Air Accident Investigation Unit Ireland

FACTUAL REPORT

ACCIDENT

BRM Land Africa, CS-UTN

Letterkenny Airfield, Co. Donegal

21 April 2019

An Roinn Iompair
Turasóireachta agus Spóirt
Department of Transport,
Tourism and Sport

Foreword

This safety investigation is exclusively of a technical nature and the Final Report reflects the determination of the AAIU regarding the circumstances of this occurrence and its probable and contributory causes.

In accordance with the provisions of Annex 13[1] to the Convention on International Civil Aviation, Regulation (EU) No 996/2010[2] and Statutory Instrument No. 460 of 2009[3], safety investigations are in no case concerned with apportioning blame or liability. They are independent of, separate from and without prejudice to any judicial or administrative proceedings to apportion blame or liability. The sole objective of this safety investigation and Final Report is the prevention of accidents and incidents.

Extracts from this Report may be published providing that the source is acknowledged, the material is accurately reproduced and that it is not used in a derogatory or misleading context.

[1] **Annex 13**: International Civil Aviation Organization (ICAO), Annex 13, Aircraft Accident and Incident Investigation.
[2] **Regulation (EU) No 996/2010** of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation.
[3] **Statutory Instrument (SI) No. 460 of 2009**: Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulations 2009.

AAIU Report No: 2020 – 013
State File No: IRL00919017
Report Format: Factual Report
Published: 28 July 2020

In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No 996/2010 and the provisions of SI No. 460 of 2009, the Chief Inspector of Air Accidents on 21 April 2019, appointed Clive Byrne as the Investigator-in-Charge, to carry out an Investigation into this accident and prepare a Report.

Aircraft Type and Registration:	**BRM Land Africa, CS-UTN**
No. and Type of Engines:	**1 x Rotax 912ULS**
Aircraft Serial Number:	**0234**
Year of Manufacture:	**2014**
Date and Time (UTC)[4]:	**21 April 2019 @ 14.00 hrs**
Location:	**Letterkenny Airfield (EILT), Co. Donegal**
Type of Operation:	**General Aviation**
Persons on Board:	**Crew - 1 Passengers - Nil**
Injuries:	**Crew - Nil**
Nature of Damage:	**Substantial**
Commander's Licence:	**Private Pilot Licence (PPL) Aeroplanes (A), issued by the UK Civil Aviation Authority (CAA)**
Commander's Age:	**76 years**
Commander's Flying Experience:	**1,950 hours, of which approximately 43 were on type**
Notification Source:	**Airfield Operator**
Information Source:	**AAIU Investigation by correspondence, AAIU Report Form submitted by the Pilot**

[4] **UTC**: Co-ordinated Universal Time. All timings in this report are quoted in UTC; to obtain the local time add one hour.

SYNOPSIS

The aircraft, a BRM Land Africa, was on its final approach to Runway (RWY) 25 at Letterkenny Airfield (EILT) when it veered to the left in crosswind conditions prompting the Pilot to attempt a go-around. The left wing struck the ground. The aircraft pivoted about the wing tip and impacted nose first into a boundary fence and ditch on the southern side of RWY 25. The Pilot was uninjured and exited the aircraft unaided. The aircraft sustained substantial damage. There was no fire.

NOTIFICATION

The AAIU was notified of this accident by the Airfield Operator.

1. FACTUAL INFORMATION

1.1 History of the Flight

The Pilot, who was the sole occupant in the Land Africa aircraft, departed EILT for a local flight with the stated intention of landing back at EILT. According to a witness, the aircraft appeared to be '*very lively to control during the climb-out phase*' as it departed the airfield. Wind conditions at the airfield at the time of the accident were from between the south to south-west at a speed of 10-15 knots (kts) and gusting at 25-30 kts.

A microlight aircraft landed just prior to CS-UTN on RWY 25 and reported *'a strong crosswind coming from the left* [southerly] *on landing at the airfield*'. The microlight backtracked on RWY 25 and reported that the runway was clear to CS-UTN with whom he was in radio communication.

The Pilot of CS-UTN reported that wind conditions on final approach to RWY 25 were '*between 12 and 14 kts'* and his airspeed was '*60 mph*'. The Pilot stated that, due to the crosswind conditions coming from a direction of approximately 220°, as observed on the airfield windsock, he employed a crabbed approach[5] into wind. He applied full right rudder at a height of approximately eight feet above the runway, but '*to no avail*', at which point the Pilot reported that he attempted to perform a go-around manoeuvre.

The Pilot reported that the aircraft *'weathercocked'* (see **Section 1.8**) into wind due to a strong gust. The Pilot stated that as he attempted the go-around, the aircraft *'caught a low fence'* which '*spun the aircraft*' to the left and impacted into the airfield's perimeter wire fence, which runs parallel to the southern side of the runway.

The Pilot informed the Investigation that due to the speed of the occurrence he was uncertain as to the exact sequence of events. He stated that he was unsure '*if it was the left wing tip or the left wheel that caught the fence and spun* [the aircraft] *around 180 degrees into a ditch/drain nose first'*. The aircraft came to rest, nose down, in a drain, which runs adjacent to the airfield's perimeter fence (**Photo No. 1**). The Pilot was uninjured and exited the aircraft unaided.

[5] **Crabbed Approach:** A crosswind approach executed by establishing a heading (crab) into wind with the wings level so that the airplane's ground track remains aligned with the centreline of the runway.

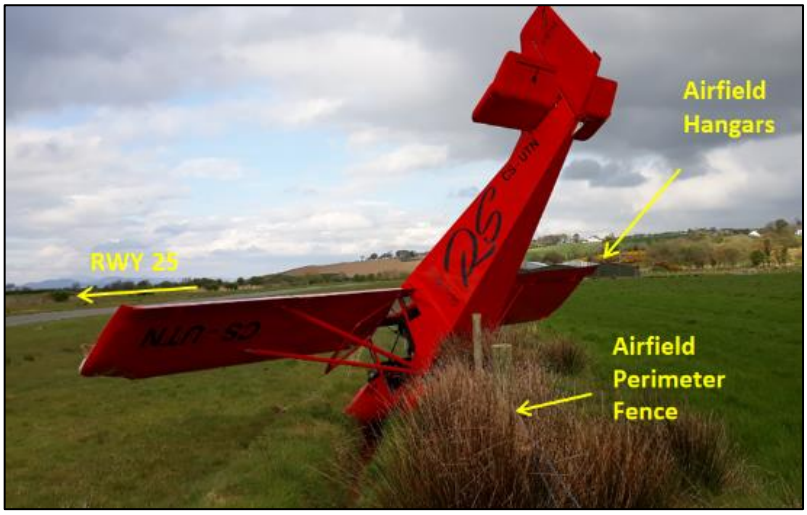

Photo No. 1: Final Resting Position of CS-UTN

Approximately 15 minutes after the accident, another Land Africa aircraft landed onto RWY 25 and reported crosswind conditions encountered as being *'challenging*' and at speeds of between '*20-25 kts coming from a southerly direction*'.

1.2 Aircraft Information

The aircraft was a BRM Land Africa aircraft. It was manufactured in 2014 and was powered by a Rotax 912ULS engine, driving a clockwise rotating propeller (as viewed from the cockpit). The two-seater, side-by-side configured aircraft was of all metal construction, featuring a strut-braced high wing and a fixed tricycle landing gear arrangement. The aircraft type incorporates a high-lift wing design with flaperons[6]. This gives the aircraft Short Take-Off and Landing (STOL) capabilities. The aircraft was registered in Portugal and was relocated to Ireland in 2018 by the Owner. The aircraft was normally based at EILT and according to the aircraft logbook entries; it entered Ireland first on 26 July 2018.

1.2.1 Flight Permit Legislation

According to Regulation (EU) 2018/1139, the subject aircraft is an Annex I aircraft and the Regulation is not applicable. Therefore, the aircraft is subject to national legislation. The aircraft was Portuguese-registered and, at the time of the accident, was operated using a Portuguese National Civil Aviation Authority (ANAC[7]) issued Permit to Fly[8] in accordance with Portuguese Decree-Law 238/2007 of 13 August 2007. This Permit to Fly was issued on 5 June 2018 and was valid for three years from date of issue.

In accordance with the provisions of Regulation (EU) 2018/1139, a State-issued Permit to Fly is only valid within the State of issue unless recognised by another State. Recognition by the Irish State, of Flight Permits issued by another national airworthiness authority for an aircraft registered in that State, is subject to the conditions referenced and set out in IAA Aeronautical Notice A.19[9].

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[6] **Flaperon:** A control surface located on an aircraft wing functioning both as a flap to increase lift, and as an aileron to control aircraft roll.

[7] **ANAC:** Autoridade Nacional de Aviação Civil. Portuguese National Civil Aviation Authority.

[8] **Portuguese Ultralight Permit To Flight:** Certificado De Voo De Aeronave Ultraleve.

[9] **IAA Aeronautical Notice A.19:** Visiting aircraft not holding ICAO compliant Certificates of Airworthiness. Issue 8, Date 29.03.18.

Accordingly, a Pilot in Command / Operator of an Annex 1 aircraft, registered outside of Ireland, would need to apply for permission from the IAA if the aircraft was to remain in Ireland in excess of 28 days. The aircraft owner informed the Investigation that he had not sought permission from the IAA to operate the aircraft in Ireland as laid down by IAA Aeronautical Notice A.19 (extant at the time of the accident). This was confirmed in communication with the IAA who stated that *'There is no record of the Pilot-In-Command/Operator applying for permission* [to operate outside of the conditions of Aeronautical Notice A.19] *for this aircraft'.*

1.3 Damage to Aircraft

Following the impact, the aircraft came to rest approximately 250 metres (m) from the threshold of RWY 25 entangled in a barbed wire perimeter fence running parallel to the southern side of the runway. It had rotated approximately 220 degrees anti-clockwise from its original direction of travel onto a magnetic heading of approximately 030 degrees. The aircraft sustained substantial damage, as shown in **Photo No. 2**.

The left wing was buckled, split and creased along its wing tip and leading edge area. The wing tip area and leading edge of the right wing also suffered impact damage. The barbed wire fence pierced through the right wing's leading edge, tearing the wing's main rib structure.

The propeller, which was providing power at the time of the accident, was broken during the impact and accordingly the engine would have suffered shock loading. Significant damage and skin buckling to the engine cowlings and aircraft fuselage area was also evident.

Photo No. 2: Damage Sustained To Aircraft

1.4 Meteorological Information

Met Éireann, the Irish Meteorological service, provided the Investigation with the following aftercast for Letterkenny Airfield valid for 14.00 hrs UTC on 21 April 2019:

A moderate stable south-westerly flow across the country in the morning and early afternoon. A double-structure cold front moved across the country later in the afternoon and evening.

Wind (at surface):	South to southwest 10-15 kts, gusts 25-30 kts.
Wind (at 2,000 ft.):	South 25-30 kts.
Wind between surface and 300 ft.:	No significant directional variation. Occasional gusts.
Visibility:	35 km.
Weather:	Cloudy, mainly dry with some light drizzle at times.
Cloud:	Few (1-2/8^{ths} of sky) cumulus with bases 2,000 ft. and broken (5-7/8^{ths} of sky) stratocumulus layers with bases 4,000 ft.
Surface Temp/Dew Point:	Temp 17 ˚C, Dew Point 11 ˚C.
Mean Sea Level Pressure:	1011 hectoPascals (hPa).
Freezing Level:	8,000 ft.
Other Comments:	Stable conditions ahead of cold front would have been suitable for the development of lee-wave activity.

1.5 Pilot Information

1.5.1 General

At the time of the accident, the Pilot held a PPL (A) issued by the Civil Aviation Authority (CAA) of the United Kingdom. A Class 2 Medical Certificate pertaining to this Licence was issued by a CAA approved Aviation Medical Examiner on 23 April 2018 and was valid until 25 April 2019; **Table No. 1** sets out the Pilot's flying experience.

Age:	76 years
Licence:	PPL (A)
Total all Types	1,950 hours
Last 90 Days:	3 hours
Last 28 Days:	2 hours
Last 24 Hours:	10 mins
Total on Accident Type:	43 hours

Table No. 1: Pilot's Flying Experience

1.5.2 Applicable Pilot Licencing Requirements

In order to operate a Portuguese registered aircraft within the territorial limits of the Irish State, Pilots must consider, *inter alia*, the following:

1. *IAA's Aeronautical Notice P.21, 'Acceptance of Flight Crew Licences'.*
2. *S.I. No. 333/2000 – IAA's Personnel Licensing Order, 2000.*

Section 3 and 4 of the IAA's Aeronautical Notice P.21, '*Acceptance of Flight Crew Licences*' states:

3. *The holder of an appropriate pilot licence or aviation qualification issued by another ICAO signatory state or its national aviation authority or qualified entity, which permits or is accepted as being appropriate to enable the holder to act as pilot-in-command within that state of an aircraft described in Annex II of EU Regulation No 216/2008 (as amended), shall be exempt within the territorial limits of the State from the requirements of Article 5 of the Order while acting as a member of the flight crew of an aircraft being operated as a private aircraft.*

4. *This Direction shall apply only provided that the appropriate pilot licence or aviation qualification holder has:-*

   a) *given prior notification to the Authority by submitting the appropriate details in the manner published by the Authority on its website;* [Form RPPL.F.127B or P21 Form]

   […]

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With regard to paragraph 3 of Aeronautical Notice P.21 above, the IAA informed the Investigation that:

> *'The IAA recognises a valid licence or qualification from another ICAO member state for use in Ireland subject to a notification being received. However, that licence or qualification must also be acceptable to the state of registry of the aircraft, in this case Portugal'.*

The Investigation asked ANAC, as the competent licensing authority of the state (Portugal) in which the aircraft was registered, if a UK CAA issued PPL (A) was acceptable to the Portuguese authorities to fly the aircraft type at the time of the accident. ANAC informed the Investigation that the aircraft is classified as an Ultralight and that a UK CAA issued PPL (A) was not acceptable. ANAC referred to Article 7 (*Foreign Licenses, Qualifications and Authorizations*) and Article 24 (*Piloting*) of the Portuguese National Regulations, Decree-Law 238/2004, as amended and republished by Decree-Law 238/2007 of 13 August 2007, in this instance.

With regard to paragraph 4 of the IAA's Aeronautical Notice P.21 above, the IAA informed the Investigation that no notification had been received in respect of the Pilot and therefore no permissions detailed within P.21 were applicable in this instance.

When contacted by the Investigation, the Pilot accepted that the requirements of Aeronautical Notice P.21 had not been complied with in this instance.

With regard to S.I. No. 333/2000 – Irish Aviation Authority (Personnel Licensing) Order, 2000, Article 5(2) of the Order states:

> *5(2) A person shall not, within the territorial limits of the State, act as a flight crew member of an aircraft registered in any other state unless —*
>
> […]
>
> *(b) in the case of a private aircraft, that person is the holder of an appropriate licence, issued or validated by the competent licensing authority of the state in which the aircraft is registered or by the Authority, or a JAA licence* [now EASA].

The Investigation also contacted the UK CAA, as State of Licence issue, to ascertain if there had been a request to convert the UK CAA PPL (A) into an EASA licence — no such application had been made.

1.6 Airfield Information

EILT is a privately owned airfield adjacent to the River Swilly and situated two nautical miles to the east of Letterkenny Town, Co. Donegal. The airfield has a paved runway, which is approximately 530 m in length and is orientated in a direction of 07-25. The airfield has two separate hangar structures and a small clubhouse situated to the left of the threshold of RWY 25 (**Figure No. 1**).

The Investigation was informed that, in southerly winds, local topographical features coupled with the position of the hangars on approach to RWY 25 could give rise to rapidly changing crosswind conditions. In order to lessen the effects of crosswind conditions, local custom and practice at the airfield was for pilots to '*land long*' when approaching RWY 25.

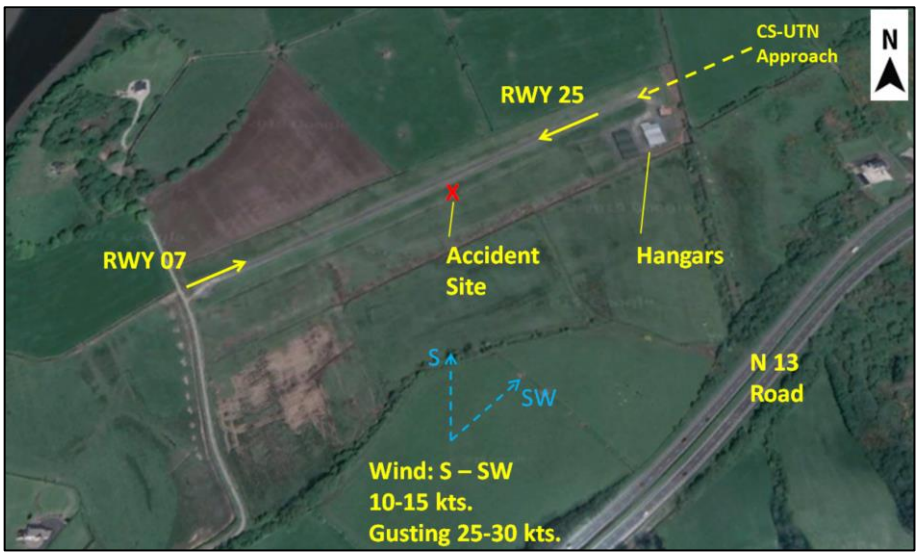

Figure No. 1: Aerial view of Letterkenny Airfield (*Google Earth*)

1.7 Crosswind Landings

High-wing aircraft are particularly susceptible to control difficulties during crosswind conditions. Crosswind landings are normally performed using either the crab or wing low [sideslip] methods. Chapter 8 of the FAA *'Airplane Flying Handbook'* (FAA-H-8083-3A) provides guidance to pilots regarding the handling of aircraft during Crosswind Approach and Landing.

> '*Although the crab method may be easier for the pilot to maintain during final approach, it requires a high degree of judgement and timing in removing the crab immediately prior to touchdown. The wing-low method is recommended in most cases, although a combination of both methods may be used'.*

1.7.1 Aircraft Crosswind Limitations

According to the Aircraft Manufacturers Operating and Maintenance Manual[10], the recommended maximum crosswind for landing for the aircraft is 20 mph (17.4 kts). Landing with crosswinds higher than 20 mph is not recommended.

1.8 Weathercocking / Weathervaning

The effect of the wind on the side of the aircraft may generate a yawing moment, which turns the nose of the aircraft into the direction of the crosswind. This is sometimes referred to as weathercocking or weathervaning.

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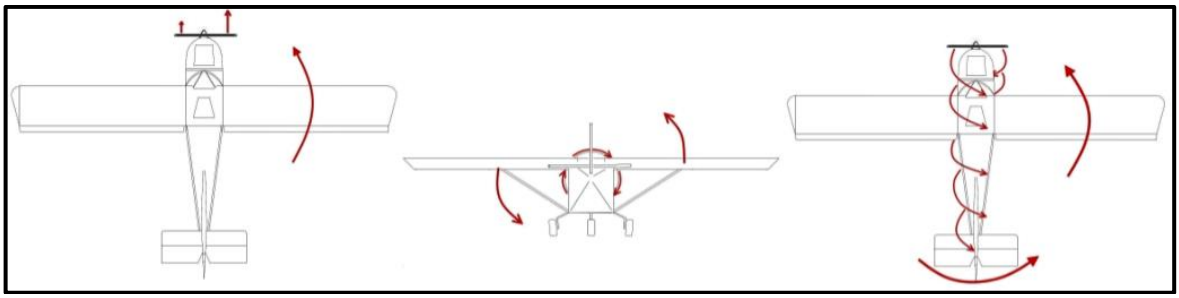
1.9 Effects of Propeller Rotation



P-Factor **Torque Effect** **Prop Wash**

Figure No. 2: Effects of Propeller Rotation

1.9.1 Asymmetric Propeller Effect (P-Factor)

P-Factor, as illustrated in **Figure No. 2**, is a condition of asymmetric or unequal loading of the propeller disc due to changes in an aircraft's angle of attack. The propeller blade moving downwards has a higher angle of attack and will consequently generate more thrust than the propeller blade moving upwards. In aircraft that have a clockwise rotating propeller (as viewed from the cockpit), the thrust imbalance on the propeller will cause an aircraft to yaw to the left. This is due to the propellers centre of thrust being located to the right of the centre of the propeller. The yaw to the left as a result of P-Factor is more pronounced during take-off and climb and is normally counteracted by the pilot inputting rudder as necessary to counteract the unwanted yaw.

[10] Land Africa Operating and Maintenance Manual V1.2010

1.9.2 Propeller Torque Reaction

In aircraft that have a clockwise rotating propeller (as viewed from the cockpit), the torque reaction from the propeller will cause the aircraft to rotate anticlockwise and roll the aircraft to the left (**Figure No. 2**). The left undercarriage will counteract this rolling reaction on the ground however, in the air the aircraft will roll to the left. The torque reaction is more prominent at high propeller speeds and low forward airspeed.

1.9.3 Slipstream / Corkscrew Effect

Aircraft that have a clockwise rotating propeller (as viewed from the cockpit) will induce a clockwise rotation on the slipstream as the air flows over the aircraft, (**Figure No. 2**). This causes asymmetric or unequal loading over the left-hand side of the aircrafts vertical fin and rudder. This slipstream effect imparts a force on the left-hand side of the tail area, pushing it to the right. The result is that the aircraft nose will yaw to the left.

2. AAIU COMMENT

According to ANAC, the UK CAA issued PPL (A) licence held by the Pilot was not valid for use on the Portuguese registered aircraft. Therefore, permissions detailed within the IAA's, Aeronautical Notice P.21, *'Acceptance of flight Crew Licences'* and S.I. No. 333/2000 – '*Personnel Licensing Order, 2000'* were not applicable in this instance.

The aircraft was operated by the Owner under a Portuguese-issued Permit to Fly, which was in date. However, IAA Aeronautical Notice A.19 states that for aircraft registered in an EU Member State to operate within the Irish State for a continuous period of more than 28 days, permission from the IAA would be required.

According to aircraft logbook records, the aircraft entered the Irish State on 26 July 2018, 269 days prior to the accident, and flew exclusively into and out of EILT until the subject accident flight. The aircraft Owner informed the Investigation that no application pursuant to Aeronautical Notice A.19 was made to the IAA. This was confirmed in communications with the IAA.

The Pilot was attempting a landing in wind conditions close to the Aircraft Manufacturer's recommended maximum of 20 mph (17.4 kts). However, had the wind gusted to the forecast maximum of 30 kts, this would have been outside the Aircraft Manufacturer's recommended maximum. The weather aftercast stated that the surface wind was south to southwest, 10-15 kts with gusts of 25-30 kts.

Due to the crosswind, the Pilot was employing a '*crab*' method for the final approach onto RWY 25. The strength of the crosswind was such that there was a considerable difference between the aircraft's actual heading on the approach and the runway heading. In order to align the aircraft with the runway as the aircraft approached the surface, the Pilot stated that he applied full right rudder [to de-crab] but '*to no avail*'. At approximately eight feet from the runway surface and with full right rudder applied, the aircraft experienced a strong gust of wind. The Pilot reported that he then elected to commence a go-around manoeuvre.

During the attempted go-around manoeuvre, the combination of a strong gusting crosswind, rudder inputs, the effects of propeller aerodynamics at low aircraft speed and application of additional engine power, likely caused the aircraft to roll to the left. From eyewitness reports, and from the damage observed, the left wing tip impacted the ground first and the aircraft pivoted about this point. Once the left wing struck the ground, control of the aircraft was lost, and a recovery was no longer possible.

- END -

In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No. 996/2010, and Statutory Instrument No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulation, 2009, the sole purpose of this investigation is to prevent aviation accidents and serious incidents. It is not the purpose of any such investigation and the associated investigation report to apportion blame or liability.

A safety recommendation shall in no case create a presumption of blame or liability for an occurrence.

Produced by the Air Accident Investigation Unit

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