



Air Accident Investigation Unit Ireland

FACTUAL REPORT

**ACCIDENT
ELA AVIACION SL, ELA 07S, EI-FSR
Spanish Point Airfield, Co. Clare**

18 March 2022



An Roinn Iompair
Department of Transport

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 13¹ to the Convention on International Civil Aviation, Regulation (EU) No 996/2010² and Statutory Instrument No. 460 of 2009³, 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 23 November 2022, appointed Ray Jordan as the Investigator-in-Charge, assisted by Howard Hughes to carry out an Investigation into this Accident and prepare a Report.

Aircraft Type and Registration:	ELA AVIACION SL, ELA 07S, Gyroplane, EI-FSR	
No. and Type of Engines:	1 x Rotax 914	
Aircraft Serial Number:	09061140724	
Year of Manufacture:	2006	
Date and Time (UTC)⁴:	18 March 2022 @ 18:00 hrs	
Location:	Spanish Point Airfield (EISP), Co. Clare, Ireland	
Type of Operation:	General Aviation	
Persons on Board:	Crew – 1	Passengers – 1
Injuries:	Crew – 1	Passengers – Nil
Nature of Damage:	Substantial	
Commander's Licence:	Private Pilot Licence (PPL) Gyroplanes (G), issued by the UK Civil Aviation Authority (CAA)	
Commander's Age:	63 years	
Commander's Flying Experience:	382 hours, of which 275 were on type	
Notification Source:	Airfield Owner	
Information Source:	AAIU Report Form submitted by the Pilot AAIU Field Investigation	

⁴ **UTC:** Co-ordinated Universal Time. All times in this report are quoted in UTC unless otherwise stated; local time was the same as UTC on the date of the accident.

SYNOPSIS

During take-off from Runway 24 at Spanish Point Airfield (EISP), Co Clare, the tandem seat gyroplane, with one pilot and one passenger on board, encountered a gust of wind from the south-east which caused the gyroplane to depart from the runway centre line. The Pilot was unable to prevent the gyroplane from veering towards a boundary fence to the right of the runway where the main rotor struck a fence post. The gyroplane eventually came to rest on its left side and facing in the opposite direction to the departure runway. The Pilot was seriously injured in the accident. The gyroplane sustained substantial damage. There was no fire.

NOTIFICATION AND RESPONSE

The Airfield owner notified the AAIU by telephone. Two Inspectors of Air Accidents deployed to the accident site to commence an Investigation.

1. FACTUAL INFORMATION

1.1 History of the Flight

The Pilot and passenger arrived at the airfield at approximately 12:00 hrs. The Pilot carried out a pre-flight inspection and prepared the gyroplane for flight, following which both occupants donned flying suits and helmets.

The Pilot informed the Investigation that the weather conditions on the day were good with no significant cloud and good visibility, but that *'there was a lot of gusty wind going on'*. The Pilot recalled that the wind direction as indicated by a windsock at the airfield was from the south-east, which he noted favoured Runway (RWY) 24 *'but only marginally'*.

The engine was started, and the gyroplane was taxied to the runway and lined up. The Pilot informed the Investigation that the purpose of the day's flights was to adjust the engine oil and water temperatures to optimum values for ambient temperatures for the time of year. At approximately 14:00 hrs the Pilot with the passenger on board, commenced the first take-off of the day which was described as being uneventful. After approximately ninety minutes of local flying and some circuits⁵ at the airfield the Pilot carried out a full-stop landing⁶. The gyroplane was then parked on a helipad adjacent to an airfield club house. After a refreshment break, the Pilot planned to assess the weather and decide whether or not to go flying again.

The Pilot reported that after the break, he felt that the weather was becoming more benign and that, *'it was looking good and [they would] go for another quick half an hour'*. The Pilot, with the passenger on board, started the engine and taxied from the helipad to line up on RWY 24 abeam the clubhouse. Prior to take-off the Pilot observed that the windsock indicated a 90° crosswind from the left and noted that there were no other aircraft flying in the vicinity.

⁵ **Circuits:** The specified path to be flown by aircraft operating in the vicinity of an aerodrome. (Standardised European Rules of The Air).

⁶ **Full-stop landing:** A normal landing which ends with the aircraft stopping and exiting the runway.



The Pilot stated that as he advanced the throttle and with the gyroplane gaining speed, 'we were pushed over to the right side' towards the boundary fence. The Pilot closed the throttle to abort the take-off but was unable to recover directional control. The gyroplane departed the side of the runway, impacted with a fence, and came to rest lying on a magnetic heading of 105 degrees (**Photo No. 1**).

The passenger, who was uninjured aided the Pilot in exiting the front cockpit as the Pilot had sustained serious injuries to his right arm and shoulder during the accident. The Pilot instructed the passenger to switch off the engine ignition and radios due to the risk of fire posed by leaking fuel.

Both the Pilot and passenger walked back to their vehicle. The passenger drove the Pilot to a local hospital, where he received medical attention. The Pilot's own assessment as to the cause of the accident was that a 'severe crosswind gust' caused the gyroplane's left main wheel to lift resulting in a runway excursion⁷ and an impact with a fence post. The Pilot further stated that 'the event happened too quickly' for him to react and 'compensate by tilting the stick into wind'.



Photo No. 1: Final position of gyroplane

⁷ **Runway Excursion:** A veer off or overrun off the runway surface (ICAO).
www.aaiu.ie

1.2 Accident Sequence

The Investigation's site survey and the Pilot's own account of the accident indicate the following likely sequence of events:

When the gyroplane departed from the runway centreline it commenced a roll to the right and the main rotor struck a post in a fence running parallel to the runway (**Figure No. 1A**). The gyroplane continued to roll, became inverted with the tail impacting another fence post (**Figure No. 1B**). The gyroplane came to rest lying on a magnetic heading of 105 degrees (**Figure No. 1C**).

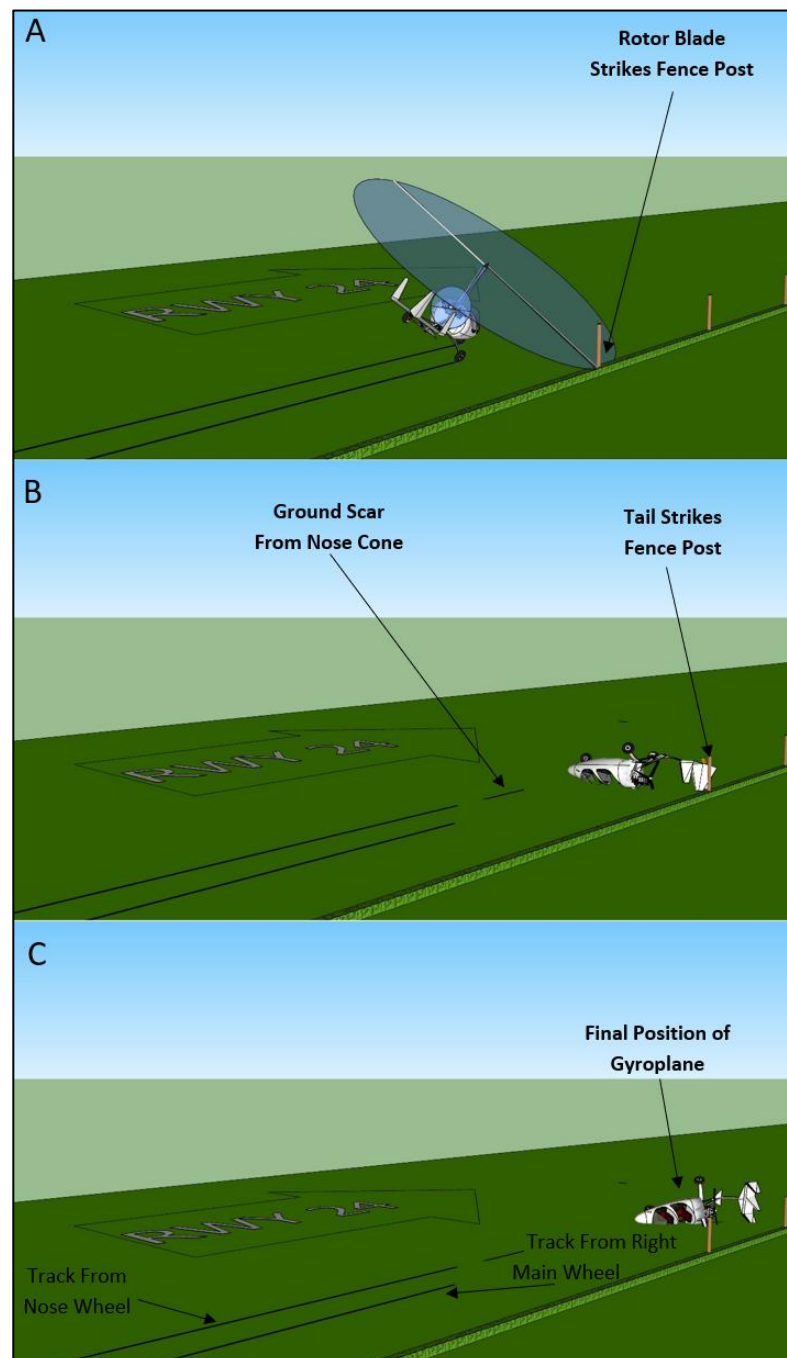


Figure No. 1: Illustration of likely accident sequence



1.3 Injuries to Persons

The Pilot sustained serious injuries requiring hospitalisation. The passenger reported that he was uninjured.

1.4 Aircraft Information

The ELA AVIACION SL ELA 07S is a two seat, three axis gyroplane with dual flight controls, designed and manufactured in Spain. The gyroplane is powered by a Rotax 914 engine which is fitted with a three-bladed pusher propeller and a main rotor prerotator mechanism that is disengaged during flight. The gyroplane has a two-bladed main rotor which is free to rotate. It has a fixed tricycle landing gear with a steerable nose wheel. The aircraft can carry a pilot and one passenger in a tandem configuration. The gyroplane was fitted with a two-point lap-belt harness in the front (pilot) seat, and a four-point lap and shoulder harness in the rear (passenger) seat. These were used by the Pilot and passenger during the accident flight.

Unlike a helicopter, in flight, a gyroplane rotor system operates continuously in autorotation. This means the rotor is not driven by the engine but spins freely as a result of air flowing up through the blades which in turn generates lift. Prior to take-off, the gyroplane must first achieve a rotor speed sufficient to create the necessary lift. This is achieved by engaging a prerotator to the main rotor via a drive mechanism. The engine power on the subject gyroplane is gradually increased until the main rotor reaches 220 revolutions per minute (rpm). When this is accomplished the prerotator is disengaged, the cyclic (directional) control stick is moved fully back to its stop, the wheel brakes are released, engine speed is increased to normal take-off rpm, and the gyroplane moves forward along the runway. This forward movement increases airflow through the rotor which increases its rotational speed, producing sufficient lift for the gyroplane to become airborne.

For crosswind take-offs the *'Pilot Operator's Handbook'* states:

'The maximum permitted cross wind for take-off and landing is 16 Kn [Knots]. The procedure to take-off with cross wind is the same than [sic] with no wind but it's necessary to use the controls properly. In cross wind conditions the control stick should be moved into wind to keep the aircraft's direction whilst the pedals should be used to keep the alignment with the runway'.

The subject gyroplane is categorised in Annex 1 of *'Regulation (EU) 2018/1139 on the common rules in the field of civil aviation'* as being exempt from the Basic Regulation. Such exempt aircraft are commonly referred to as *'Non-EASA'*⁸ and are therefore subject to national legislation. The gyroplane was operated on a Flight Permit issued by the Irish Aviation Authority (IAA). The most recent permit was issued on 28 September 2021 and was valid until the 27 September 2022.

⁸ EASA: European Union Aviation Safety Agency.
www.easa.europa.eu

1.5 Guidance Material

The IAA and the UK CAA promote safety awareness among the general aviation community in their respective states through their websites and other channels. The UK CAA in its 'HandlingSense Leaflet 4' on Gyroplane Handling and Performance states the following in its section on Rotor Handling:

'4) Be very careful when operating in gusty wind conditions, when the direction and strength of the wind can change rapidly.

5) Be wary of blade sailing. Always be prepared to abort the take-off or rotor acceleration if the stick starts to thrash about, or if the blades appear to be physically sailing rather than following a circular trajectory.

[...]

7) Always position the stick according to the wind direction. Even a small crosswind component may cause a gyroplane to roll over on the ground if the pilot is not sufficiently attentive. A tailwind can be problematic especially when trying to accelerate the rotors as airflow from above the rotors will always have a negative effect.

Gyroplanes can be at their most vulnerable when in contact with the ground with their rotors turning. Understand the implications of wind direction and strength on taxiing, pre-rotating, take-off, and landing.'

1.6 Engine Torque applied to a Propeller

When viewed from behind, the propeller on the gyroplane type rotates in an anti-clockwise direction and induces a reactive torque in a clockwise direction. Engine torque effect is more noticeable at high power settings such as at take-off or go around (**Figure No. 2**).

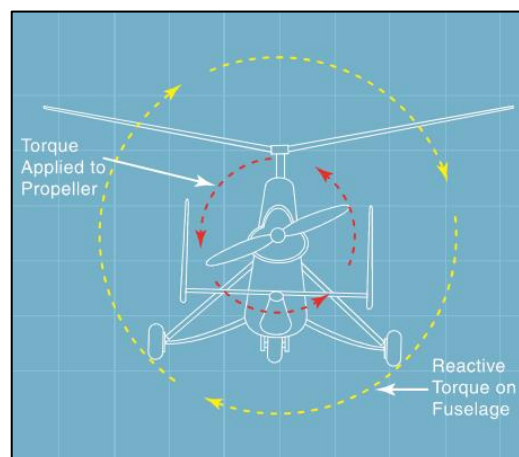


Figure No. 2: Engine torque (FAA Rotorcraft Flying Handbook)



1.7 Damage to Gyroplane

There was significant damage to the rotor blades with one blade detaching from the hub bar during the accident sequence and coming to rest approximately 23 metres (m) from the main wreckage. The remaining blade remained connected to the hub bar at the rotor head. There was chord-wise creasing of the left horizontal stabiliser (**Photo No. 2**). The main rotor mast had fractured and separated with significant distortion of the control rods. The rudder detached from the vertical stabiliser. Sections of two of the propeller's blades had completely separated while the third blade sustained significant cracking and distortion (**Photo No. 3**).

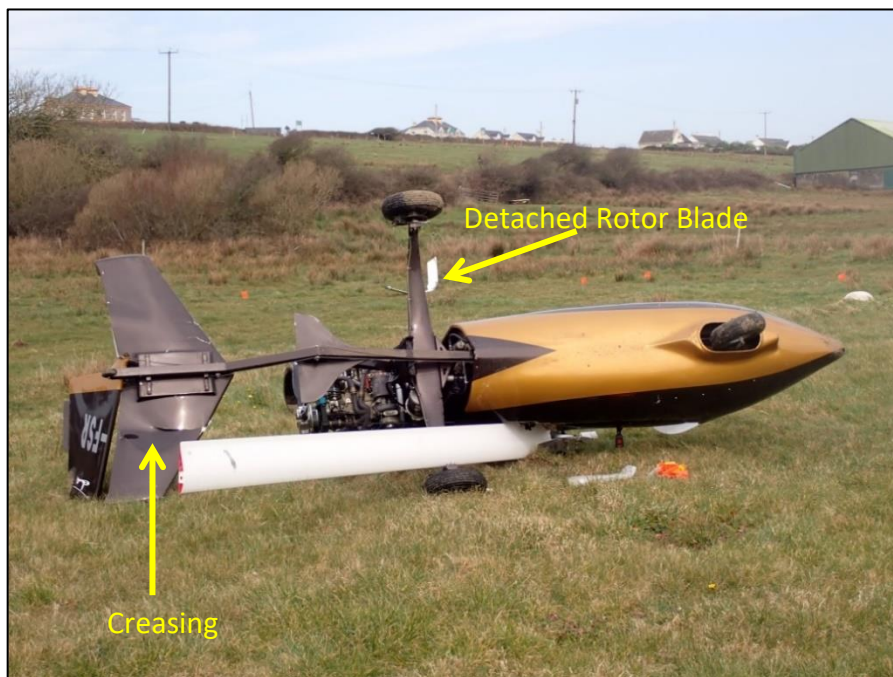


Photo No. 2: Damage to stabiliser and rotor blades



Photo No. 3: Damage to control rods, mast, propeller and rudder

1.8 Pilot Information

The Pilot held a PPL(G) issued by the UK CAA on the 8 June 2017 and was valid for the holder's lifetime. The licence contained a Single Engine rating for Gyroplanes, which was valid until 22 November 2022. The Pilot also held a Class 2 Medical Certificate issued by the IAA, which was valid until 3 June 2022.

Total all types:	382 hours
Total on type:	275 hours
Last 90 days:	12 hours 56 minutes
Last 28 days:	4 hours 35 minutes
Last 24 hours:	1 hour 35 minutes

Table No. 1: Pilot's flying experience

1.8.1 Relevant Regulation

The UK CAA PPL(G) permits pilots to fly gyroplanes, which are UK-registered in UK airspace only, unless pilots have an agreement with the aviation authorities in another country which will allow them to fly in that country's airspace. The IAA's Aeronautical Notice (AN) P.21, 'Acceptance of Flight Crew Licences', Issue 4, extant at the time of the accident, 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 I of EU Regulation No 2018/1139 (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 only apply 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;

b. no operational restriction imposed by the state of issue relating to the minimum distance allowed to be flown from the point of departure;

c. the valid medical certificate required by the state of issue, but in any case where no such certificate is required or where the certificate required is not an ICAO Class 2 or an EU Part-MED LAPL medical certificate, a minimum of an ICAO Class 2 medical certificate or an EU Part-MED LAPL medical certificate;

[...]



7. The Exemption issued under this Direction shall be valid for a period not exceeding one year, whereupon it may be reissued by the Authority subject to a new application being made therefor.'

When contacted by the Investigation, the Pilot stated that he had not submitted prior notification and was unaware that such notification was required to be submitted to the IAA in accordance with AN P. 21.

1.9 Meteorological Information

Met Éireann, the Irish Meteorological Service, provided the Investigation with an aftercast of the estimated meteorological conditions at the time and location of the accident.

Meteorological Situation:	An anticyclone of 1048 hectopascals centred over the North Sea generating a mostly moderate southeast airflow over Ireland.
Surface Wind:	South-east 10-15 knots (kt).
Wind at 2,000 feet (ft): Between Surface and 300 ft:	South 30 kts. Similar to surface.
Visibility:	30 kilometres (km).
Weather:	Sunny spells and cloudy patches.
Cloud:	Few (1-2/8th oktas ⁹) fair weather cumulus with bases around 1500-2,500 ft.
Surface Temperature/Dew Point:	11/7 degrees Celsius.
Mean Sea Level (MSL) Pressure:	1036 hPa [hectopascals].
Freezing Level:	8,000 ft.
Other Comments:	Nil.

Table No. 2: Aftercast of meteorological conditions (Met Éireann)

⁹ **Okta:** An estimate of cloud coverage in the sky on a scale from 0 to 8; completely clear sky is described as 0 oktas, while completely overcast sky is described as 8 oktas.

1.10 Airfield Information

Spanish Point Airfield is located 18.5 nautical miles west of Ennis, Co Clare. The airfield is at an elevation of 110 ft above mean sea level. Pooley's Flight Guide states it has a single grass runway 600 m in length, designated 24/06. The distance from commencement of the take-off run to the final position of the gyroplane was 155 m (**Figure No. 3**).

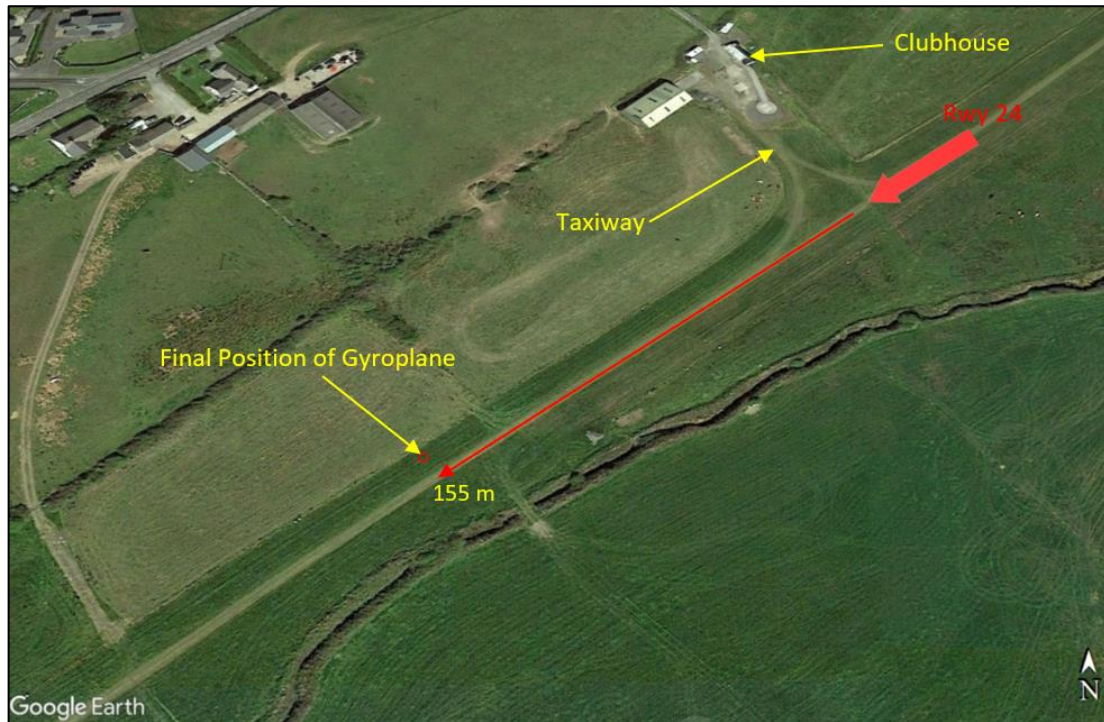


Figure No. 3: Final position of Gyroplane

2. AAIU COMMENT

The Pilot's report, the Investigation's survey and the available weather information would indicate that a crosswind, in combination with engine torque effect, initiated a rolling moment to the right from which the Pilot was unable to recover. Following impact with the fence post the gyroplane rolled over, resulting in serious injury to the Pilot and substantial damage to the gyroplane.

The Investigation notes that both the Pilot and passenger were wearing helmets and did not sustain head injuries. The Investigation further notes that the passenger, who was uninjured, was restrained with a four-point harness. However, the Pilot had a two-point (lap-belt) harness, and it is likely that, as his upper body was not restrained, this may have contributed to the injuries he sustained.

The Pilot held a UK CAA PPL(G) licence and a Class 2 Medical Certificate. The Pilot did not submit a notification to the IAA as he was not aware of IAA AN P.21 and how its requirements applied to a UK CAA PPL(G) being used in Ireland.

- 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.

Produced by the Air Accident Investigation Unit

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