

A-4K, T/N N143EM, 12 July 2023

DRAKEN INTERNATIONAL
AIRCRAFT ACCIDENT INVESTIGATION
RELEASABLE PRELIMINARY REPORT



DRAKEN INTERNATIONAL
KINSTON REGIONAL JETPORT
KINSTON, NORTH CAROLINA



LOCATION: MARINE CORPS AIR STATION, CHERRY POINT, NORTH CAROLINA

DATE OF ACCIDENT: 12 JULY 2023

INTERNAL INVESTIGATOR: JASON WILLIAMS, DIRECTOR OF SAFETY

**A-4K, T/N N143EM
MARINE CORPS AIR STATION, CHERRY POINT, NORTH CAROLINA
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At approximately 1800 Zulu (Z) (2:00 p.m. Local Time) on 12 July 2023, an A-4K, tail number N143EM departed the runway surface and impacted the terrain beyond Runway 5L while performing an initial takeoff at Marine Corps Air Station Cherry Point, North Carolina. The Mishap Pilot (MP) was a pilot contractor employed by Draken International at Kinston Regional Jetport, North Carolina (NC).

The weather on the day of the flight was visual meteorological conditions. (VMC) Clouds were scattered around 2,000' Above Ground Level (AGL). It was sunny with more than 10 miles of visibility with temperatures in the high 80s Fahrenheit.

All maintenance procedures were performed in accordance with the OEM Navy/Royal New Zealand Air Force Maintenance Manuals.

The Mishap Sortie (MS) was the fifth leg of an off-station Tactical Aviation Control Team (TACT) mission contracted by the United States Marine Corps (USMC).

The MP planned to takeoff as the second aircraft in formation out of MCAS Cherry Point with the Mishap Flight Lead (MFL) acting as the lead aircraft. All ground operations checks were executed normally, and the Mishap Aircraft (MA) departed the parking location and taxied with correct configuration with landing gear down and locked, 25 degree flap setting (half-flaps), and 8 degrees pitch trim setting as per technical order.

The MFL executed his initial takeoff at approximately 1358 Local Time, with the MP following approximately 15 seconds after. The MP selected full military power and began his initial takeoff roll down Runway 5L. At normal rotation speed, the MP brought the control stick aft to begin his rotation and liftoff. Despite moving the control stick aft to the normal position for takeoff, the MA did not leave the ground. The MP continued to move the control stick aft until it reached its maximum aft limit, with no change to the situation. The MP then selected full aft trim to get the MA airborne. These stick and trim actions totaled approximately 3-5 seconds. Seeing as the departure end of the runway was quickly approaching, the MP selected idle power and initiated an ejection at approximately 140-160 knots and roughly 1,000 feet prior to the departure end of Runway 5L.

After ejection, the MA traveled for approximately 3,000 feet off the departure end of Runway 5L. One external fuel tank departed the aircraft, causing a fire which destroyed the external fuel tank and a majority of the fuselage, wings, and landing gear sections of the MA. The resulting impact and fire destroyed the MA.

1. Preflight

There were no major maintenance write-ups with the Aircraft T/N N143EM other than the Heads-Up Display (HUD) being changed the night prior. This maintenance on the HUD had no impact to the accident.

Flight controls were free and correct, flaps were set at the 25 degree, or half-flap normal takeoff setting, and trim was set at the normal takeoff setting of 8 degrees nose up trim. A final check was performed before taxi by a separate, experienced maintenance superintendent to not only double check all systems but ensure the maintainer launching the jet correctly performed and set the configuration required.

2. Egress and Aircrew Flight Equipment (AFE)

The MP used the lower ejection handle to initiate ejection. Canopy jettison M-99 initiator on the firing mechanism actuated and caused the canopy bungee to actuate the emergency bottle causing canopy to unlock and begin canopy upward movement. Canopy jettison occurred and departed aircraft. Upon canopy jettison, the canopy interdictor cable was pulled and allowed the catapult firing mechanism to actuate. Catapult firing primary M-99 initiator was then actuated. The ballistic gas energized the rocket catapult (10407-11) and seat-man separation delay initiator (JAU-20/M53). The rocket catapult fired causing the seat to travel upwards along the seat rails. The DART stabilization system was pulled as the ejection seat traveled out of the cockpit. The seat-man separation delay initiator and booster fired causing the bell crank to rotate and retract seat lower and upper pins holding the pilot to the seat. Simultaneously, the seat-man separator rocket (MK-82) fired. This pushed the seat structure away from the pilot. As the seat pulled away from the pilot, the parachute actuating lanyard was pulled. This fired the 0.75 sec parachute opening delay initiator (MK-4). The delay initiator fired actuating the opening lanyard of the parachute. The parachute opened and the pilot parachute pulled the parachute from the container. As the parachute risers fully extended, the ballistic spreader gun with CCU-33 fired causing the parachute risers to forcibly open into the airstream. Due to the low altitude, the parachute was only able to achieve one half swing prior to contact with the ground, however all analysis suggests the system primarily functioned as designed.

3. Post Crash Analysis and Evaluation

During recovery the horizontal stab was found at the zero degrees. Normal setting for takeoff is between 6 and 8 degrees, and this was checked by all ground maintenance personnel, the Mishap Flight Lead prior to takeoff, and by the Mishap Pilot internally prior to takeoff. This anomaly would be investigated by the safety team during the analysis phase of the investigation.

Regarding the flaps UP abnormality, there are several possible reasons this could have occurred. It is possible, however not probable, that the MP left the flaps in the UP position by mistake. This is not probable due to multiple witness statements saying the flaps were set appropriately to the takeoff position before the MA started its taxi. It is most probable that the flaps and flap lever were forced into the UP position during the ejection sequence or during the aircraft's violent departure from the runway.

Regarding the stab position, during analysis the safety team verified the Horizontal Stabilizer Actuator Limit Switches and wiring read correctly. There were no shorts, opens, or anomalies to this system. Using the Horizontal Stabilizer Trim Test Box, the team verified that horizontal stabilizer trim traveled correctly when directed, both nose up and nose down directions. All indications of the stab trim system were of normal operation, meaning the trim switch and manual override stab switches were verified electrically neutral and not stuck in the up or down position. It is a possibility that the aircraft suffered a runaway nose down trim during the takeoff roll, which is a known anomaly in the A-4 Skyhawk, and has happened several times in the US Navy and US Marine Corps fleet history. This runaway nose down trim could have been either mechanical or electrical in nature.

During further analysis, it was discovered in the front left throttle quadrant that the Air-to-Air Refueling Store Control Head Cannon Plug was loose. The Cannon Plug was resting against the Horizontal Stab Manual Override Push-Pull Rod End in such a manner that it may have impeded the normal operation of the Manual Override Switch. Although not conclusive, the possibility does exist that it may have interfered with the normal operation of the Trim Override Switch. The Cannon Plug also showed evidence of severe chafing which could have caused an abnormality in the pitch trim system when the Manual Override Switch is used.

4. Causal Findings Based on a Preponderance of Evidence

From the beginning of the takeoff roll to the MP attempted rotation, the stabilator trim setting moved from 8 degrees to 0 degrees. The 0 degrees stabilator position prevented the aircraft from becoming airborne when rotation was attempted by the pilot. The exact cause of the trim change from 8 degrees to 0 degrees during the takeoff roll could not be determined. However, the following possibilities could not be ruled out as potential causal factors; the MP unintentionally moved the trim switch forward on the control stick while holding the stick full forward during the takeoff roll (holding the stick full forward on takeoff roll is normal procedure in the A-4) or the trim was moved by an input (runaway trim forward) not commanded by the MP. Either of the two scenarios are just as likely to have occurred.

APPENDIX A – Photos



MCAS Cherry Point security footage of N143EM accident



Aircraft N143EM at departure end of RWY 5L



Flaps and Flap Switch discovered in the UP position



Stab position discovered in the 0 position (Left) / Normal 8 position (Right)

APPENDIX B - Addendum to N143EM Accident Report

10 August 2023

Upon further investigation in the N143EM accident, the following was discovered:

- The Air-to-Air Refueling Store Control Head Cannon Plug was resting against the Horizontal Stab Manual Override Push-Pull Rod End in such a manner that it may have impeded the normal operation of the Manual Override Switch
 - This is not conclusive; however, the possibility does exist that it may have interfered with the normal operation of the Override Switch
- The Buddy Store Control Head Cannon Plug showed evidence of severe chafing

Original location of cannon plug



Cannon plug moved for clarity



Chafing of cannon plug

