filling out the paperwork, the MM obtained his toolbox from the rear of the hangar and brought it to Dock 5, where the MA was parked (Tabs V-8.15 to V-8.17). He placed the toolbox on the left side of the MA besides a table with the MA's maintenance records (Tabs V-9.12 to V-9.13 and V-9.16). The MM also went to the M1 Supply office to retrieve a maintenance cart and lube kit, which he wheeled down to Dock 5 next to his toolbox (Tabs V-8.5 to V-8.7 and V-9.10 to V-9.11). Sometime between the pre-shift briefing and 1445L, the MM left the hangar to make a couple phone calls (Tabs V-9.12 to 9.13 and V-9.27 to V-9.58).

Around 1445L-1450L, the MM returned to Dock 5 and began the lube task on the MA's NLG (Tabs V-8.7 to V-8.8, V-9.7, and V-9.26). As part of this process, the MM used the lube gun to apply lubricant through the appropriate pressure point fittings (Tabs V-9.7 and V-9.31). For harder to reach points, the MM applied lubricant directly with his fingers, after dispensing grease from the lube gun onto his hand (Tabs V-8.7 to V-8.8, and V-9.7). Within minutes of beginning this task, the NLG retracted and the front of the MA collapsed, pinning the MM under the nose of the

MA (Tabs V-8.9 and V-9.16). A mishap witness (MW) who observed the collapse immediately came over and attempted to lift the MA off the MM using the pitot tube, which became bent in the process (Tabs V-2.14 and V-8.20). However, the MA was too heavy for the MW to lift alone, so the MW ran to the day shift PM's office to obtain help (Tabs V-2.4 and V-8.11).

Upon learning of the accident, the day shift PM contacted emergency services and called out to other employees for help, and the MW called 911 (Tabs R-47, V-2.4, and V-8.11). Within minutes, the day shift PM assembled a team of about seven other M1 employees who were able to lift the MA long enough for the MW to pull the MM out from under the nose (Tabs V-1.10, V-2.4, and V-8.11). The employees helped lay the MM out on the hangar floor while paramedics and other emergency responders arrived (Tabs V-1.11 and V-8.12).



Figure 3, MA Day After Mishap (Tab Z-24)



Figure 4, MA Day After Mishap (Tab Z-22)

### **b. Search and Rescue (SAR)**

From 1504L to 1506L, first responders from the 49 MDG's Ambulance Response Element (ARE) and Holloman Fire Emergency Services arrived on scene (Tabs DD-39 to DD-40). Medics ensured the MM's respiratory airways were open, administered an IV, braced the MM's neck and spine, moved the MM onto a stretcher, loaded the MM into an ambulance for transport, and initiated transport to a local hospital in Alamogordo, NM (Tabs DD-39 to DD-40). On the way to the hospital, a Life Flight helicopter met the ARE team and transferred the MM to the helicopter to medevac him to a trauma 1 treatment facility at University Medical Center in El Paso, TX, where he was treated for his injuries (Tabs DD-39 to DD-40).

### **c. Recovery of Remains**

Not Applicable.

## 5. MAINTENANCE

### a. Forms Documentation

The AIB Maintenance Member conducted a review of the MA's documentation, including its Jacket File and Air Force Technical Order (AFTO) Form 781s, and records of maintenance activities occurring at or prior to the date of the mishap (Tabs D-3 to D-19). Air Force Technical Order 781 series forms collectively document all maintenance actions, inspections, servicing, status, and flight activities for an aircraft (Tabs D-3 to D-19). Automated Maintenance Information Systems are used to document maintenance actions and track fleet health (Tab BB-213). Maintenance Information Systems includes the Integrated Maintenance Data System (IMDS), which automates aircraft history, aircraft scheduling, aircraft current airframe times, and aircrew debriefing processes (Tabs D-3 to D-19 and BB-213). This system provides a common interface for entering base-level maintenance data into other standard logistics systems (Tabs D-3 to D-19 and BB-213).

Maintenance personnel are required to comply with all written guidance to ensure necessary repairs, inspections, and documentation are completed in a compliant, safe, timely, and effective manner (Tabs BB-213 to BB-217). IAW this guidance, maintenance personnel use the TCMaX® database for tool and equipment accountability (Tabs O-9 and BB-216). Scheduled maintenance within the scope of Plans, Scheduling, and Documentation include: phase inspections (PH), aircraft washes, aircraft complete paint, engine washes, ground bonds, and Time Compliance Technical Orders (TCTO) that are either due or needing to be scheduled (Tabs D-3 to D-19 and BB-217).

M1 personnel at HAFB use a local towing checklist, which begins with a designated tow supervisor ensuring the aircraft is safe for towing (Tabs V-3.3 to V-3.6 and V-6.5 to V-6.6). An aircraft is deemed safe for towing when all requisite safety pins, hardware, and covers are installed (Tabs V-3.3 to V-3.6, V-6.4 to V-6.5, BB-237, and BB-241). The next step requires that the AFTO 781A forms be reviewed to verify the aircraft's maintenance status (Tabs BB-235 to BB-241). This is followed by a visual inspection to ensure all landing gear pins are properly installed (Tab BB-241). The towing guidance also includes a "Warning" section requiring compliance with specified safety precautions (Tabs V-6.4 to V-6.5 and BB-241).

Prior to performing *any* maintenance tasks, personnel are required to consult and comply with the "Aircraft Safe for Maintenance" protocols including: (a) positioning a fire extinguisher as required; (b) checking the 781 series forms to verify the aircraft's maintenance status; (c) ensuring wheel chocks are properly positioned and laced fore and aft of the left and right landing gear wheels; and (d) ensure the NLG ground safety pin is installed (Tab BB-257). This guidance also notes that only the MLG shall be chocked as failure to use correct wheel chocks or position may result in injury, and landing gear safety pins that cannot be installed are indicators of unsafe gear conditions that may result in injury (Tabs BB-255 to BB-257).

### b. Inspections

The PR and a combined Basic Postflight/Preflight Inspection (BPO/PR) include visually examining the aerospace vehicle and operationally checking certain systems and components "to ensure no serious defects or malfunctions prior to flight" exist (Tabs BB-231 and BB-233). The

T-38 aircraft PH is a thorough inspection of the entire aerospace vehicle, performed in a phase cycle of 450 hours; a 1st minor PH is due after 450 hours cycle, a 1st major PH is due every 900 hours, and a 2nd major PH is due every 1800 hours (Tabs BB-265 to BB-266). These are accomplished by aircraft maintainers and non-destructive inspectors (Tabs BB-265 to BB-266).

On 7 November 2022, the MA was scheduled for a complete paint job (Tabs D-12, V-2.5, BB-269 to BB-270). Based on a review of the MA's records, the 1st major PH began on 16 November 2022 and was completed on 5 January 2023, with no noted discrepancies (Tabs D-3 to D-19 and BB-265 to BB-266). The full paint was complied with on 24 February 2023 with no discrepancies noted (Tabs D-14 and BB-269 to BB-270). A Functional Check Flight (FCF) profile was required due to the occurrence of the 1st major PH (Tabs D-12 and BB-265 to BB-266). The BPO/PR and FCF were accomplished on 3 February 2023 and then again on 8 February 2023, after which no discrepancies were noted (Tabs D-3 and D-10).

### **c. Maintenance Procedures**

Based on the MA's active and historical AFTO 781 series forms and IMDS records, all documented maintenance actions complied with approved maintenance procedures and TOs (Tabs D-3 to D-19). On the day of the mishap between approximately 0715L and 0800L, the MA was towed from the HAFB corrosion facility to the aircraft parking apron outside of maintenance hangar 578 (Tabs V-3.3 to V-3.7 and V-6.3 to V-6.5). The MA was later towed from the aircraft parking apron into Dock 5 around 1200L (Tabs V-3.3 to V-3.4 and V-6.3 to V-6.5).

The daily maintenance schedule for the afternoon swing shift on 27 February 2023 indicates the MA was scheduled for multiple tasks in preparation for its return to the 509 BW at WAFB (Tab O-3). Consistent with post-paint maintenance procedures, the first assigned task was aircraft lube maintenance, to be followed by putting the aircraft on jacks and performing a full landing gear retraction operational check (Tab O-3). After the gear retraction operational check, the aircraft was to be taken off jacks and towed to the flightline (Tab O-3).

According to the daily maintenance schedule, two individuals were assigned to complete the lube task (Tab O-3). One of the assigned individuals was the MM, who was authorized to work on the MA's nose (Tab O-3). Witness testimony suggested the MM began to perform the lube task on the NLG at approximately 1450L (Tabs V-8.6 to V-8.7). According to witness testimony, the MM was located in front of the NLG facing towards the back of the aircraft and was pulling on the NLG when it retracted (Tabs V-8.9 and V-9.16). This led to the nose collapsing, thereby pinning the MM underneath the MA (Tabs V-8.9 and V-9.23).

### **d. Maintenance Personnel and Supervision**

M1 personnel at HAFB were responsible for the 1st major PH and subsequent maintenance on the MA (Tabs D-3 to D-19, V-2.5 to V-2.6, and V-6.3 to V-6.4). On the date of the incident, M1 personnel were tasked with completing all tasks on the MA (Tabs D-3 to D-19 and O-3). The mishap occurred at the beginning of the afternoon swing shift, which is scheduled from approximately 1400L to 2230L, during performance of the lube task assigned to the MM (Tabs V-1.2, V-8.7 to V-8.8, V-9.7, and V-9.26). The day and swing PMs were on site and responded to the mishap by facilitating and participating in rescue efforts (Tabs

V-1.4 and V-2.13 to V-2.14). There is no evidence to suggest any personnel had training or qualification deficiencies regarding the assigned tasks performed on the MA at the time of the mishap.

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

No samples of fuel, hydraulic fluid, or engine oil from the MA were collected or analyzed following the mishap as no evidence indicates the engines were running when the nose collapsed. Additionally, based on the MA's location and maintenance status, no evidence indicates hydraulic pressure had been applied with Aerospace Ground Equipment during the mishap.

#### **f. Unscheduled Maintenance**

Unscheduled maintenance is any maintenance accomplished between scheduled maintenance and inspections, excluding TCTOs. A review of the MA's active and historical maintenance records revealed three significant unscheduled maintenance events within the 30 days preceding the mishap: (1) removal/installation of the right communication navigation panel; (2) aircraft battery connection; and (3) aircraft lubrication (Tabs D-3 to D-19, BB-253 to BB-254, and BB-221 to BB-228).

A FCF profile was performed on 3 February 2023 on the MA at HAFB (Tabs D-5 and BB-263 to BB-266). The FCF profile resulted in a non-release with five discrepancies (Tabs D-5 and BB-263 to BB-266). The first discrepancy for the MA was for cabin pressurization exceeding the accepted limits and was resolved by repairing the rear cockpit canopy seal (Tab D-5). The second discrepancy was a nose wheel shimmy, which required the removal and replacement of the nose wheel and tire assembly (Tab D-5).

The third discrepancy noted involved inaccuracies with the right fuel quantity gauge (Tab D-6). This issue was resolved by repairing a broken wire corresponding to this gauge (Tab D-6). The fourth discrepancy resulted from an anti-G-suit hose connector that failed to remain attached, and the hose was subsequently replaced (Tab D-6). The fifth discrepancy involved the speed brake switch button being unable to determine center to up position (Tab D-6). The forward cockpit speed brake switch was removed and replaced to address this issue (Tab D-6).

A follow-up FCF was flown on 8 February 2023, resulting in release with one discrepancy due to the right fuel gauge not testing properly and freezing (Tabs D-13 and BB-263 to BB-266). This issue was addressed by removing and replacing the gauge, and follow-up testing indicated this discrepancy was resolved (Tab D-13).

Prior to its scheduled full paint, the MA battery was disconnected and the three landing gear ground safety pins were removed to install pins without streamers (Tab D-14). Consistent with paint procedures, the MA was masked and engine vane plugs were installed (Tabs D-15 and BB-269 to BB-270). Following the full paint, the battery was reconnected, the safety pins were replaced with pins attached to streamers, the plugs were removed, and the MA was de-masked (Tabs D-3 to D-19). The MA then required a weight and balance recalculation, which revealed no discrepancies and confirmed the MA was within accepted limits (Tabs D-3 to D-19). The MA also required LOX servicing, which was accomplished on 27 February 2023 (Tab D-17).



All unscheduled maintenance on the MA was completed, checked, and documented in the AFTO 781A forms (Tabs D-3 to D-19). The MA was towed to hangar 578 for a post-wash/post-complete inspection, and the full aircraft lube and remaining maintenance tasks were scheduled on 27 February 2023 (Tabs D-3 to D-19). There is no evidence, including witness testimony, indicating any unscheduled maintenance performed on the MA contributed to the mishap.

## **6. AIRFRAME SYSTEMS**

### **a. Structures and Systems**

The MA was damaged due to the NLG collapse (Tabs P-3 and S-13, S-17, S-23). The NLG retracted during the lubrication process while the MM was underneath the aircraft (Tabs V-8.8 to V-8.9 and V-9.16 to V-9.17). Evidence suggests the MM was underneath the forward portion of the aircraft and was facing the NLG when the gear retracted (Tabs V-8.10 and V-9.16). The MA damage consisted of damage to the pitot boom, forward NLG door, lower mode 5 antenna, and right-hand forward fuselage (Tabs P-3 and S-13, S-17, S-23). Witness testimony suggests the pitot boom was bent when personnel tried to stop the nose from collapsing and then tried to lift the MA off of the MM (Tabs V-2.15 and V-8.20). Evidence indicated the remaining damage was sustained as a direct result of the collapse and/or rescue efforts by other maintenance personnel (Tab V-2.15).

### **b. Evaluation and Analysis**

When the MM performed the lube maintenance task on the NLG, the NLG retracted and caused the nose to collapse altogether (Tabs V-8.9 and V-9.16). The upper drag brace assembly, lower drag brace assembly, left side bungee spring, right side bungee spring, left retraction linkage, right retraction linkage, left shoulder bolt, right shoulder bolt, and NLG actuator were submitted to the Accelerated Material and Processing Solutions Branch at the Air Force Research Laboratory (AFRL) for analysis (Tabs I-3 to I-5 and I-7 to I-8).

The AFRL report states there were no fractured or significantly deformed components observed during testing (Tab D-35). Wear limitations were observed, but results were inconclusive as to the significance of these conditions as a contributing factor to the mishap itself (Tab D-35). Further, the AIB members did not observe any damage upon examination of the NLG safety pin. This suggests the NLG safety pin was not installed at the time of the incident.

## **7. WEATHER**

### **a. Forecast Weather**

The 27 February 2023 forecast for HAFB predicted clear skies, moderate temperatures, and good visibility (Tab W-3). There were no other significant weather conditions forecasted at the time of the mishap (Tab W-3).

## **b. Observed Weather**

Weather conditions at the time of the mishap were consistent with the forecast (Tab W-3). The observed weather was 59 degrees Fahrenheit, sunny, with approximately 7-8 mile per hour winds and good visibility (Tabs W-3 and W-9). There was no precipitation (Tab W-7).

## **c. Post-Accident Weather**

Not Applicable.

## **d. Environmental Conditions**

The mishap occurred indoors, and witness testimony suggests the door to hangar 578 was completely or nearly closed until after the MM was pulled from under the MA and emergency responders began arriving on scene (Tabs V-2.44 and V-9.8). There is no further evidence to suggest that environmental conditions contributed to the mishap (Tabs W-3 to W-9).

# **8. CREW QUALIFICATIONS**

## **a. Mishap Maintainer Training**

Based on the evidence, M1 documents personnel training records in a system called “Stinger” (Tabs G-3 to G-151, V-2.12, V-3.11, V-4.3, and V-5.4). Training is based on an individual’s role within the organization (Tabs V-4.3 and V-5.4). Training consists of hands-on instruction for each task included in the list of training items documented in Stinger (Tab V-9.5). A trainer is assigned to a trainee for each task, and Stinger is documented when initial training on a given task begins (Tab V-5.4). Once an individual demonstrates competency on a task under the supervision of a trainer, the individual is “signed off” and authorized to complete the task independently (Tab V-2.11). Stinger is updated as trainers sign off employees on a given task, and the overall progress on the list of job-specific training items is maintained in this system (Tab V-2.11).

A review of the MM’s training records indicated that he was trained and authorized to complete the lube task at the time of the mishap (Tabs G-3 to G-13). Witness testimony also confirms that the MM was trained on lube tasks and had performed this task previously (Tab V-2.12). Testimonial evidence also indicates that the MM had acquired 5-level training and was nearing completion of his 7-level training on military helicopters from his role as an aircraft maintainer in the Alaska (AK) Air National Guard (ANG) (Tabs V-3.10 to V-3.11, V-9.4 to V-9.5, and Tab V-9.22).

## **b. Mishap Maintainer Experience**

Witness testimony indicates that M1 personnel who work on T-38A Talons at HAFB are required to have maintenance experience with fighter aircraft (Tabs V-3.10 and V-9.4). Evidence suggests the MM had approximately five to six years of helicopter maintenance experience from his service with the ANG (Tabs V-9.4 to V-9.5). Additionally, the MM worked as a civilian contractor on F-1 Mirages for over a year when he was offered a position with M1 (Tab V-9.4). According to witness testimony, other personnel concluded the MM possessed the requisite qualifications and

experience for his current position (Tabs V-1.14 and V-2.11 to V-2.12). Further, evidence indicates the MM was not hired until he obtained fighter jet maintenance experience (Tab V-9.4)

## **9. MEDICAL**

### **a. Qualifications**

The MM's medical records revealed no disqualifying medical conditions or limitations and indicated he was fully medically ready to perform aircraft maintenance duties.

### **b. Health**

The MM's pre- and post-accident medical examination records were reviewed (Tab DD-11). There were no indications of illness or other abnormal medical symptoms at the time of the mishap.

### **c. Pathology**

The ARE of the 49 MDG was notified and activated as first responders (Tab R-19). After stabilizing the MM at the mishap site, ARE began transport of the MM to a local hospital in Alamogordo, NM (Tabs R-19 to R-23 and DD-39 to DD-40).

During transport, a Life Flight helicopter became available and met ARE near 1954 US-54, Alamogordo, NM, at which point the air crew intubated and transported the MM to UMCEP via helicopter (Tabs R-19 to R-21 and DD-39 to DD-40). The MM was unresponsive during transport (Tabs R-19 to R-21).

The MM was admitted to the UMCEP Emergency Department for traumatic injuries sustained from the MA collapse (Tabs R-18 to R-21). The MM was subsequently diagnosed with a number of injuries including rib and spinal fractures (Tab V-9.21).

### **d. Toxicology**

Toxicology testing was conducted for relevant M1 personnel following the mishap with negative findings (Tabs DD-3 to DD-10). There is no evidence to suggest that toxicology was a factor in this mishap (Tabs DD-3 to DD-10).

### **e. Crew Rest and Crew Duty Time**

A review of the 72-hour reports and 7-day histories for relevant M1 personnel provided no evidence to suggest crew rest or duty time were factors in this mishap (Tabs DD-11 to DD-37).

## **10. OPERATIONS AND SUPERVISION**

### **a. Operations**

At the time of the incident, the M1 organization at HAFB distributed manning across five duty days with two shifts scheduled each day (Tabs O-3 to O-7 and V-1.2). The first shift was "Day

Shift” beginning at approximately 0600L and until 1430L, and the second shift known as “Swing Shift” began at 1400L and lasted until 2230L (Tabs V-1.2, V-4.3, and V-9.2).

Maintenance activities were assessed daily, with initial taskings scheduled and assigned by the day shift PM (Tab V-2.12). All outstanding tasks that could not be completed by Day Shift personnel were then turned over in a meeting between the day and swing shift PMs (Tab V-2.12). The swing shift PM would then delegate the remaining tasks to swing shift personnel for completion (Tab V-1.4).

Each shift began with a pre-briefing, referred to as a “roll call” meeting, which is attended by all personnel present for a given shift (Tabs V-1.4 and V-2.12). The meeting covered assigned tasks, company news and updates, safety notices, and other topics as needed (Tabs V-1.4 and V-2.12). Following the meetings, personnel proceeded to complete their assigned tasks IAW their respective shift’s daily maintenance schedule (Tabs O-3 and V-9.35).

A review of the maintenance schedules from the day of and weeks prior to the mishap do not indicate any changes in the organization’s ops tempo, which is further corroborated by witness statements and testimony (Tabs O-3 to O-7). Records for the MA, however, suggest delays in the timeline for completion of the scheduled maintenance (Tabs D-3 to D-19).

Based on these records, the MA was received by M1 personnel at HAFB in November 2022 and the final maintenance tasks were being accomplished the week of 27 February 2023 (Tabs O-3 and D-3 to D-19). Based on trend data aircraft production from one month and one year prior, the organization was 14 days behind past production timelines on 27 February 2023 (Tabs O-3 to O-7). Nevertheless, there is no evidence to suggest the operational tempo of the organization contributed to the mishap (Tabs D-3 to D-19 and O-3 to O-7).

## **b. Supervision**

The M1 organization at HAFB is led by a site lead and assistant director (Tabs V-7.3 to V-7.4). Each shift has a PM and team leads (Tabs V-2.3 and V-3.2). The PM oversees all aircraft and personnel within the hangar floor (Tabs V-1.2 and V-2.3). Witness testimony suggests that supervision was stronger on day shift than swing shift due to a worsening rate of aircraft production that contributed to changes in FCF schedules and aircraft availability (Tabs V-7.3 to V-7.4).

At the time of the incident, both day and swing shift PMs, as well as the swing shift team lead, were on site (Tabs V-1.9 and V-2.3). The daily pre-briefing was conducted by the swing shift PM based on prior turnover, and personnel was notified of their assignments for that shift (Tab V-1.5).

The lube task scheduled on the mishap date was assigned to the MM and one other M1 maintainer (Tab O-3). The MM was not under direct supervision and the other assigned maintainer was not nearby at the time of the mishap (Tabs O-3 and V-9.36). However, the task of lubricating the NLG only requires one person and the MM was authorized to perform this task autonomously (Tabs G-3 to G-13 and V-1.16). Accordingly, there is no evidence to suggest that supervision contributed to this mishap.

## 11. HUMAN FACTORS ANALYSIS

### a. Introduction

The Department of Defense (DoD) Human Factors Analysis and Classification System (HFACS) 8.0 lists potential human factors that can play a role in aircraft mishaps and identifies potential areas of assessment during an accident investigation (Tabs EE-5 to EE-7). 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. The DoD HFACS 8.0 model was used to identify human factors relevant to this mishap and are described below (Tabs EE-5 to EE-34).

### b. Applicable Factors

(1) AD001 Performed Known Deviation (Work-Around): is when the mishap individual disregarded published policy/guidance/procedure in order to pursue what he/she believed to be the best course of action based on available information to make a real-time risk decision, which resulted in the near-miss or mishap. (Examples include: chose to drive/operate outside published limits, by-pass safety procedures, not use available PPE, etc.) (Tab EE-10).

(2) AD003 Extreme Lack of Discipline (Indiscipline): is when an individual was trained to standard, knows the standard, but elected not to follow the standard without cause or need, which resulted in a near-miss or mishap (Tab EE-10).

(3) PC206 Overconfidence: is when the individual unreasonably overvalued or overestimated his or her own capability, the capability of others or the capability of aircraft/vehicle/vessel or equipment, which resulted in hazardous conditions or unsafe act. For this to be selected, there must be strong evidence the individual acted in a manner inconsistent with the "reasonable person concept" (this individual's overestimation is above and beyond what a reasonable person in a similar situation would have been expected to do). NOTE: This code rarely is selected as a stand-alone and should be paired with either another precondition, supervisory or organizational code(s) (Tab EE-13).

(4) PC209 Pressing, Haste, Motivation: is when the individual's motivation to complete a task/mission was misplaced, and/or the individual knowingly pressed him or herself and/or equipment beyond reasonable capabilities, which resulted in a hazardous condition or unsafe act. This also includes excessive or weak motivation when either the weak or excessive motivation to succeed disregarded mission needs or superseded the goals of the unit (e.g. rushed to complete a task, mission or reach a destination; or demonstrated a weak/excessive motivation that increased risk to self and/or team.). This precondition may be the result of internal or external pressures or influences on the individual. (PC207 was combined with this code). NOTE: This code rarely is selected as a stand-alone and should be paired with either another precondition, supervisory or organizational code(s) (Tab EE-13).

(5) SD001 Failure to Enforce Published Rules/Guidance: 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. (Examples include: a failure to enforce a policy, standard operating procedures or technical guidance in regards to vehicle/watercraft operation, weapons or explosives handling, use of machines or hand tools, etc.; failure to enforce use of PPE such as restraints, eye, face or head protection, hearing protection devices, etc.) (Tab EE-23).

(6) SI007 Failed to Identify or Correct Hazardous Practices, Conditions or Guidance: 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 (Tab EE-24).

## **12. GOVERNING DIRECTIVES AND PUBLICATIONS**

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

1. DAFI 91-204, *Safety Investigations and Reports*, dated 10 March 2021
2. AFI 51-307, *Aerospace and Ground Accident Investigations*, dated 18 March 2019
3. AFI 21-101\_ACCSUP, *Aircraft and Equipment Maintenance Management*, dated 23 June 2020, paragraphs 1.1, 1.6, 8.5.1, and Chapter 14
4. DAFMAN 91-203, *Air Force Occupational Safety, Fire, and Health Standards*, dated 25 March 2022, paragraph 24.8

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

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

1. T.O. 1T-38A-6WC-1, Basic Postflight Inspections, Section 3 Work Cards 3-001 through 3-028.
2. T.O. 1T-38A-6WC-1, Lube, Section 1, Part 4 Work Cards 4-001 Thru 4-005.
3. T.O. 1T-38A-2-2CL--2, Chapter 2, Towing Procedures.
4. Local Page Supplement (LPS) for T-38A/B Towing Procedures Local Work Cards for M1 Support LPS-001.
5. T.O. 1T-38A-2-8, Testing Landing Gear Normal Operation.
6. T.O. 4SA6-17-4, Illustrated Parts Breakdown, NLG Drag Brace.

7. T.O. 4SA6-17-3, Depot Overhaul Instructions, NLG Drag Brace.
8. T.O. 1T-38 A-2-1, Landing Gear Safety Pin Operation, paragraph 1.14, “Right Communication Panel.”
9. T.O. 1T-38A-2-7, Battery Install/Removal, paragraph 4.10.
10. T.O. 1T-38C-2-1-CL-1, Chapter 2 Safe For Maintenance, Chapter 2.
11. T.O. 1T-38A-2-2CL-3, Chapter 1, Jacking Procedures, Chapter 4.
12. T.O. 1T-38A-6 CL-1, FCF.
13. T.O. 1T-38A-6WC-3, Phase Work Cards, Part 2.
14. LPS for T-38A/B Towing Procedures Local Work Cards For M1 Support LPS-004.
15. T.O. 1T-38A-2-6-2, Fuel Cut Off Switches.

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

Based on the evidence, there are suspected deviations from the aforementioned directives and publications. IAW TO 1T-38A-2-1, paragraph 1.14, the NLG safety pin must remain installed when the aircraft is on the ground (not on jacks) (Tab BB-252). When the aircraft is not on jacks the NLG safety pin should only be removed prior to flight (Tab BB-252). Accordingly, the primary suspected deviation is that the MM deviated from this guidance by removing the NLG safety pin prior to or during the lube task while the plane was not on jacks (Tab BB-252).

According to witness testimony, witnesses observed the NLG safety pin installed hours prior to the mishap (Tabs V-4.6 and V-4.17). Following the accident, however, witnesses noticed this pin had been removed (Tabs V-2.15 and V-5.13). It is unclear why this pin would have been removed, particularly because the aircraft was not on a nose axle jack and did not have tripod jacks on the wing or fuselage points during lube maintenance (Tabs V-3.12, V-3.8, V-4.10, and V-9.31). Although TO 1T-38A-6WC-1 does not require that the aircraft be on jacks during the lube task, this safety precaution should be taken if a maintainer removes the NLG safety pin (Tabs BB-221 to BB-228, BB-249 to BB-252, BB-257, and BB-262). Moreover, this guidance does not include language requiring that the NLG safety pin be removed as part of the lube task process (Tabs V-9.48 and BB-221 to BB-228).

There is also evidence suggesting the MM did not refer to TO 1T-38C-2-1CL-1, Chapter 2, “Aircraft Safe for Maintenance,” or comply with the safety protocols in this guidance prior to performing his assigned maintenance tasks (Tabs V-2.9 and V-8.15). There is no evidence to indicate the MM had the requisite guidance for the lube task open at the time he began performing this tasker. Evidence further indicates that the MM was lubing the MA by applying grease to his hand with a lube gun and then using his hand to apply the lubricant to various lube points on the

NLG, as opposed to applying the substance directly to the points with the equipment specified within the governing TO (Tabs V-8.8, V-9.31 to V-9.33, and V-9.37 to V-9.39).

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22 February 2024

PARKER V. DODDS, Maj, USAF  
President, Accident Investigation Board



**STATEMENT OF OPINION**  
**T-38A, T/N 67-14831**  
**HOLLOMAN AIR FORCE BASE, NEW MEXICO**  
**27 FEBRUARY 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 27 February 2023, at approximately 1500 local (L) time, the nose of a T-38A Talon, tail number (T/N) 67-14831, collapsed upon a civilian maintenance member (referred to as mishap maintainer or MM) who was performing a maintenance task inside hangar 578 at Holloman Air Force Base (AFB), New Mexico. The mishap aircraft (MA) belonged to the 509th Bomb Wing (509 BW) at Whiteman AFB, Missouri and was temporarily stationed at Holloman AFB for a standard 900-hour major phase inspection. In preparation for the MA's return to the 509 BW, the MM was assigned to complete a lube task on the MA. While lubricating the nose landing gear (NLG), the front end of the MA collapsed and subsequently pinned the MM under the nose for several minutes.

Another nearby civilian contractor, the MW, who witnessed the collapse attempted to lift the nose off of the MM using the MA's pitot tube, ultimately damaging the tube and its housing. Unable to lift the aircraft himself, the MW ran to the hangar offices to notify a Production Manager (PM). Upon learning of the mishap, the PM and MW contacted emergency services and sought help from other nearby civilian maintenance members to continue rescue efforts.

Approximately seven civilian personnel were able to lift the MA long enough for the MM to be removed from underneath the MA. At approximately 1504L, first responders began arriving on scene and performed life-preserving measures on the MM before initiating ground transport. While in transit, first responders met a Life Flight helicopter crew at a parking lot off the installation, who transported the MM to University Medical Center of El Paso in El Paso, Texas. The MM was hospitalized and treated for multiple bone fractures and trauma injuries before being released. The total value of damages sustained by the MA were initially estimated to be \$116,715.

I find, by a preponderance of the evidence, the cause of this mishap resulted from the removal of the MA's NLG safety pin combined with the forces exerted on the NLG assembly by the MM after the NLG safety pin was removed. Additionally, I find, by a preponderance of the evidence, the MM's actions leading up to the incident included repeated deviations from standard operating procedures (SOPs), and is, therefore, a significantly contributing factor in this mishap.

## **2. CAUSE**

I find, by a preponderance of the evidence, the cause of this mishap resulted from a combination of two events: (a) the removal of the MA's NLG safety pin; and (b) the exertion of force on the

NLG assembly by the MM after the NLG safety pin was removed. The combination of these two events resulted in the retraction of the NLG, which led to the MA's nose collapsing on the MM.

The T-38 aircraft has 3 landing gear assemblies, each with their own safety pin. The purpose of each gear safety pin is to lock the gear in the down position, preventing inadvertent gear retraction during maintenance or towing. Technically speaking, when installed, the NLG safety pin keeps multiple mechanical components, such as the landing gear, upper and lower drag braces, actuator, and retraction links "centered," or locked in place. The presence of this pin also shows that the NLG is properly rigged for gear retraction and extension during flight. The NLG is secured and locked when the two-retraction links are in a centered position.

Each of the three pins has a "Remove Before Flight" streamer attached to the pin's head. When the safety pin is installed, the streamer will hang down over the lower portion of the NLG assembly. The position of this streamer can cause a minor visual obstruction to personnel viewing or working on the NLG. However, the lubrication process and the corresponding Technical Order (TO) governing this procedure do not support the removal of the NLG safety pin for any reason, and even warns against removing this pin due to the heightened risk of an aircraft collapsing. Additionally, the removal of this pin is not necessary to properly accomplish the lube task in accordance with the TO.

The evidence suggests the NLG safety pin was removed by the MM. Prior to the mishap, multiple witnesses confirmed the NLG safety pin was properly installed. There were no components of the MA out of place, and they observed a "Remove Before Flight" streamer hanging in front of the NLG assembly in compliance with governing TOs. Following the mishap, and while the nose of the aircraft was still collapsed on the floor of the hangar, multiple witnesses observed the NLG safety pin located on the MM's tool cart and not installed in the appropriate rig hole. These statements are corroborated by images of the MA, MM's toolbox and cart, and mishap scene the day after the mishap occurred.

The absence of the safety pin will not, in and of itself, result in the retraction or collapse of the NLG. As long as the NLG retraction links stay centered and the NLG bungees are retracted, the landing gear will stay in the down and locked position. Therefore, an exertion of force on the retraction links causing them to become overcentered must also occur while the NLG safety pin is removed for the landing gear to become unlocked and begin to retract.

There were two maintenance members present for the mishap: the MM and a mishap witness (MW). According to the MM's testimony, he was applying lube directly to various lube points on the NLG with his hands before the MA collapsed. Specifically, he applied grease to his hand and used his fingers to work the grease into the lube points manually as opposed to using equipment from a lubrication kit. The MW corroborates this testimony and suggests that the MM was pulling on components of the NLG with noticeable force immediately before the MA began to collapse.

### **3. SUBSTANTIALLY CONTRIBUTING FACTOR**

I find, by a preponderance of the evidence, the MM's actions leading up to the incident included repeated deviations from SOPs, which significantly contributed to the mishap.

#### **a. Repeated Deviation from Standard Operating Procedures**

During the investigation, this board discovered many instances of divergence from SOPs. First, prior to performing any maintenance tasks, personnel are required to review aircraft maintenance forms and perform a Safe for Maintenance check on an aircraft. Based on testimony from both the MM and MW, the MM performed neither of these tasks prior to lubricating the NLG.

Second, personnel are required to reference corresponding TOs while performing maintenance tasks. This guidance is made accessible to personnel through iPads. Testimony from the MM and images of the MM's iPad following the mishap suggest he did not have the relevant guidance pulled up before initiating the lube task.

Next, the Post-Wash Lubrication TO contains a list of approved equipment for the lubrication task, including the hydraulic pump spray can, lube gun, and the high- and low-pressure point attachments. It also contains safety warnings and describes the steps required to complete the task. Testimony from the MM and MW confirm the MM performed parts of the lube task by spreading lubricant on his hand and applying it to lube points on the aircraft, which is not an approved application method from the TO.

The same TO neither requires nor supports the removal of the NLG safety pin. Other maintenance personnel confirmed the NLG safety pin is only removed during the preflight inspection (PR) or when the aircraft is on jacks for maintenance. Testimony from multiple personnel confirmed they observed the NLG safety pin on the MM maintenance cart and not installed in the NLG assembly.

Finally, multiple witnesses confirmed the MM had been assigned to accomplish a PR on a different aircraft prior to starting maintenance on the MA. At approximately 1415L, the MM updated the PR paperwork indicating the task was completed at 1800L; however, the MM had been transported to El Paso by 1600L. The MM was not observed completing the inspection. Due to this discrepancy, this aircraft's functional check flight had to be canceled.

#### **4. CONCLUSION**

After a comprehensive investigation, I find, by a preponderance of the evidence, the mishap was caused by the combination of two events: (a) the removal of the NLG safety pin; and (b) the exertion of force on the NLG assembly by the MM after the NLG safety pin was removed. Furthermore, I find, by a preponderance of the evidence, the MM's actions leading up to the incident included repeated deviations from SOPs, which significantly contributed to the mishap. I developed my opinion and determined sequence of events by analyzing factual data from the mishap. This data included personnel training records, maintenance records, testimony from witness interviews, information from technical experts, and Air Force directives and guidance.

22 February 2024

 Digitally signed by  
Date: 2024.02.22 15:30:17 -08'00'  
PARKER V. DODDS, Maj, USAF  
President, Accident Investigation Board

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