

# National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR21FA203

## **AIRFRAME EXAMINATION SUMMARY REPORT**

Factual Report

May 29, 2021

## Table of Contents

A. ACCIDENT .....	3
B. EXAMINATION PARTICIPANTS .....	3
C. SUMMARY .....	3
D. DETAILS OF THE EXAMINATION.....	4
1.0 AIRPLANE PRIOR TO THE EXAMINATION.....	4
1.1 ENGINE EXAMINATION.....	4
1.2 Airframe Examination.....	5

## **A. ACCIDENT**

Location: Las Vegas, Nevada  
Date: 05/24/2021  
Time: 1417 PDT  
2117 UTC  
Airplane: N567EM Mirage F-1

## **B. AIRFRAME EXAMINATION SUMMARY REPORT PARTICIPANTS**

Albert Nixon  
Sr Aviation Accident Investigator-IIC  
National Transportation Safety Board  
Phoenix, Arizona

Thomas Garrett Jr.  
F1 Flightline Lead  
Draken International  
Las Vegas, Nevada

Carel Pretorius  
Field Service Rep  
Draken International  
Las Vegas, Nevada

John Waugh  
Aviation Safety Inspector  
Federal Aviation Administration  
Las Vegas, Nevada

Andrew Swick  
Aviation Accident Investigator  
National Transportation Safety Board  
Phoenix, Arizona

Jason Damico  
F1 Senior Technical Advisor  
Draken International  
Lakeland, Florida

Harlie Bodine  
Director of Safety  
Draken International  
Fort Worth, Texas

Rich Ramirez  
Aviation Safety Inspector  
Federal Aviation Administration  
Las Vegas, Nevada

## **C. SUMMARY**

Examination of the airframe and engine was conducted at a secured storage facility at the Air Transport in Phoenix, Arizona, on May 28 and May 29, 2021. The examination of the airframe was conducted by technicians from Draken International with oversight from the NTSB. The wreckage was displayed on the examination floor and revealed extensive impact and thermal damage. Both wings separated from the fuselage and engine. Both wings had impact and thermal damage. The left aileron separated from the wing and was found in the wreckage debris. Both stabilators remained attached to the fuselage and were cut during the wreckage recovery process. The stabilators had leading edge damage and the left stabilator had thermal damage. The vertical stabilizer and rudder separated from the main wreckage. The

forward 2/3rds of the fuselage was separated and was found in multiple recovery bags.



**Figure 1: Airplane wreckage arranged for the examination.**

Overall, the examination of the aircraft revealed that the slats were extended, and the flaps were retracted. No additional preimpact mechanical failures or malfunctions that would have precluded normal operation were observed.

## **DETAILS OF THE EXAMINATION**

### **2.0 Aircraft Prior to the Examination**

The airplane was recovered from the back yard of a private residence. The airplane sustained significant thermal and impact damage.

### **2.1 Engine Examination**

The engine had extensive impact damage to the intake and compressor section. The induction inlet separated, and the rotor disk No. 1 was found with the wreckage debris. The engine was bent to one side near the exhaust section. The fuselage

remained partially attached to the exhaust section. The exhaust section had impact damage to the upper side. The starter, turbogenerator, single lever control box, both hydraulic pumps, both alternators, pto shaft and accessory gear box, ab pump, ac bleed-air line, and all four engine mounts separated from the engine. The fuel control partially separated. The central casing was ripped open and was found in multiple pieces.

A walkaround of the engine was accomplished on a live video platform with a National Transportation Safety Board Aerospace Engineer - Powerplants lead. Damage observed was consistent with high rotational signatures at impact.



**Figure 2: Engine arranged for examination.**

## **2.2 Airframe Examination**

### **Landing Gear**

The nose landing gear and mounting structure separated from the airplane and had impact damage. The thrust jack was found in transit position. The steering assembly was found 180-degrees from its neutral forward position. The nose wheel steering block is ripped off. The retraction sleeve was found in the retracted position. The left

wheel had symmetrical damage around its outer rim. The right wheel outer flange separated. The right tire separated and was not found during the examination.

Left main landing gear remained partially attached to the fuselage. The wheel and axel assembly separated from the rocker. The wheel rims are broken, and the inboard tire had impact damage. The telescoping rod separated from the main landing gear leg. The telescopic rod was attached to the separated fuselage and was in the fully extended position. The elastic rod separated from the bellcrank of the swivel tube. The swivel knuckle was found in the down and locked position. The uplocks were found in the open position.

The right main landing gear remained attached to a section of airframe structure that separated from the main wreckage. The wheel and axel assembly separated from the rocker. The inboard wheel separated from the axel and had extensive impact damage. The tires remained partially attached and had thermal damage. The telescoping rod separated from the landing and remained attached to a small section of airframe structure. The telescopic rod was found in the fully extended position. The elastic rod remained attached to the gear and structure and is bent. The maneuvering actuator was found in the retracted position. The landing gear assembly position was unable to be determined. The uplock was not found during the examination.

## Right Wing

The right wing separated from the main wreckage and remained attached to the section of frame 25B. The wing pins pulled through section 25A about 4 inches. The secondary pin separated from the wing and the aft secondary pin separated from the fuselage. The flap surface separated from the wing and only the actuating linkages remained attached. The linkages revealed the flaps were near the retracted position. A large section of the trailing edge, outboard flap area, separated from the wing. The aileron remained attached to its hinge points and control and had impact damage. A small section of the spoilers remained attached to the inboard side. During aileron movement linkage remained attached. The droop slats separated from the leading edge and attached linkages revealed the slats were in the extended position. The slotted slats separated from the wing and attached linkages separated from the wing and were found with the loose wreckage debris. The slot slat jackscrews were found in the extended position. Excessive leading edge damaged was found outboard of the slot slat area. The outboard leading edge had missing material.



**Figure 3: Picture of wing showing the extent of thermal and impact damage sustained.**

### Left Wing

The left wing separated from the main wreckage and remained attached to the section frame 25A and 25B. The secondary pin and mounting structures remained attached. The landing gear telescoping rod remained attached to the fuselage structure. The landing gear aft hinge section of the forward lower door remained attached to the fuselage structure. The flap linkage rod separated at the wing root area. The flap linkage and actuator remained intact. Small sections of the inboard flap remained attached with thermal damage and were found near the retracted position. The actuator control rod was found retracted. A small section of outboard flap remained attached and was found near the retracted position. The control linkage for the outboard flap had impact and thermal damage. The aileron separated from the wing and small sections of the aileron were found in the wreckage debris. The aileron control rod remained in its relative position. The aileron and wing tip area was buckled and had thermal damage. The leading edge had impact and thermal damage. The leading-edge slotted slats separated from the wing. The jackscrews remained attached, and one was found fully extended and one had impact damage and separated. The slotted slat torque tubes had impact and thermal damage. The

droop slats separated from the wing at its hinge points. The spoilers remained attached and had impact damage.

### Ventral Fins

The ventral fins separated from the fuselage and the left ventral fin was found with the wreckage debris. The surface area was clear of debris

### Stabilizers

The stabilizers remained attached to the fuselage and were cut to facilitate the relocation of the wreckage. Both stabilizers had leading edge damage and punctures from the lower sides. Both stabilizer control linkages remained intact near the stabilizer area.

### Vertical Stabilizer

The vertical stabilizer separated from the main wreckage. The main and secondary pins and supporting structure had impact damage. The left side of the vertical stabilizer was covered in an oily dirt residue. The two large inspection panels had oil concentrated near the panel areas. The inspection panels were removed, and the internal structure and components had an oily residue. The rudder servo barrel No. 1 pressure line had damaged metal braiding that was disfigured and discolored. No damage was noted to the inside of the vertical stab area. The fillet fairing remained attached to the left side and had thermal and impact damage. The fillet fairing on the right side separated. Each respective horizontal stabilizer was moved by hand and the actuator moved normally.

### Rudder

The rudder remained attached to the vertical stabilizer and was intact. The lower trailing edge had impact damage. The rudder was moved by hand and the actuator moved normally.

### Hydraulic System

The ancillary shutoff valve was disassembled, and examination revealed no anomalies besides the solenoid armature was observed missing from its housing. The ancillary shutoff valve will close when the hydraulic system drops below a capacity of 2.6 liters. If electrical power is disconnected from the unit, it will position itself in the open position.

The No. 1 hydraulic pump separated from the engine and had impact damage to its mounting flange. The 3 lines connected to the pump separated. The housing has impact damage, and no data tag was attached.

The No. 1 hydraulic pressure filter was disassembled, and the filter screen was clear of debris. The bypass (delta P) indicator was not extended. Melted aluminum was found in the connection block.

The No. 1 hydraulic reservoir separated from the airplane and was breached. The reservoir gauge was not found.

The No. 2 hydraulic pump separated from the engine and had impact damage to its mounting flange. The 3 lines connected to the pump separated. The housing has impact damage, and no data tag was attached. About 2-3 ounces of hydraulic fluid leaked from the pump.

The No. 2 hydraulic pressure filter was disassembled, and the filter screen was clear of debris. The bypass (delta P) indicator was not extended. Melted aluminum was found in the connection block.

The No. 2 hydraulic reservoir remained attached to the airplane. The sight gauge remained attached and was illegible.

The auxiliary pitch and roll servos separated from the wreckage and had impact damage.

#### Cockpit Area

Multiple switches, control levers, circuit breakers and instruments were found in the wreckage debris. The landing gear switch was found in the retracted position. The flap switch was separated and found near the half-flap position. The throttle lever handle was separated from the throttle quadrant. The throttle position was found in the afterburner range. The control stick grip separated from the control stick. The control stick was separated into several sections. The tachometer gauge was found damaged, and the needle was found near 7,100 RPM. The majority of switches had impact damage.

Submitted by:

Andrew Swick  
Aviation Accident Investigator