# CANADIAN FORCES
# FLIGHT SAFETY INVESTIGATION REPORT

## FINAL REPORT

**FILE NUMBER:** 1010-N546PA
**DATE OF REPORT:** 09 May 03

**AIRCRAFT TYPE:** Lear 36A
**DATE/TIME:** 3 December 2002 1412Z
**LOCATION:** Astoria Regional Airport, Oregon
**CATEGORY:** A Category Air Accident

The aircraft and crew were under contract to provide electronic countermeasure training for the Canadian Navy ship HMCS Regina while she transited south along the West Coast of the United States. A Canadian Electronic Warfare Officer was on board for information security reasons and to observe the mission. The aircraft took off approximately one and a half hour before sunrise at the Astoria Regional Airport. During the take-off run, just prior to the nose wheel being raised off the runway, the aircraft struck an elk with the left wing. The impact ruptured the left wing fuel tanks and the left engine ignited the fuel. The pilots were successful in maintaining aircraft control but the aircraft overran the end of the runway and came to rest, on fire, in the grass area past the departure end of the runway. The four crewmembers exited the aircraft through the main door and were uninjured. The aircraft fuselage then was almost entirely consumed by the fuel fed fire.

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# 1. FACTUAL INFORMATION

## 1.1 History of the Flight

The accident aircraft and crew were under contract to provide electronic countermeasure training for the Canadian Navy ship HMCS Regina while she transited south along the West Coast of the United Stated. When the crew arrived at the airport in the morning, the manager of the local Fixed Base of Operation (FBO) informed them he had heard elk on the airfield. The IFR Supplement also warns of the possibility of elk on the airfield and the crew had seen them in the infield when they landed the previous day. With that information, the crew ensured that the runway was clear of wildlife by taxiing down the runway with all their lights on. Once they were sure that the runway was clear they taxied back to the threshold and started their take-off run.

Immediately after the first officer called V1, there was a loud noise from the left side of the aircraft as the left wing made contact with an elk. The impact ruptured the left wing fuel tanks and fuel sprayed onto the left engine and ignited. The pilots maintained directional control and aborted the take-off. They used brakes and deployed the drag chute in an attempt to stop the aircraft on the remaining part of the runway. The drag chute burned off immediately and was of no use. The aircraft came to rest upright in the grass area past the end of the runway. The left rear part of the fuselage was engulfed in flames but the main cabin door was free of fire and provided a quick and easy way out for the crew. They exited uninjured before the fire spread to the cabin and the cockpit.

Once outside the aircraft, the crew moved to a safe distance and were met by the FBO manager who arrived in his vehicle. They were returning to the FBO when they met the arriving emergency vehicles. The firemen were advised of the location of the aircraft and that everyone had vacated it safely. A local helicopter assisted the firefighter crew by illuminating the site with its searchlight. The crew were then examined at the FBO by paramedic technicians and were found to be in good health. The Canadian EWO later reported to the Coast Guard Station to be examined by the Flight Surgeon. He was declared fully fit for duty.

## 1.2 Injuries to Personnel

The crew was not injured in the accident.

## 1.3 Damage to Aircraft

The aircraft received A Category damage (see photos). The impact with the elk damaged the left wing just inboard of the mid-span point and ruptured the wing fuel tanks. The leaking fuel was ignited by the left engine. The drag chute was deployed and was ignited by the fire. After the aircraft came to rest past the end of the runway, the fuel fed fire consumed most of the fuselage, from the nose to the engine intakes.

### 1.4 Collateral Damage

The accident occurred on the airfield. Fuel was spilled from the wing and tip tanks. Although no collateral structures were damaged, there may have been environmental damage to the field as a result of the fuel spilled and the fire.

### 1.5 Personnel Information

The crew documents were reviewed by the investigator from the National Transportation Safety Board (NTSB) of the United States and were found to be in order. Both pilots held a valid and current Airline Transport Rating (ATR).

The Canadian EWO was authorized to be on board. This authorization was supported by a risk assessment by 1 CAD.

### 1.6 Aircraft Information

The aircraft documents were also reviewed by the NTSB and were found to be in order. The aircraft was serviceable prior to the accident. All maintenance and inspections were up to date. The weight and balance was within limits.

### 1.7 Meteorological Information

The accident occurred at 1412Z and the actual weather conditions for the Astoria Regional Airport around the time of the accident were as follows:

> 08004KTS 10SM OVC370 43F/38F A3008.

Sunrise was at 1541Z, approximately one and a half hour after the accident.

### 1.8 Aid to Navigation

Not applicable

### 1.9 Communications

The airport is uncontrolled and, at the time of the accident, the Unicom frequency was not monitored. The accident was observed by the FBO manager who called the emergency services.

## 1.10 Aerodrome Information

The Astoria Regional Airport is on a point of land between the mouth of the Columbia River and the Pacific Ocean. It is uncontrolled and the Unicom frequency is only attended between 0800 and 1700 Pacific Time. The accident runway is oriented 08-26 and is 5800 feet long. The US IFR Supplement includes a warning about birds and elk hazard for this airport.

## 1.11 Flight Recorders

The aircraft was equipped with flight recording devices. These devices were not recovered since the accident was only investigated as a Class 5 accident. In light of the circumstances surrounding this accident, it is not likely that the flight recorders would hold any significant information.

## 1.12 Wreckage and Impact Information

The collision with the elk caused substantial damage to the leading edge of the left wing and may have seriously damaged the main spar (see photo 3). It is uncertain if the wing would have been able to support the weight of the aircraft had the crew elected to continue the take-off since they were past V1. The fuel tank was ruptured and fuel spilled into the air stream and onto the left engine. This fuel was ignited by the engine and continued to burn as the aircraft decelerated. The fire intensified after the aircraft came to a stop past the end of the runway. The post crash fire completely destroyed the cabin and cockpit areas.

## 1.13 Medical

The crewmembers were uninjured in the accident. They were assessed on site by EMT technicians and were released. The Canadian EWO then reported to the US Coast Guard Station's flight surgeon for a post accident examination and was declared fit to return to flying duties.

## 1.14 Fire, Explosives Devices, and Munitions

The left engine ignited the fuel from the ruptured fuel tanks. The trailing fire plume ignited and burned the deployed drag chute. Once the aircraft came to a stop and the crew had exited the cabin, the fire spread forward to the cabin and the cockpit.

## 1.15 Survival Aspects

### 1.15.1 Crash Survivability

The crash was survivable. The fuselage maintained its survivable volume and was undamaged until the crew was able to exit the aircraft. The fire and smoke

did not spread to the cabin area until all personnel had evacuated the aircraft. The deceleration forces that the crew was subjected to were within the tolerance level of the human body.

1.15.2 Life Support Equipment

The harness used by the crew were effective and prevented injury.

1.15.3 Emergency Transmitters

The aircraft was equipped with a standard aviation Emergency Locator Transmitter (ELT). The deceleration forces were not sufficient to activate the transmitter.

### 1.16 Test and Research Activities

Nil.

### 1.17 Organisational and Management Information

The authorization to carry a Canadian EWO on board was granted by 1 CAD after a risk analysis determined that it constituted a low risk. His presence was required in order to program and later erase classified Canadian specific radar parameters in the aircraft electronic warfare equipment. He was also requested to observe the mission for quality assurance purposes.

## 2. ANALYSIS

### 2.1 The Aircraft

The aircraft was fully serviceable before the collision and is not considered to have contributed to the accident.

### 2.2 The Crew

All crewmembers were qualified and current. They were aware of the presence of elk on the airfield and used sound judgement in first taxiing down the runway in order to assess that it was clear.

### 2.3 The Airport

The elk problem at the Astoria Regional Airport is a known problem. The Airport does not have a perimeter fence that completely encloses the property. The Airport Authority has approved and financed the completion of the last remaining section of the perimeter fence. That fence will be erected in the spring.

## 3. CONCLUSIONS

### 3.1 Findings

3.1.1 The aircraft was fully serviceable and did not contribute to the accident.

3.1.2 The crew were aware of the presence of elk on the airfield.

3.1.3 The crew taxied down the runway immediately before take-off in order to ensure that it was clear.

3.1.4 The Astoria Regional Airport does not have a fence around the full perimeter of the property.

3.1.5 The Astoria Regional Airport Authority had already approved and financed the last section of the perimeter fence. This fence will be erected in the spring.

### 3.2 Causes and contributing factors

3.2.1 Cause

This accident was caused by an elk wandering onto the runway while the aircraft was on its take-off run.

3.2.2 Contributing Factors

The fact that the airport is an area rich in wildlife and that it does not have a fence around the full perimeter of the property allowed elk and other wildlife free access to an attractive grazing area.

The take-off occurred at night. Although the pilots ensured that the runway was clear before take-off, they were unable, in the dark, to notice that an elk had just wandered onto the runway until the collision was unavoidable.

## 4. SAFETY MEASURES

### 4.1 Safety Measures Taken

Part of the airport property is already fenced. The final portion of the fence had already been approved and funded before the accident and will be erected in the spring. This fence should now fully enclose the airport and prevent any further elk incursion.

This is the first accident with a Canadian EWO on board a contracted Combat Support flight. In order to ensure the safety of our aircrew on board future flights, DFS has been actively involved in the review of the bids for the Contracted Airborne Training Services (CATS) project.

### 4.2 Further Safety Measures Required

Nil

R.E.K. Harder
Colonel
Director of Flight Safety

## Annex A: Photographs

**Photo 1: Final resting place**

**Photo 2: Fuselage damage**

**Photo 3: Elk impact point**