Air Accident Investigation Unit Ireland

FACTUAL REPORT

ACCIDENT

Aerotechnik EV-97 Eurostar, G-LYNI

Inisheer, Co. Galway

22 June 2018

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 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.

Accordingly, it is inappropriate that AAIU Reports should be used to assign fault or blame or determine liability, since neither the safety investigation nor the reporting process has been undertaken for that purpose.

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[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.

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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 22 June 2018, appointed Mr Howard Hughes as the Investigator-in-Charge to carry out an Investigation into this Accident and prepare a Report.

Aircraft Type and Registration:	**AEROTECHNIK EV-97 EUROSTAR, G-LYNI**
No. and Type of Engines:	**1 x Rotax 912 UL**
Aircraft Serial Number:	**PFA 315-14409**
Year of Manufacture:	**2006**
Date and Time (UTC)[4]:	**22 June 2018 @ 10.57 hrs**
Location:	**Inisheer Airport**
Type of Operation:	**General Aviation**
Persons on Board:	**Crew – 2 Passengers – Nil**
Injuries:	**Crew – Nil**
Nature of Damage:	**Substantial**
Commander's Licence:	**Private Pilot Licence (Aeroplanes), PPL(A) issued by the UK CAA[5]**
Commander's Age:	**56 years**
Commander's Flying Experience:	**618 hours, of which 142 were on type**
Notification Source:	**Airport Manager**
Information Source:	**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; Local time was UTC + 1 Hour.
[5] **UK CAA**: United Kingdom Civil Aviation Authority.

SYNOPSIS

The microlight aircraft departed Spanish Point Airfield (EISP), Co. Clare, at 10.40 hrs, for a flight to Inishmore (EIIM), Co. Galway. When overhead Inisheer Airport (EIIR), the Pilot elected to land there. Engine power was reduced to idle at approximately 1,800 ft, and the aircraft commenced a glide approach to Runway (RWY) 31 at EIIR. On short finals the Pilot noted that the aircraft was low on the approach, and advanced the throttle lever in an attempt to increase engine power. This had no immediate effect, and the aircraft continued to descend, and touched down at the very beginning of the paved surface of the runway. The aircraft bounced, and at the same time engine power increased. It veered to the left, impacted a raised area south west of the runway and sustained substantial damage. The occupants of the aircraft were uninjured. There was no fire.

NOTIFICATION

The AAIU Inspector-on-Call was notified by the Manager of Inisheer Airport.

1. FACTUAL INFORMATION

1.1 History of the Flight

On the morning of the accident flight, the aircraft had departed Ardfert Airfield (Co. Kerry) at 09.18 hrs with an intended stop at EISP for refreshments for the flight to EIIM. The aircraft landed at EISP at 09.55 hrs. As no refreshments were readily available, the Pilot elected to continue to EIIM and departed EISP at 10.40 hrs.

The Pilot informed the Investigation that he had called EIIM by phone, and received prior permission to land. However, he said that it '*was quite hot on the day of the flight*, *and it was too hot in the cockpit*' so he elected to land at EIIR.

The Pilot stated that as he approached overhead EIIR he called them on the published radio frequency[6]. As he received no response, he transmitted his position and intention to land at EIIR over the radio a number of times. He also said he visually checked the airfield and airport circuit pattern for other aircraft. As there were none, he felt it was safe to approach and land at EIIR.

The aircraft commenced a descent from 1,800 ft, towards EIIR RWY 31. The Pilot stated that to remain close to the airport, the descent was carried out with the throttle at the idle position from top of descent until just before the runway threshold. As the aircraft neared the runway, the Pilot felt that it was low on the approach path and he moved the throttle forward to increase engine power. He stated that the engine did not immediately respond. The aircraft then touched down on the runway surface, before the runway markings, and bounced.

The Pilot stated that as it bounced there was a sudden increase in engine power, and the aircraft veered left and departed the runway. The aircraft impacted an area of raised sand dunes south-west of RWY 31. It came to rest approximately 28 m to the left of the runway centreline, and 114 m from the beginning of the paved surface of the runway (**Photo No. 1**).

[6] Note, this is a common frequency for all the Aran Island airports and Inverin.

Photo No. 1: Aircraft in-situ at accident site.

The Pilot said that when the aircraft came to rest, he shut it down, and he and the passenger exited the aircraft normally.

The Pilot stated that there was a slight crosswind from the right as they touched down on RWY 31, which may have contributed to the aircraft veering left as it bounced.

The Pilot also stated that he believed the lack of power during the final stages of the approach was possibly due to vapour lock[7] caused by the long descent at idle power. This may have reduced the flow rate of cooling air through the engine compartment, resulting in heating of the fuel pipes in the area of the engine.

1.2 Injuries

No injuries were reported to the Investigation.

1.3 Damage to Aircraft

The aircraft nose gear collapsed and the propeller and lower part of the engine cowling sustained substantial damage. The engine is likely to have suffered shock loading, as it was under power at the time of impact.

1.3.1 Other Damage

The Airport Operator reported that the aircraft impacted the cover of a Precision Approach Path Indicator (PAPI) light assembly situated to the left of the runway, causing the cover to come off. No other damage was sustained by the PAPI assembly, which had been decommissioned prior to the accident.

[7] **Vapour Lock**: A condition of interruption of fuel flow to the engine caused by unintended liquid fuel vaporisation, due to variations in fuel temperature or pressure.

1.4 Aircraft

The EV-97 aircraft type is a low-wing monoplane of all metal, semi-monocoque construction. G-LYNI was equipped with two side-by-side seats and dual flight controls. The aircraft was amateur-built in 2006 by a previous owner and was fitted with a Rotax 912-UL engine, which powered a three-bladed fixed-pitch propeller, which rotated clockwise (when viewed from the cockpit). The aircraft was flying on a UK CAA issued Permit-to-Fly, which was valid until 5 July 2019. It was classified as a Microlight.

The Pilot stated that the fuel used was Mogas. Mogas is permitted for use by Microlight aircraft.

1.5 Mogas

Mogas is an aviation term for gasoline or petroleum that is normally used by motor vehicles, and commonly referred to as unleaded petrol. It may be used in certain classes of General Aviation aircraft. Mogas typically contains 5% ethanol (alcohol). The UK CAA Civil Aviation Publication CAP 747 '*Mandatory Requirements for Airworthiness*', section GC No. 7, states the following:

> *Because of the difficulties experienced in obtaining Aviation Gasoline (Avgas), particularly in small quantities, and the ready availability of Motor Gasoline (Mogas), the CAA was asked to consider permitting the use of Mogas in general aviation aircraft. This was granted under the auspices of Generic Concessions (GCs) 2, 3, 4 and 5, published in CAP 747 (previously Airworthiness Notices 98, 98A, 98B and 98C), which allow microlights and certain light aircraft to use Mogas, subject to the conditions therein.*
>
> *Since the publication of these documents, the composition and properties of some Mogas fuels has changed and it is becoming increasingly difficult to obtain Mogas that does not contain any alcohol. With the exception of microlights, the use of Mogas containing alcohol is generally prohibited in aircraft.*
>
> *This Generic Concession, by means of the attached Exemption against Article 16(1) of the Air Navigation Order 2009 (as amended), permits the use of a new unleaded aviation fuel, UL 91 Avgas, in Annex II aircraft, subject to the conditions stated in this Concession.*
>
> One of the characteristics of Mogas containing ethanol is an increased likelihood of vapour lock due to increased vapour pressure of gasoline-ethanol mixtures.

1.6 Inisheer Airport

Inisheer Airport is located on the island of Inisheer, which is one of the Aran Islands in Galway Bay. The airport is licensed by the Aeronautical Services Department of the Irish Aviation Authority, and is noted as Prior Permission Required (PPR) in the Irish Aeronautical Information Publication.

The airport has one runway designated 13/31 with a bituminous surface, measuring 520 m long by 18 m wide, at an elevation of 13 m above mean sea level.

1.7 Effects of Propeller Rotation

The following factors are known to affect single engine, propeller driven aircraft:

- P-Factor
- Roll due to propeller torque effect
- Prop-wash

1.7.1 P-Factor

This is the term for asymmetric propeller loading that causes the aircraft to yaw when the propeller disc is not perpendicular to the relative airflow, e.g. when the aircraft is at a high angle of attack.

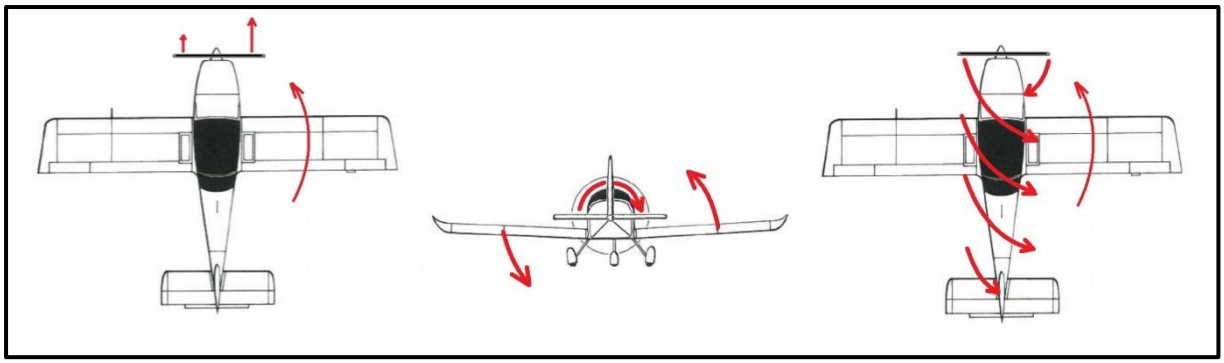
In the case of a clockwise rotating propeller (when viewed from the cockpit), the descending right side of the propeller disc, as seen from the rear, has a higher angle of attack relative to the oncoming air, and thus generates a higher air flow and thrust than the ascending left side. This moves the propeller's aerodynamic centre to the right of the aircraft centreline, thus inducing an increasing yaw moment to the left. The effect increases with increasing aircraft angle of attack or increasing engine power.

1.7.2 Propeller torque effect

Torque effect is the tendency for an aircraft to roll in the opposite direction to the rotation of the propeller. This is generally exhibited as a left rolling tendency in a single engine propeller driven aircraft, with a clockwise turning propeller (when viewed from the cockpit). The effect is greater at slow forward airspeeds.

1.7.3 Prop-wash

A propeller pushes air back in a helix around the fuselage. In the case of a clockwise rotating propeller (when viewed from the cockpit), as the air spirals around the fuselage it pushes against the left side of the vertical tail, causing the aircraft to yaw to the left. The prop-wash effect is at its greatest when the airflow is flowing more around the fuselage than along it, i.e., at high power and low airspeed.



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

2. AAIU COMMENT

The Pilot reported that the engine did not respond to throttle inputs as he approached the airport. The cause of this was not determined, but the Pilot stated it may have been due to vapour lock.

However, the Pilot stated that when the aircraft bounced on touch down, there was a sudden increase in engine power. With the low forward speed, a high angle of attack, and sudden increase in power from the engine, there would have been a tendency for the aircraft to turn to the left as it had a clockwise rotating propeller (as viewed from the cockpit), due to a combination of P-Factor, Propeller Torque Effect, and Prop Wash.

The Pilot also noted that there was a slight crosswind from the right which may have contributed to the left drift off the runway following the bounced landing.

Landing without PPR

The Investigation notes that, as the airports at the Aran Islands are used for commercial flights, they are all classified as PPR. The flight had obtained PPR to land at EIIM. The Pilot stated that both he and the passenger were becoming uncomfortable due to the heat in the cockpit and that he felt it best to land at EIIR. The Pilot stated he took the precaution of making radio calls on the common Aran Island airports frequency, and checking that the EIIR circuit was clear of traffic. However, given that the distance to EIIM (where PPR had been arranged), was a little over 5 NM beyond EIIR, a more prudent course of action might have been to continue to EIIM, unless a state of emergency (Mayday) or urgency (Pan) existed.

SAFETY RECOMMENDATIONS

This Report does not sustain any Safety Recommendations.

- 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

AAIU Reports are available on the Unit website at www.aaiu.ie

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

Air Accident Investigation Unit,
Department of Transport Tourism and Sport,
2nd Floor, Leeson Lane,
Dublin 2, D02TR60, Ireland.
Telephone: +353 1 604 1293 (24x7): or
+353 1 241 1777 (24x7):
Fax: +353 1 604 1514
Email: info@aaiu.ie
Web: www.aaiu.ie