

Accident

Aircraft Type and Registration:	EV-97 teamEurostar UK, G-IFLE	
No & Type of Engines:	1 Rotax 912-UL piston engine	
Year of Manufacture:	2004 (Serial no: 2113)	
Date & Time (UTC):	4 June 2023 at 1257 hrs	
Location:	Otherton Airfield, Staffordshire	
Type of Flight:	Private	
Persons on Board:	Crew – 1	Passengers – 1
Injuries:	Crew – 1 (Fatal)	Passengers – 1 (Fatal)
Nature of Damage:	Destroyed	
Commander's Licence:	National Private Pilot's Licence	
Commander's Age:	56 years	
Commander's Flying Experience:	134 hours (of which 134 were on type) Last 90 days – 3 hours Last 28 days – 2 hours	
Information Source:	AAIB Field Investigation	

Synopsis

The pilot intended to fly to another airfield 37 nm south of Otherton Airfield where the aircraft was based. The aircraft was climbing into the overhead while flying along the downwind leg. When at a height of about 740 ft agl, it started to descend and appeared to be returning to land. The base leg was flown relatively close to the airfield and during the turn onto the final approach the aircraft entered a spin from which it did not recover before striking the ground. The investigation was unable to establish why the aircraft descended and appeared to return to the airfield. However, the relatively high bank angle, decaying speed and retracted flaps would have provided the conditions for an entry to the spin. Guidance for pilots on stall and spin awareness can be found in CAA Safety Sense Leaflet 30¹.

History of the flight

At 1120 hrs the pilot and passenger taxied from outside the hangar where G-IFLE was kept to the clubhouse (Figure 1), where they had breakfast and spoke to a witness. The pilot and passenger both appeared to be fine and told the witness that they were going to fly to Croft Farm. About an hour later the pilot taxied back to the hangar and approximately 20 minutes after that taxied back to the clubhouse where the engine was shut down. The pilot entered the clubhouse and booked out, while the passenger remained seated in the aircraft. The airfield movement log shows that he booked out at 1345 hrs (1245 hrs UTC)

Footnote

¹ CAA Safety Sense Leaflet 30, Loss of Control, Stall & Spin Awareness. [CAA8230_SafetySense_30-LossOfControl_V10.pdf](#) [accessed 23 November 2023].

with one passenger for a flight to Croft Farm, which is approximately 37 nm south and located near Defford, Worcester.

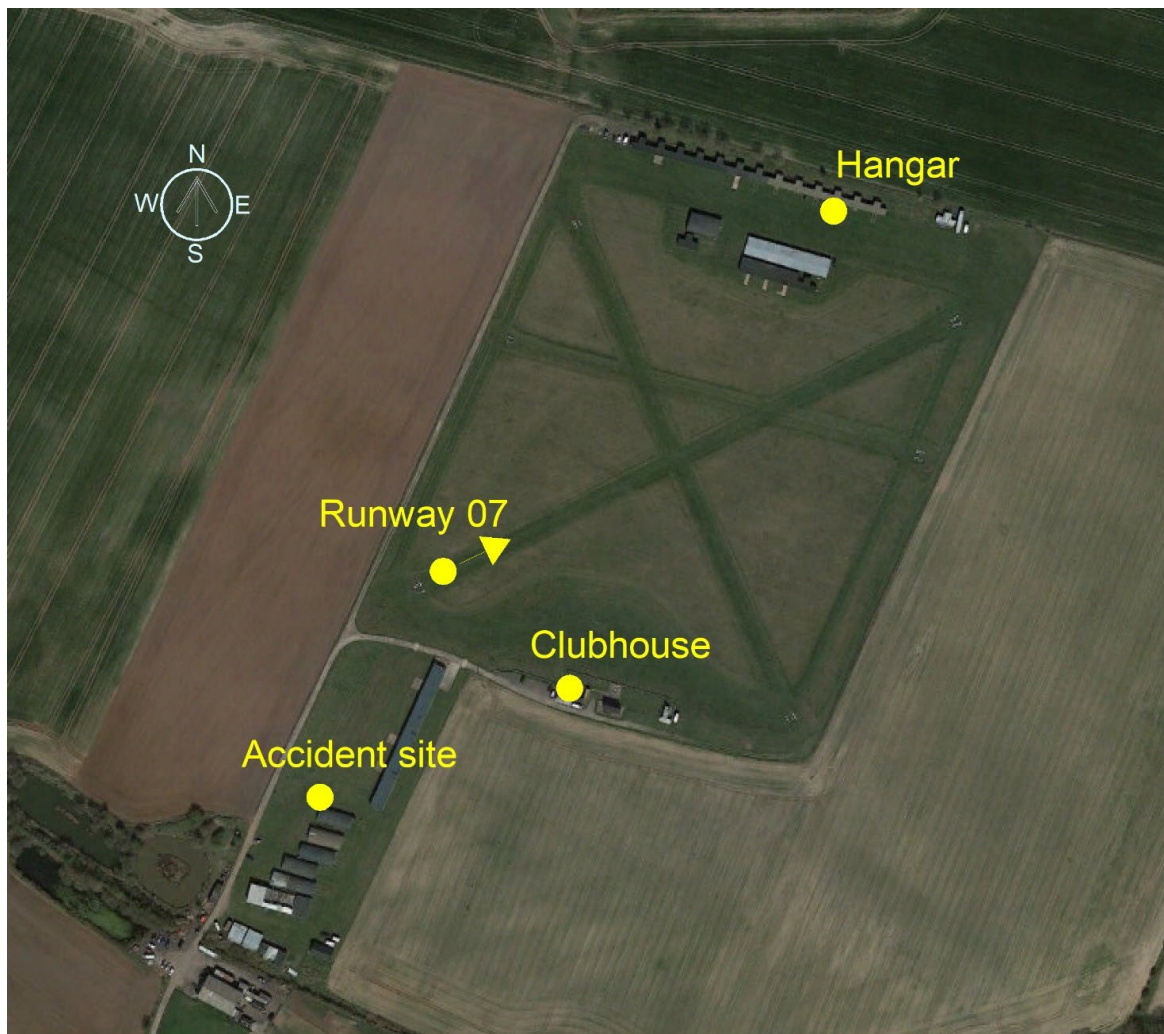


Figure 1

Otherton Airfield - location of G-IFLE's hangar, clubhouse and accident site
(© 2023 Google, Image © Maxar Technologies)

Approximately six minutes later, the pilot started the engine and taxied to Runway 07. The aircraft stopped short of the runway for about 30 seconds and then at 1256 hrs lined up and commenced the takeoff run.

The takeoff run and climb appeared to be normal and a witness reported that the engine sounded as if it was at full power. The aircraft continued to climb and at around 360 ft agl, started a right turn which brought it onto a heading of 240°, aligned with the downwind leg for Runway 07. When the aircraft was abeam Runway 34, at a height of about 740 ft agl, it commenced a right turn onto a heading parallel with the base leg and began to descend.

At approximately 500 m from the threshold of Runway 07, at a height of approximately 550 ft agl, the aircraft entered a right turn towards the runway. Shortly afterwards, it

descended in a steep nose-down attitude in a clockwise rotation and struck a metal shipping container adjacent to one of the hangars on the south side of the airfield. The aircraft immediately caught fire. The pilot and passenger were fatally injured, and the aircraft was destroyed.

There were no reports of any radio calls having been made from G-IFLE during the short flight.

Aerodrome information

Otherton Airfield has three grass runways and the circuit height is 500 ft agl² (Figure 2). The airfield elevation is 340 ft amsl. An Air/Ground radio service is available and if it is unmanned, pilots are asked to make "Blind Calls".

The airfield plate³ states:

'Remarks....NO FLY ZONE to north and south of airfield...

Departures. *Climb in the overhead to minimum 1,200ft agl. Depart East or West, maintain heading until 2nm from the airfield before turning onto course'*

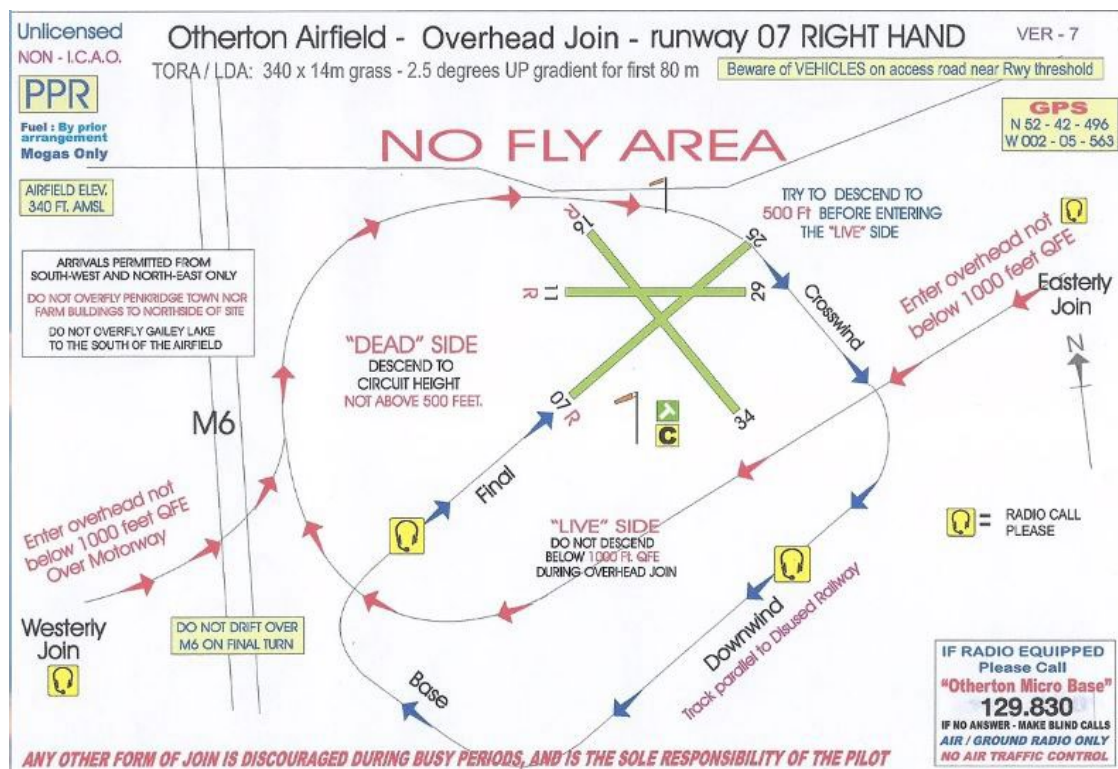


Figure 2
Airfield information
(Used with permission)

Footnote

- ² QFE and agl are used interchangeably in this report; they both refer to height above the ground.
³ Pooleys Flight Guide 2023.

Meteorology

An Aftercast provided by the Met Office reported:

'...at the time of the incident there was no cloud below 5000FT reported in the area and visibility was greater than 10Km with light east to north-easterly winds.'

The Aftercast was consistent with CCTV footage from the airfield taken at the time of the accident. From the recorded images of the windsock located near the clubhouse it was estimated that the wind was from 030° at 8 kt.

Accident site

The accident site was approximately 140 m from the threshold of Runway 07 and adjacent to one of the hangars on the south side of the airfield (Figure 3).



Figure 3

Aerial view showing the location of the accident site relative to the Runway 07 threshold

The left-wing had struck the top of a metal shipping container and separated from the rest of the aircraft, which came to rest alongside. The fuel tank was split open and there had been a post-crash fire that consumed parts of the aircraft; no fuel remained in the tank.

Witness marks in the ground and damage on the wings indicated that the aircraft was in a steep nose-down attitude when the accident happened. From a review of the CCTV footage and examination of the wreckage the aircraft appeared to be intact when it struck the container.

Aircraft information

The EV-97, also known as the Eurostar, is a two-seat microlight aircraft (Figure 4). G-IFLE was an EV-97 teamEurostar UK, meaning that it was assembled in the UK by a CAA approved organisation. The aircraft was built in 2004 and its Permit to Fly was valid until 18 September 2023. The aircraft was kept in a hangar at the airfield.

G-IFLE was fitted with a three-bladed composite propeller. The aircraft can be equipped with an optional stall warner, but G-IFLE did not have a stall warner fitted.

The POH⁴ provides the following operating information:

- Stall speed with the engine at idle: flaps fully extended is 40 mph (CAS) and with flaps retracted is 48 mph (CAS).
- Best glide speed is 68 mph with flaps retracted, for landing select flaps as required.
- Intentional spins are prohibited.



Figure 4

Image of teamEurostar UK, G-IFLE
(Image used with permission)

Local practice

The local practice which the pilot had been taught when flying the EV-97 at Otherton was:

- The initial climb in the EV-97 would normally be flown at 75 mph and on turning onto the downwind leg slow to 65 mph and select full flap.
- The turn from base leg onto the final approach would normally be at a height of around 300 to 400 ft agl.

Footnote

⁴ Light Sport Aviation, Pilot's Operating Handbook, EV-97 teamEurostar UK, POH/EUR/01 Issue 4.

- Engine failures were not practised at Otherton as the circuit was tight and the runways short.
- Glide approaches would be conducted from the final approach at around 400 ft agl.
- When leaving the circuit, climb on the downwind leg to above 1,000 ft agl.
- For a flight to Croft Farm, the aircraft would leave the circuit to the west.
- The pilot's normal practice was to fly one or two full stop landings before leaving the circuit to land at another airfield.

Recorded information

Recorded data

Data for the accident flight was available from a ground receiver system⁵ that had recorded transmissions from a Pilot Aware Rosetta⁶ electronic conspicuity device fitted to the aircraft. This provided GNSS derived position, groundspeed and the altitude of the aircraft at recorded rates of between once a second and once every four seconds. This data ended shortly before the aircraft struck the ground.

CCTV footage of the aircraft was captured by several co-located cameras on the airfield and a camera located at a private property which was about 0.5 nm south-east of the airfield. The footage included the period when the aircraft taxied to the runway and took off, and then as it subsequently descended and struck the ground.

Accident flight

The takeoff roll and liftoff appeared normal with the aircraft climbing at an average rate of 660 ft/min at an estimated airspeed of about 70 mph; this was based on a wind from 030° at 8 kt.

The following sections of the flight are shown on Figure 5 and 6:

- As the aircraft climbed through 260 ft agl (600 ft amsl) it started a right turn onto a downwind heading and at 600 ft agl (940 ft amsl) the rate of turn was reduced with the aircraft rolling out onto a track of about 240° (Figure 5 and Figure 6 Point A).
- The climb rate then reduced to about 340 ft/min and the airspeed gradually increased to an estimated 85 mph (Figure 5 and Figure 6 Point B).
- At a height of about 740 ft agl (1,080 ft amsl) (Figure 5 and Figure 6 Point C) the aircraft started to descend and its airspeed increased to an estimated 100 mph; the aircraft was laterally positioned about 550 m from the threshold of Runway 07 at this time. As the aircraft descended it turned to the right,

Footnote

⁵ PilotAware Air Traffic Observation and Management (ATOM) grid.

⁶ [Rosetta \(pilotaware.com\)](https://pilotaware.com) [accessed 13 November 2023].

back towards the airfield, with the estimated bank angle increasing to approximately 30° right wing down.

- As the aircraft descended to about 550 ft agl (880 ft amsl) (Figure 5 and Figure 6 Point D) its rate of descent reduced from about 1,800 ft/min to an average of 360 ft/min. As the aircraft gradually descended its airspeed also reduced.
- After about 10 seconds the estimated airspeed of the aircraft had reached about 60 mph at which point the data indicates that the rate of turn had also increased quickly with the estimated bank reaching more than 45°.
- At a lateral distance of about 200 m from the threshold of Runway 07, the aircraft then entered a rapid descent from a height of about 480 ft agl (Figure 5 and Figure 6 Point E). The first CCTV image of the aircraft as it descended was captured shortly after.

Comparison of the ground track of the accident flight with a previous flight recording of G-IFLE landing on Runway 07 showed that the downwind leg of the previous flight had extended much closer to the M6 motorway (Figure 2) before the aircraft turned onto base leg.

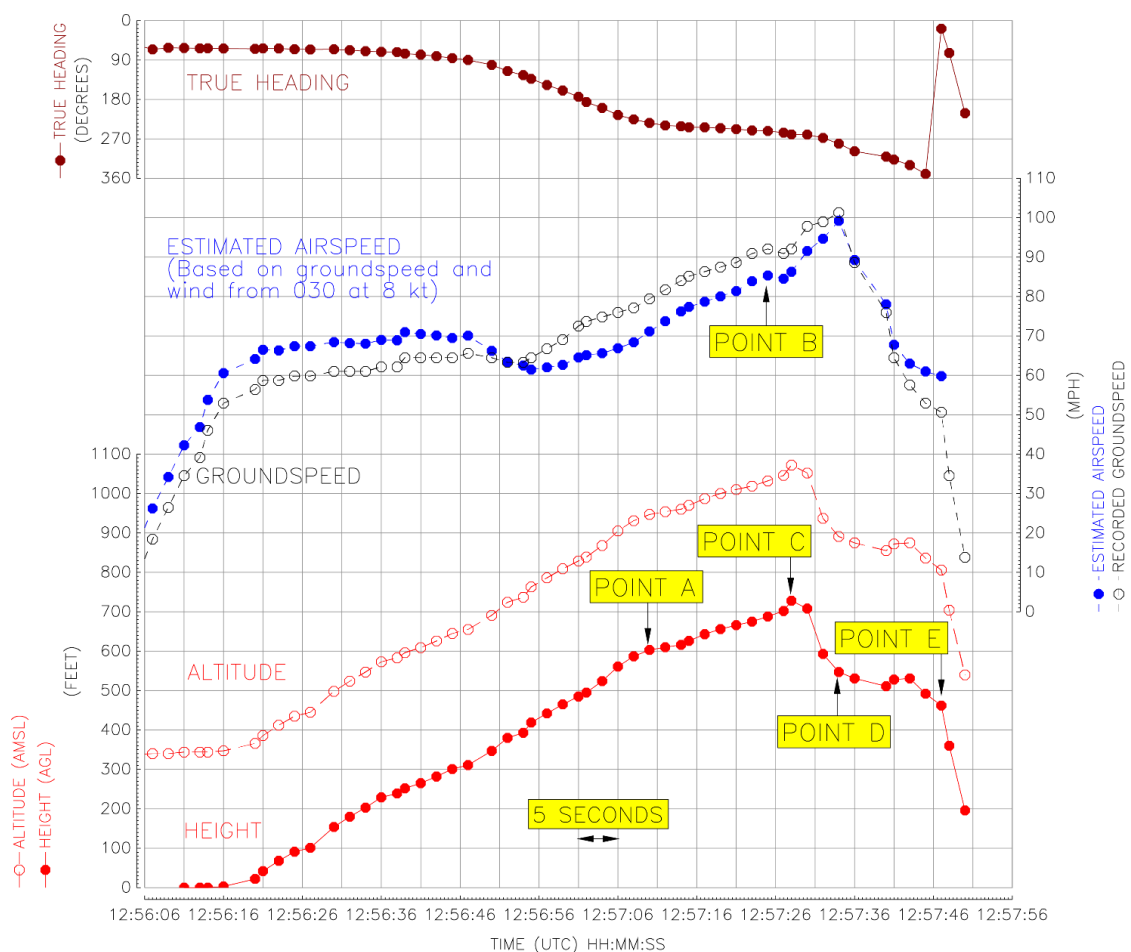


Figure 5
Data plot of accident flight

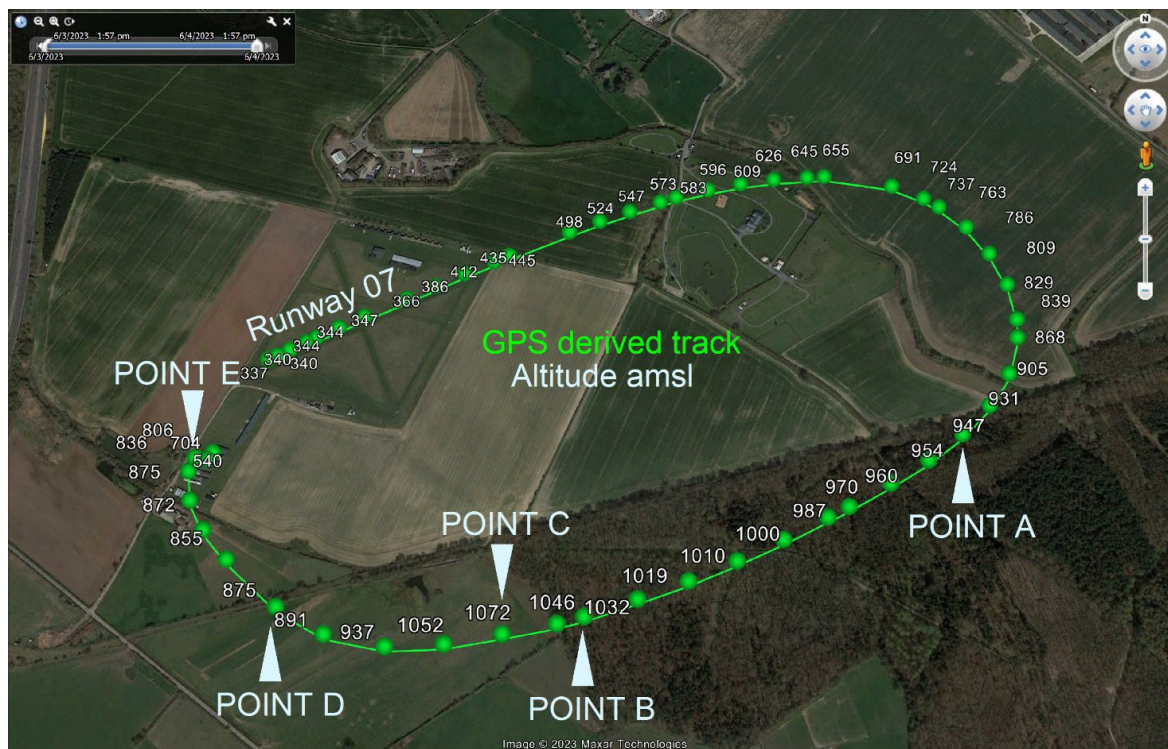


Figure 6

GPS derived track and altitude
(© 2023 Google, Image © Maxar Technologies)

The descent

A composite image of the descent footage is provided in Figure 7; each image of the aircraft is 0.5 second apart.

At the beginning of the CCTV footage the aircraft's pitch attitude was at about 35° nose-down and the bank angle was about 80° right wing down. The aircraft turned to the right as it descended, and its nose-down attitude increased to about 70°. The average descent rate was about 5,000 fpm (57 mph) with one complete rotation of the aircraft taking about 4.5 seconds. The aircraft remained in a steep nose-down attitude until it struck the ground, which was captured by CCTV at the airfield.

The time from the aircraft departing from controlled flight to crashing was approximately six seconds during which it made around 1.5 rotations. There was no evidence of the aircraft starting to recover from the spin.



Figure 7

Composite CCTV image of the descent

Aircraft examination

The aircraft was badly damaged in the accident and fire, which prevented a full assessment of its condition prior to the impact being carried out. The investigation established the following:

Structure

There was no evidence of a structural failure.

Flying controls

- There was no evidence of a control failure.
- The flaps were retracted.

Fuel

- The fuel tank had cracked in the impact and was empty.
- The fuel pump had broken off the engine, but its internal condition was good. It contained a small amount of fuel.
- The fuel shut-off valve was open.
- The main fuel jets in the carburettors were clear, and the throttle plates were both close to the idle position.

Engine

- The visual appearance of the spark plugs was normal.
- The cylinders and pistons were intact and of a normal appearance.
- The oil filter was clear of debris and the oil pump was in good condition.
- The engine ignition switches were ON, which is the normal position for flight.

Propeller

Witness marks in the reduction gearbox indicated that the propeller was rotating when the aircraft crashed. The speed of rotation is unknown.

Recent engine maintenance

The engine was manufactured in 2008 and last underwent maintenance in April 2023 after reports of a rough running engine. The spark plugs were replaced and the carburettors adjusted. The flight log recorded that the aircraft had flown 13 times since this maintenance, including a three-hour flight the day before the accident. There were no reports of any engine problems following this maintenance.

Weight and Balance

G-IFLE, which is classed as a microlight, has a Maximum Take-off Weight (MTOW) of 450 kg. The Aerotechnik EV-97A Eurostar, which is classed as a Single Engine Piston aeroplane has a MTOW of 480 kg. Both aircraft are structurally the same and have the same flying characteristics.

The website for Croft Farm Airfield states that fuel is not available; therefore, the pilot would have had to take sufficient fuel for the return journey plus a reserve. It was not possible to establish the actual fuel load at the start of the flight.

An instructor familiar with the aircraft said he would expect to plan for 30 litres of fuel. For the occupants he would have allowed for a weight of between 152 and 160 kg. This would have given an estimated minimum weight at the start of the flight of 472 kg, which would have placed the CG at 23% inside the allowable limit.

With a full fuel tank, the estimated maximum weight would have been 485 kg with the CG at 18% inside the allowable limit.

Estimation of stall speed

The British Microlight Aircraft Association (BMAA) calculated the stall speed of G-IFLE during the final turn assuming ISA conditions, level flight in a 45° bank, flaps retracted, and a weight of between 472 kg and 485 kg, and estimated it to be around 59 mph.

Medical

The pathologist found that the pilot and passenger both died from injuries sustained during the accident. There was no evidence of medical impairment or incapacitation of the pilot before the aircraft struck the ground. Carboxyhaemoglobin analysis was carried out on a sample of the pilot's blood and was not found to be indicative of carbon monoxide poisoning.

Pilot and passenger information

Pilot

The pilot was issued with a UK National Private Pilot's Licence Aeroplanes (NPPL(A)) on 26 July 2019, and held a microlight aeroplane rating, which was issued on 10 August 2021 and valid until 31 August 2023.

The pilot's logbook shows that he started his flying training in May 2016 and had flown around 134 hours of which around 30 hours were recorded as Pilot in Command (P1). All the flights were undertaken in an EV-97 and since 12 May 2021 were flown in G-IFLE.

In 2023 the pilot flew seven flights totalling 4 hours 30 minutes and in 2022 flew four flights totalling 3 hours 25 minutes. His last flight with an instructor was on 6 September 2021 and the logbook entry records '*P/APP Glide App Side Slips Ex 12 +13*'. The BMAA Microlight Instructor and Examiner Guide⁷ describes Exercise 12 and 13 as '*Take-off, Climb to Downwind, The Circuit, Final Approach and Landing*'.

Passenger

The passenger also held a NPPL(A) and completed his General Skills Test (GST) on 20 June 2022. His microlight rating had expired and he was flying under the supervision of an instructor as he prepared to take his GST to renew his rating. He last flew as PIC on 22 May 2023 and the remarks columns in his logbook for this flight recorded '*Ex 17B⁸*'. His total hours were 143 hours 10 minutes of which 24 hours 50 minutes were recorded as P1. All the flights were in an EV-97.

Footnote

7 BMAA Instructor & Examiner Guide. Edition 5. May 2013 (Amended December 2016).

8 BMAA Instructor & Examiner Guide. Edition 5. May 2013 (Amended December 2016). Exercise 17b Solo circuit, local area, and general flying consolidation to GST for microlight NPPL.

Spin awareness training

Training for a NPPL is conducted in accordance with a syllabus approved by the CAA; the BMAA syllabus which the pilot followed during his training is approved by the CAA. Section 4 of the BMAA Instructor & Examiner Guide, provides guidance to instructors and details the exercises that a student must complete in order to pass the GST. Exercise 11 covers spin awareness.

Spinning is not permitted in microlight aircraft and, therefore, students and pilots only receive spin awareness training. The guidance for Exercise 11 states:

'4.12.1 It is not possible to provide flying training for recovery at the incipient stage of the spin in the current generation of microlight aircraft, as none are cleared for spinning...Instructors should cover the spin awareness exercise as a discussion item. Individual aircraft may have different recovery procedures; always refer to the Pilot Operator's Manual.'

4.12.4 It should be appreciated that in any unplanned spin entry situation the element of surprise is likely to limit the ability of the student to respond promptly and correctly. The time available to effect a recovery at the incipient stage of the spin is limited.

4.12.6 It should be noted that many aircraft will increase their spin rotation rate if the incipient recovery is used whilst the aircraft is in a fully developed spin.'

The actions to take to recover the EV-97 from an incipient and developed spin are listed in Table 1.

Order of actions	Incipient spin	Developed spin
1	Control column forward	Reduce throttle to idle
2	Power as required	Ailerons neutralised
3	Rudder to prevent further yaw	Apply full opposite rudder
4	Level wings and regain balanced flight	Control column forward as required to stop spin
5		Immediately after rotation stops, neutralise rudder.
6		Recover from dive

Table 1

Actions to be taken to recover from an incipient and developed spin

CAA guidance on stall and spin awareness

CAA Safety Sense Leaflet⁹ 30 provides guidance to pilots on stall and spin awareness. It states that *'Loss of control through stalling or entering a spin remains one of the leading causes of General Aviation accidents'* and that at low level it may be impossible to recover from a spin. When considering why loss of control might happen during the different stages of flight, it discusses the importance of pilot's being constantly aware of the aircraft's attitude and airspeed.

Analysis

The pilot's intention was to fly to Croft Farm, which is approximately 37 nm south of the departure airfield. His normal practice before flying to another airfield was to first make one or two full stop landings at Otherton before climbing above 1,000 ft agl and fly out to the west avoiding the No-Fly Zone to the south.

The takeoff appeared normal, and the aircraft turned onto the downwind leg and continued climbing to 740 ft agl. The airspeed and height then started to reduce, and the aircraft turned onto a track roughly parallel to the base leg, but much closer to the airfield. When the aircraft was about 200 m from the runway threshold, at a height of about 480 ft agl, it entered a 70° nose-down attitude, with a clockwise (right) rotation. There was no evidence that the aircraft had started to recover from this attitude before it struck the ground about six seconds later. There were no reports of any radio calls having been made from G-IFLE during the short flight.

There was no evidence of a structural failure of the aircraft, or disconnection of the flying controls prior to the impact. While the estimated weight of G-IFLE at the start of the flight was between 22 and 35 kg above the maximum permitted weight, after accounting for the amount of fuel used it was probably within the permitted weight of the EV-97A, which has the same flying characteristics. Therefore, the weight and CG of G-IFLE were not considered to be factors in this accident.

Medical incapacitation seems unlikely as the pathologist concluded that the pilot and passenger were fatally injured in the crash and there was no evidence of carbon monoxide poisoning. Whilst the passenger probably had sufficient experience to fly the aircraft if the pilot was incapacitated, success would rely on recognising a need to take control.

If the pilot intended to land, then it would be normal to fly the downwind leg at 500 ft agl with the flaps extended. Continuing to climb to 740 ft agl with the flaps retracted might indicate that he intended to climb and leave the circuit, or that he had become distracted.

The possibility that the pilot climbed to practise an engine failure and glide was considered, but engine failures were not practised at the airfield and glide approaches were normally entered from the final approach. It was also unlikely that his first landing of the day would be a glide approach.

Footnote

⁹ CAA Safety Sense Leaflet 30, *'Loss of Control, Stall & Spin Awareness.'* [CAA8230_SafetySense_30-LossOfControl_V10.pdf](#) [accessed 23 November 2023].

There may have been a technical problem, but with a glide range of at least 0.8 nm, from when the downwind descent started, the aircraft would have been able to glide to one of the runways; the estimated speed of the aircraft in the circuit indicates that the glide speed of 68 mph was never maintained. The pilot's logbook recorded that he had last flown a glide approach with an instructor on 6 September 2021.

Consideration was given to the possibility that there had been an engine failure or loss of power. The fuel shut-off valve and engine ignition switches were found in the normal operating positions for flight and the intensity of the fire is evidence that there was fuel onboard the aircraft. Examination of the engine concluded that it was probably operating at a low power setting and the propeller was rotating when the aircraft struck the ground.

The low power setting could be due to the pilot closing the throttle when attempting to recover following the loss of control, or a fault in the engine. However, the damage to the engine and aircraft meant that it was not possible to establish if there had been a fault. Maintenance had previously been carried out on the engine following reports of rough running, but it had since flown 13 flights with no further reports.

The profile of the final manoeuvre was consistent with the aircraft entering a spin from which it did not recover. G-IFLE was not fitted with the optional stall warner and during the final turn the flaps were retracted, and the speed had reduced to around 60 mph; with a bank angle of 45°, the estimated stall speed would have been around 59 mph. The aircraft would have been high on the approach for a landing on Runway 07. Microlight aircraft such as G-IFLE have relatively low inertia and will quickly slow down following a reduction or loss of engine power if the pilot does not immediately lower the nose of the aircraft. The relatively high bank angle, decaying speed and retracted flaps would have provided the conditions for an entry to the spin.

It took around six seconds from the start of the final manoeuvre to the aircraft striking the ground, during which it made approximately 1.5 rotations. The pilot was relatively inexperienced and suddenly entering a spin would have startled him and possibly limited his ability to respond promptly and correctly.

Conclusion

While turning onto the final approach during a return to the airfield the aircraft entered a spin. The pilot was unable to recover the aircraft before it struck the ground and caught fire. The accident was not survivable.

Published: 1 February 2024.