

# REPUBLIC OF KENYA



MINISTRY OF TRANSPORT, INFRASTRUCTURE, HOUSING,  
URBAN DEVELOPMENT AND PUBLIC WORKS  
STATE DEPARTMENT FOR TRANSPORT  
**AIRCRAFT ACCIDENT INVESTIGATION DEPARTMENT**

INVESTIGATION REPORT No. 01/08/2021

PRELIMINARY INVESTIGATION REPORT OF AN OCCURRENCE  
INVOLVING A DHC-2 BEAVER MK1 VIKING AIRCRAFT  
REGISTRATION 5Y-BCL ON 12 JULY 2021 AT KOSOVO AREA  
OF NDABIBI NAIVASHA IN NAKURU COUNTY

## AIRCRAFT ACCIDENT INVESTIGATION

OPERATOR	:	DLCO-EA
AIRCRAFT TYPE	:	DHC-2 Beaver MK1
MANUFACTURER	:	Viking Air Ltd
YEAR OF MANUFACTURE	:	1964
AIRCRAFT REGISTRATION	:	5Y-BCL
AIRCRAFT SERIAL NUMBER	:	1552
DATE OF REGISTRATION	:	19 February 1991
NUMBER AND TYPE OF ENGINE	:	One, Pratt & Whitney R-985 AN-14B
DATE OF OCCURRENCE	:	12 July 2021
LAST POINT OF DEPARTURE	:	Wilson Airport
POINT OF INTENDED LANDING	:	Lodwar Airport
TIME OF OCCURRENCE	:	1245 (1545)
LOCATION OF OCCURRENCE	:	Ndabibi (0° 40' 51''S, 36° 10' 06''E)
TYPE OF FLIGHT	:	General Aviation (Aerial work)
NUMBER OF PERSONS ON BOARD	:	3
INJURIES	:	1 fatal, 2 serious
NATURE OF DAMAGE	:	Destroyed
CLASS OF OCCURRENCE	:	Accident
PILOT IN COMMAND	:	CPL holder
PIC FLYING EXPERIENCE	:	523.8 hours (as at 27 April 2021)

*All times given in this report is Coordinated Universal time (UTC), with East African local time in parenthesis*

## **OBJECTIVE**

This report contains information which has been determined up to the time of publication. The information in this report is published to inform the aviation industry and the public of the general circumstances of the accident.

This investigation has been carried out in accordance with *The Kenya Civil Aviation (Aircraft Accident and Incident Investigation) Regulations, 2018 and Annex 13 to the ICAO Convention on International Civil Aviation.*

The sole objective of the investigation of an accident or incident under these Regulations shall be the prevention of accidents and incidents. It shall not be the purpose of such an investigation to apportion blame or liability.

## INVESTIGATION PROCESS

The occurrence of 12 July 2021 involved Viking Air Ltd DHC-2 Beaver MK1A aircraft registration 5Y-BCL, and was notified to the Aircraft Accident Investigation Department (AAID), State Department for Transport (SDT), Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works through a phone call by the Operator.

A team of AAID investigators were dispatched to the site on 14 July 2021 for initial onsite investigation and witness interviews.

After the initial on-site investigation phase, the occurrence was classified as an “accident”. The aircraft was destroyed on impact and largely consumed by the ensuing fire. A passenger suffered fatal injuries while the pilot and the other passenger suffered serious injuries requiring more than 48 hours of hospitalization.

In accordance with ICAO best practices, AAID notified aircraft accident investigation authority of the state of aircraft and engine manufacture (Transportation Safety Board of Canada) and the International Civil Aviation Organization (ICAO).

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## LIST OF ABBREVIATIONS/GLOSSARY OF TERMS

AAID	-	Aircraft Accident Investigation Department
AMSL	-	Above Mean Seal Level
CPL	-	Commercial Pilots' License
ELT	-	Emergency Locator Beacon
FIC	-	Flight Information Center
ft	-	Foot (feet)
ICAO	-	International Civil Aviation Organization
KCAA	-	Kenya Civil Aviation Authority
NM	-	Nautical miles
TSCO	-	Time Run Since Complete Overhaul
TTSN	-	Total Time Since New
VFR	-	Visual Flight Rules

*\*Photos and figures used in this report are taken from different sources and may be adjusted from the original for the sole purpose of improving the clarity of the report. Modifications to images used in this report are limited to cropping, magnification, file compression or enhancement of colour, brightness, contrast or addition of text boxes, arrows or lines.*



## **SYNOPSIS**

On 12 July 2021 at about 1245 (1545) a Viking Air Ltd DHC-2 Beaver MK1A aircraft registration 5Y-BCL operated by the Desert Locust Control Organization of Eastern Africa (DLCO-EA) with three on board crashed at Kosovo area of Ndabibi in Naivasha, Nakuru County. The accident site is located near the edge of the hilly eastern side of Eburru forest manned by the Kenya Forest Service (KFS).

The flight originated from Wilson airport, Nairobi County and was enroute to Lodwar airport, Turkana County. The aircraft was destroyed by impact forces and largely consumed by the ensuing fire. A passenger suffered fatal injuries while the pilot and the other passenger suffered serious injuries requiring more than 48 hours of hospitalization.

At the time of the accident the area in the vicinity of the accident site had near overcast cloudy conditions.

Investigation into establishing the probable cause(s) of the accident is ongoing.

## **1. FACTUAL INFORMATION**

### **1.1. History of Flight**

On 12 July 2021 at about 1245 (1545) a Viking Air Ltd DHC-2 Beaver MK1A aircraft registration 5Y-BCL operated by the Desert Locust Control Organization of Eastern Africa (DLCO-EA) with three on board crashed at Kosovo area of Ndabibi in Naivasha, Nakuru County while enroute to Lodwar airport, Turkana County. The flight originated from Wilson airport, Nairobi County. The accident site is located near the edge of the hilly eastern side of Eburru forest manned by the Kenya Forest Service (KFS).

Availed Wilson airport ATS flight plan indicated that the pilot's representative filed with them a VFR three hours flight and four hours fuel endurance plan to Lodwar with the first destination alternate aerodrome as Oserian, Naivasha (HKOV).

The pilot contacted the ground station at 1144 (1444) via transmission 121.9MHz ground frequency and at 1145 (1445) requested to taxi to the holding point for runway 14. The request was granted and asked to taxi and hold short of runway 14. At this point the pilot reported his destination as Lowdar.

At 1152 (1452) the pilot reported that he had three and a half fuel endurance and three persons on board.

At 1153 (1453) the pilot contacted tower air frequency via 118.1MHz and requested to line up on runway 14. The request was granted and informed of southerly winds of 10 knots.

At 1156 (1456), 5Y-BCL was cleared to take off and make a right turn out and instructed to look for traffic. The aircraft took off at 1157.

At 1205 (1506), 5Y-BCL made contact with Wilson tower informing that it was approaching the zone boundary. The flight was then handed over to Nairobi center (Flight Information Center) on 118.5MHz and that was the last recorded communication.

Radar video playback availed by Nairobi center showed that the flight was captured on their radar from 1157:37 (1457:37) to 1211:58 (1511:58) when the aircraft coasted track and lost from the screen a second later. On several occasions the route adherence monitor went off triggering the alarm on the screen.

At 1210:47 (1510:47) recorded attitude was 6,700ft. Time 1211:58 (1511:58) was the last recorded time and the rate of descent was -1,000ft/min with ground speeds of 114 knots and heading of 305°.

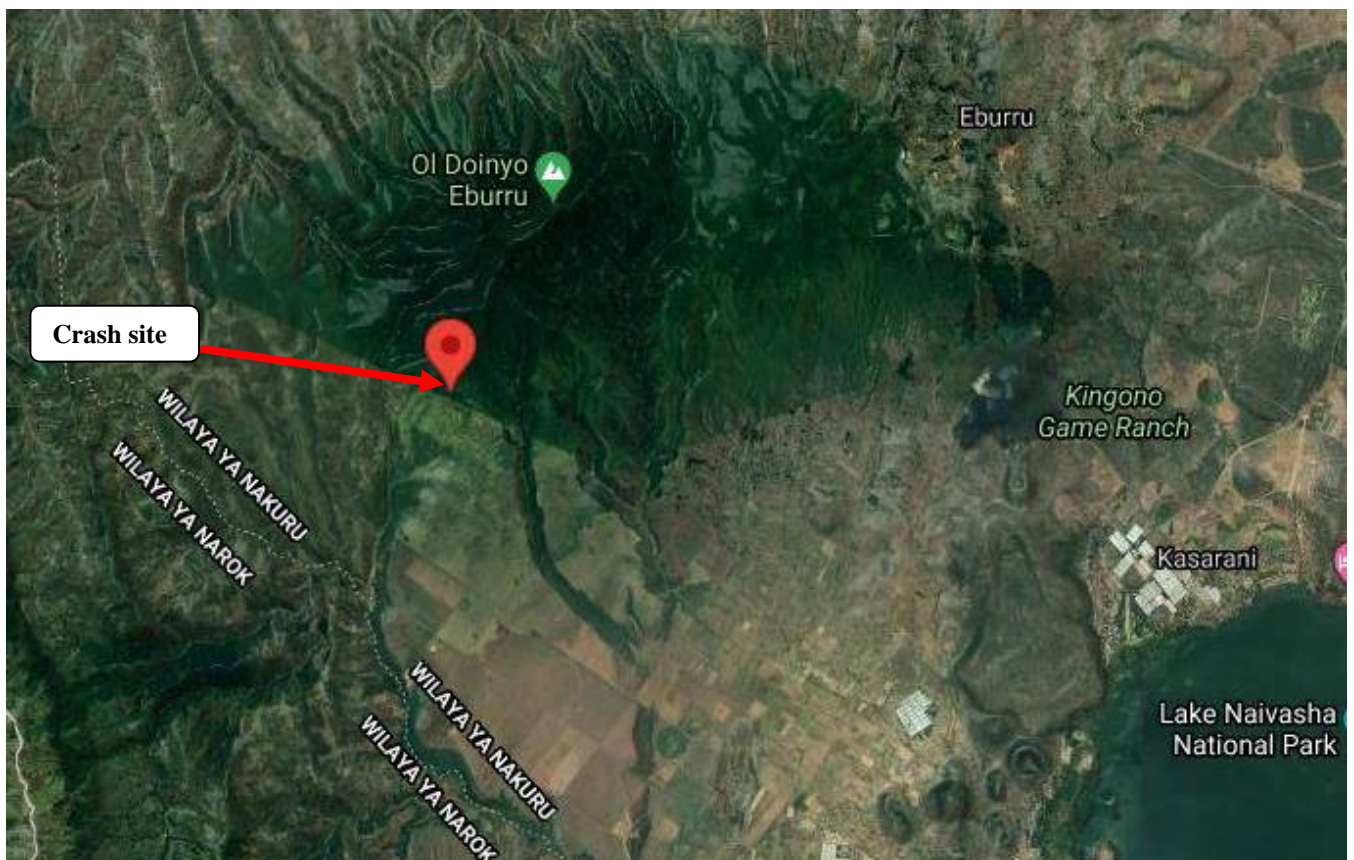
From the radar video playback, the distance from the last recorded radar position and the accident site was 37nm and that of the last recorded radar position and departure aerodrome (Wilson) was 20nm. The heading from the last recorded radar position to the accident site was 330° (northerly heading).

An eyewitness stationed 3 miles away from the accident site reported to have heard an aircraft fly past and back at least two times before he heard a loud bang in the direction of the hilly Eburru forest. He reported that for the better part of the day and at about the time of the accident, the area was foggy with reduced visibility to about 10 to 12 metres. His account was collaborated by 3 other eyewitnesses who together with him formed part of the first responders to the accident site.

Upon accessing the accident site in the thick vegetation of the forest the first responders found the wreckage on fire and managed to save two occupants who suffered serious injuries. The third occupant suffered fatal injuries. The occurrence was reported to the local administrators who then organized for the injured to be rushed to hospital on an ambulance.

The aircraft was destroyed by impact forces and largely consumed by the ensuing fire.

The accident site coordinates are 0° 40' 51''S, 36° 10' 06''E, at elevation 7,983 feet above mean sea level (AMSL).

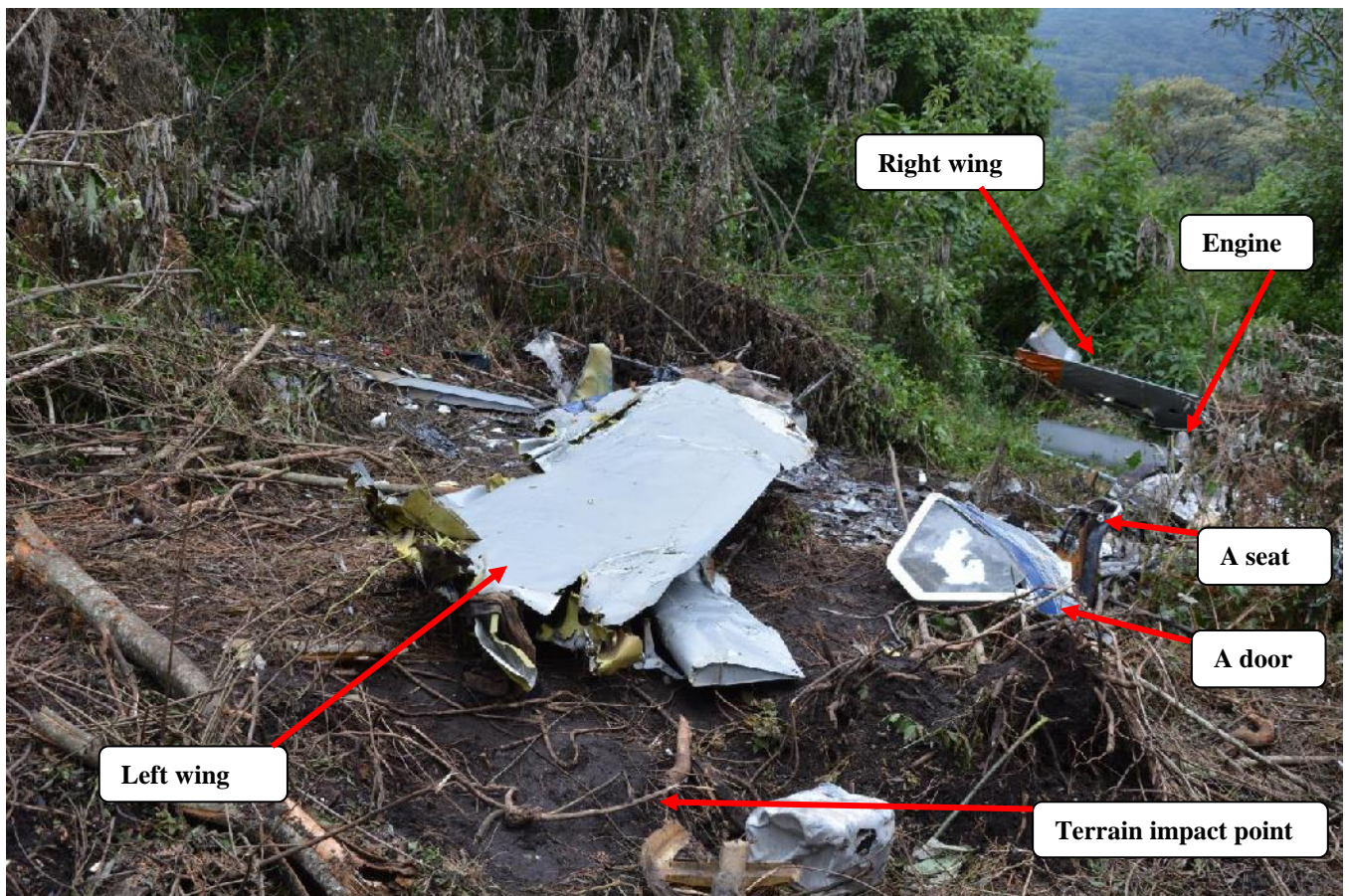


**FIGURE No. 1 – Aerial View of crash site (source: Google earth, with AAID annotations)**

## 1.2. Injuries to persons

Injuries	Crew	Passengers	Others	Total
Fatal	0	1	0	1
Serious	1	1	0	2
Minor/None	0	0	0	3

## 1.3. Damage to Aircraft



*FIGURE No. 2 - Accident site (Terrain impact point)*



*FIGURE No. 3 - Accident site (engine, propeller and tail plane)*



*FIGURE No. 4 - Accident site (A closer view of engine, propeller and part of the tail plane)*

The aircraft was destroyed by impact forces and largely consumed by the ensuing fire.

Post occurrence visual examination of the aircraft revealed no deficiencies prior to the accident.

#### **1.4. Other damage**

Not applicable

#### **1.5. Personnel Information**

##### **1.5.1 The Pilot**

At the time of the accident, the 32 year old male pilot held a CPL (Aeroplane) first issued on 30 November 2016 on the strength of his United States Federal Aviation Administration CPL license. The current renewal was issued on 28 December 2020 and valid until 05 October 2021. The current renewal of Flight Radio Telephony Operators Licence was issued on 28 December 2020 and valid until 05 October 2022. A Class 1 Medical Certificate with no limitations/restrictions was issued on 06 October 2020 and valid for 12 months in accordance with the current Kenya Civil Aviation Authority (KCAA) personnel licensing requirements.

<b>Pilot license</b>	CPL (Aeroplane)
<b>Medical expiry date</b>	05 October 2020
<b>Total flying hours</b>	534.31
<b>Total flying hours on type</b>	217.4
<b>Hours, last 90 days</b>	15.20
<b>Hours, last 30 days</b>	0
<b>Hours, last 07 days</b>	0
<b>Hours, last 24 hours</b>	0
<b>Ratings</b>	Piper PA34, Cessna 172, BE58 and DHC-2

## 1.6. Aircraft Information

### 1.6.1 The aircraft



*FIGURE No. 5 – A photo of 5Y-BCL prior to the accident (photo, courtesy of the operator)*

The occurrence aircraft was a De Havilland Canada DHC-2 Beaver MK1 serial number 1552 manufactured in 1964. It is a single-engine high-wing propeller-driven short takeoff and landing (STOL) aircraft developed and manufactured by De Havilland Canada. It has been primarily operated as a bush plane and has been used for a wide variety of utility roles, such as cargo and passenger hauling, aerial application (crop dusting and aerial topdressing), and civil aviation duties. It was first introduced in 1947. They produced approximately 1,600 before ceasing production in 1967. Viking Air Ltd became the exclusive manufacturer and distributor of De Havilland spare parts for the DHC-2 Beaver in 1983 when they acquired the original jigs and drawings for the aircraft from De Havilland Canada. The company owns the Type Certificate for the DHC-2 Beaver. It was powered by a Pratt & Whitney R-985 AN-14B radial engine, 450 hp (336 kW), serial number 17313 driving a variable pitch three bladed aluminum propeller serial number EMA1281.

<b>Manufacturer</b>	Viking Air Ltd
<b>Type, model, Serial number</b>	DHC-2, Beaver MK1, 1552
<b>Nationality / Registration Mark</b>	Kenyan, 5Y-BCL
<b>Name of Operator</b>	Desert Locust Organization for Eastern Africa
<b>Certificate of Registration issued on</b>	19 February 1991
<b>Current Certificate of Airworthiness issued on</b>	02 October 2020
<b>Current Certificate of Airworthiness valid until</b>	01 October 2021
<b>Certificate of Airworthiness Categories and/or Operation</b>	Aerial Work
<b>Total airframe time</b>	9,034.36 hours
<b>Engine type (No., Type, Model, Serial No.)</b>	1No., Pratt & Whitney R-985 AN-14B, 17313
<b>Propeller (No., Type and Serial No.)</b>	1No., Hartzel propellers Inc. (HC-B3R30-4B/R101152N-5.5)
<b>Fuel type used</b>	AVGAS

### **1.6.2 Maintenance Records**

At the time of the accident, the aircraft had a valid Certificate of Airworthiness (C of A) in the Aerial Work Category issued by KCAA on 02 October 2020, and valid until 01 October 2021. The aircraft had no known deficiencies prior to and during the flight. A review of the aircraft records indicated that it was certified, equipped, and maintained in accordance with existing KCAA regulations and approved procedures. The most recent check 1 inspection was carried out on the day of the accident (12 July 2021) and a Certificate of Release to Service (CRS) issued. The check was performed the AMO wing of the operator at its hangar at Wilson Airport. At this time, the aircraft had flown 9,034.36 hours (TTSN) and 188.82 hours since renewal of C of A. The engine had flown 9,118.57.3 hours (TTSN), 324.17 hours (TSCO) and the propeller had flown 922.11 hours (TTSN) and 323.61 hours (TSCO) respectively. Maintenance was performed by the owner/operator of the aircraft.

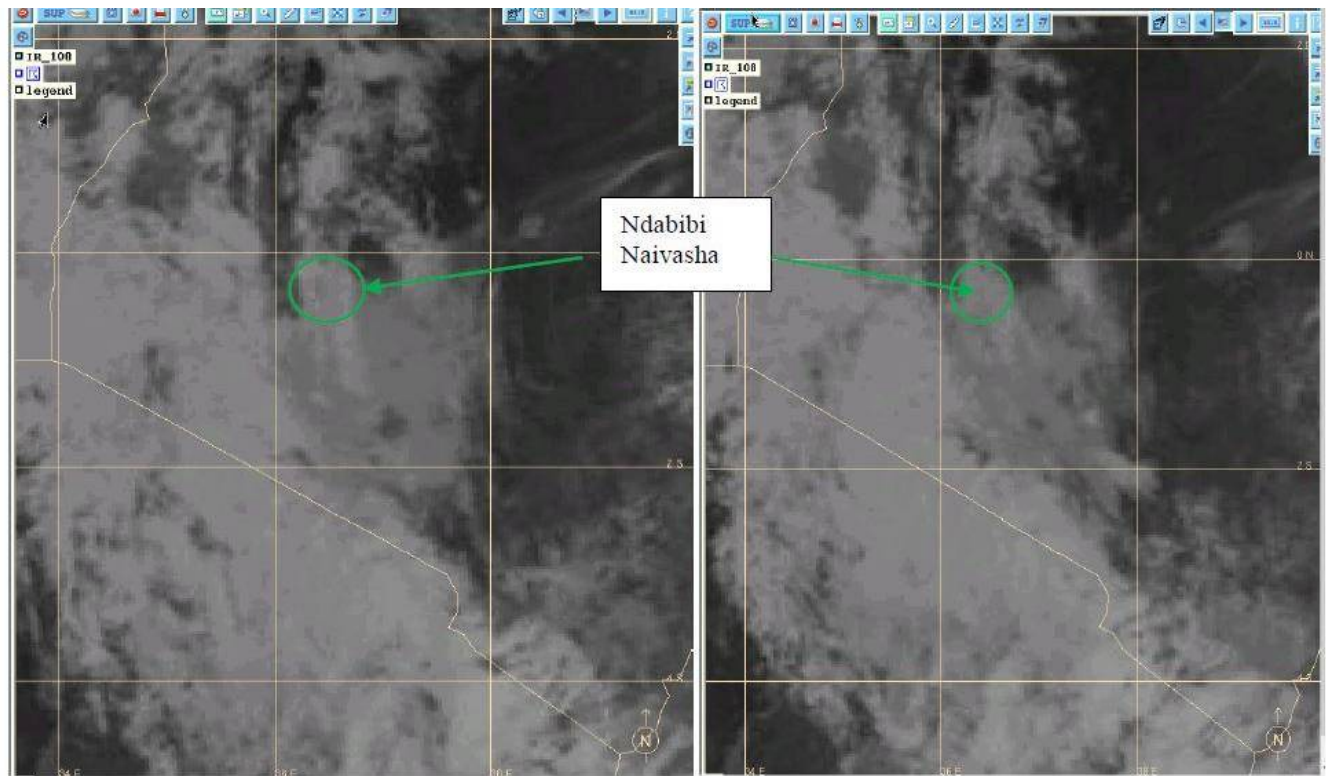
Reviewed records indicate that the aircraft was certified, equipped, and maintained in accordance with existing KCAA regulations and approved procedures.

### **1.6.3 Mass and Balance**

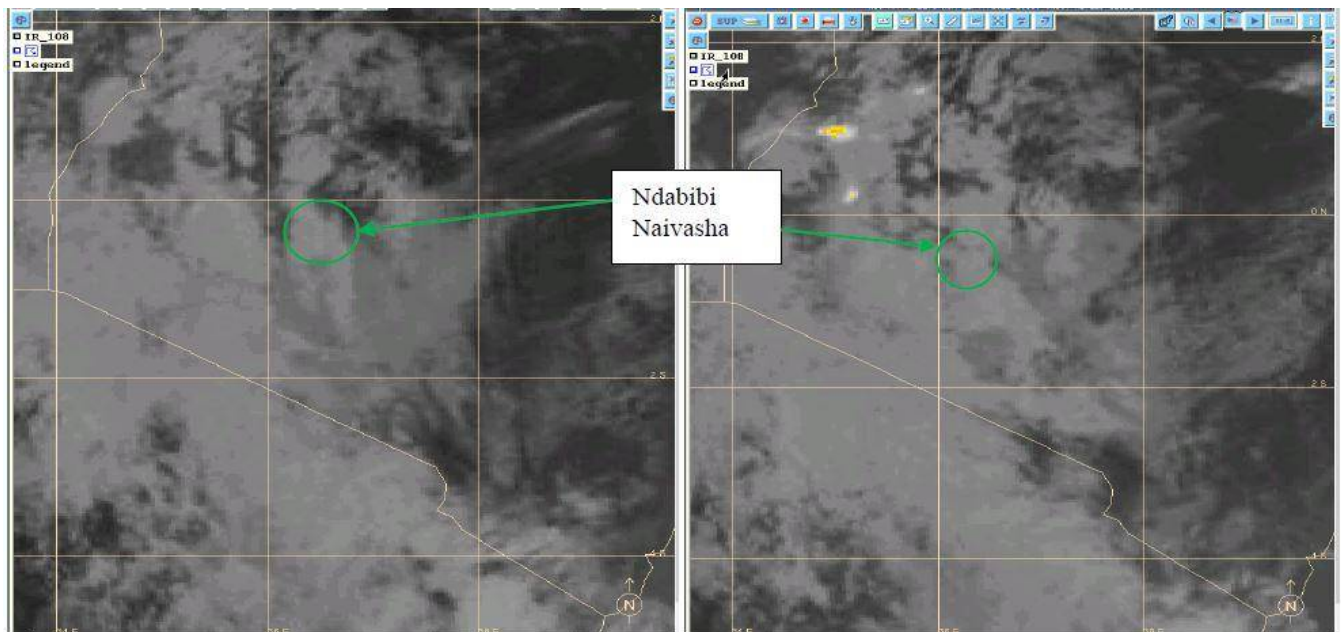
Not considered a factor in this accident.



## 1.7. Meteorological Information



**FIGURE No. 6 – Satellite information: MSG Satellite imageries on 12 July 2021 at 1000 (1300) and 1100 (1400) left and right panels respectively courtesy of the Kenya Meteorological Department**



**FIGURE 7 – Satellite information: MSG Satellite imageries on 12 July 2021 at 1200 (1500) and 1300 (1600) left and right panels respectively courtesy of the Kenya Meteorological Department**

The prevailing weather conditions report as issued by the Kenya Meteorological Department indicated that at the time of the accident, the area in the vicinity of the accident site had near overcast cloudy conditions. The cloud cover was 6 oktas out of 8 oktas, covering the entire sky with surface winds of 8 knots with no rainfall and few Cumulo Nimbus (CB) clouds at 1,500 ft from the surface.

### **1.8. Aids to Navigation**

Not considered a factor in this accident. There were no reported outages of navigation aids at the time of the flight.

The accident flight was operated under VFR.

### **1.9. Communications**

The aircraft was equipped with a two way Very High Frequency (“VHF”) radio. Apart from the communication with Wilson ground and tower air frequencies, the flight did not call FIC or any other unit for the duration of flight. All communications with the aircraft during the flight were normal.

### **1.10. Aerodrome Information**

#### **1.10.1 Departure Aerodrome**

Wilson airport (ICAO code HKNW) is located at latitude 01°19'18.19"S and longitude 036°48'53.40"E at an elevation of 5,546 feet AMSL. It is a medium-sized airport situated about 5km south of Nairobi Central Business District. It serves both domestic and international traffic and has two asphalt runways:

RWY 07/25 measures 4,800 feet (1,463m) long by 79 ft (24m) wide;

RWY 14/32 measures 5,118 feet (1,560m) long by 75 ft (22m) wide.

The Airport has eight taxiways namely A, B, C, E, H, J, K, L, and M.

It is also used for training flights. The aerodrome has a manned Air Traffic Control (ATC).

#### **1.10.2 Destination Aerodrome**

Lodwar Airport (ICAO code HKLO) is located in Lodwar town, Turkana County in the northwestern part of the Republic of Kenya. Its location is approximately 515 km, by air, northwest of Nairobi. The geographic coordinates of Lodwar Airport are: latitude 03°07'20 N and longitude 35°36'36 E. The airport serves the town of Lodwar and surrounding communities. It is situated at 1,715 ft AMSL and has a single asphalt runway 09/27 which measures 3,281 ft (1,000 m) long by 49.2 ft (15 m) wide.

#### **1.10.3 Accident location**

The crash site is located at Kosovo area of Ndabibi in Naivasha, Nakuru County, near the edge of the hilly eastern side of Eburru forest. The geographic coordinates of accident site are: latitude 0°40'51''S and longitude 36°10'06''E at an elevation of 7,326 ft (2,433 m) AMSL.

The departure and destination aerodromes were not considered a factor in this accident.

### 1.11. Flight Recorders

The aircraft was not equipped with recorders, nor was it a requirement by KCAA regulations.

### 1.12. Wreckage and Impact Information



**FIGURE No. 8 - Accident site (the direction of travel is towards the reader)**

The aircraft struck a tree at a height of 8m leaving behind a part of the pesticide tank and moved forward 27m to impact the ground where the left wing was located. At a further 1.1m, the burnt engine and the

propeller were found dislodged from the fuselage. The propeller blades were bent and exhibited rotational damage. The cockpit, all instruments and the fuselage were consumed by fire. The tail plane was burnt and at a further 9m, the right wing was located. Its pesticide tank was damaged. Two sets were recovered burnt and damaged. The entire crash site area measured 18m long by 9m wide.



*FIGURE No. 4 - Accident site (the cockpit)*

### **1.13. Medical and Pathological Information**

Pathological examination conducted on the passenger's body revealed that the cause of death was attributed to injuries associated with the accident.

There was no evidence to indicate that physiological factors or incapacitation affected the performance of the pilot.

## **1.14. Fire**

There was post impact fire that consumed a huge section of the aircraft.

## **1.15. Survival Aspects**

The accident was survivable. Two occupants survived the crash with serious injuries which required hospitalization of over 48 minutes. The other occupant suffered fatal injuries.

Two burnt and damaged seats were accounted for at the crash site however; the harnesses were consumed by the ensuing fire.

The ELT was not activated.

## **1.16. Tests and Research**

Further investigation of material failures and components malfunctions is ongoing.

## **1.17. Organizational and Management Information**

### **1.17.1. Desert Locust Control Organization of Eastern Africa (DLCO-EA)**

Aircraft Owner/Operator: DLCO-EA

Address: Wilson airport, Nairobi, Kenya

The aircraft was owned and operated by DLCO-EA for Aerial Work purposes. DLCO-EA is a regional pest and vector management organization established by an international convention signed in Addis Ababa, Ethiopia in 1962. Member countries of the organization are Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Sudan, Tanzania and Uganda. Its headquarters are in Addis Ababa, Ethiopia with country control reserve bases in each of the Member Countries. In Kenya, DLCO-EA operates from a hangar based at Wilson airport. Initially, the organization was mandated to promote control operations and forecast techniques against upsurges and plagues of desert locust in the eastern Africa region. Later the mandate was extended to include better management of infestations of other migratory pests, particularly the African armyworm, the grain-eating *Quelea* bird and the Tsetse fly that transmits the deadly human sleeping sickness (Trypanosomiasis) or nagana to livestock. The organization maintains its own fleet of fixed wing Aircraft for crops spraying.

**1.18. Additional Information**

Not applicable.

**1.19. Useful and Effective Investigative Techniques**

Not applicable.

**2.**

**SUMMARY**

The ongoing investigation will analyse, as appropriate, all the information documented, list the findings, cause(s) and/or contributing factors established and state any recommendations made for the purpose of accident prevention.

**Martyn Lunani**  
**CHIEF INVESTIGATOR OF ACCIDENTS**  
22<sup>nd</sup> July 2021