



Air Accident Investigation Unit Ireland

FACTUAL REPORT

ACCIDENT

Ozone Delta 3 (Paraglider)

Ballinacor, Co. Wicklow

11 May 2019



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

FINAL REPORT**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

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: 2019-010
State File No: IRL00919020
Report Format: Factual Report
Published: 25 October 2019

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 11 May 2019, appointed Mr Leo Murray as the Investigator-in-Charge to carry out an Investigation into this Accident and prepare a Report.

Aircraft Type and Registration:	Ozone Delta 3 (Paraglider)
No. and Type of Engines:	None
Aircraft Serial Number:	D3L-S-44E-169
Year of Manufacture:	2018
Date and Time (UTC) ⁴ :	11 May 2019 @ 13.05 hrs
Location:	Ballinacor, Co. Wicklow
Type of Operation:	General Aviation
Persons on Board:	Crew - 1
Injuries:	Crew - 1 (Fatal)
Nature of Damage:	Nil
Commander's Licence:	Issued by <i>Letecká Amatérska Asociácia</i> (LAA SR), (Slovak Air Amateur Association)
Commander's Age:	41 years
Commander's Flying Experience:	435 hours of recorded cross-country time, of which 176 are estimated on type
Notification Source:	Dublin-Wicklow Mountain Rescue Team
Information Source:	AAIU Field Investigation, Airborne Flight Log Data

⁴ UTC: Co-ordinated Universal Time. All timings in this report are quoted in UTC; Local time is UTC +1 hour.

FINAL REPORT

SYNOPSIS

On 11 May 2019, the Pilot launched his Paraglider from a location at Sorrel Hill, Co. Wicklow at 11.33 hrs, with the intention of conducting a cross-country flight to Wexford town. The launch was witnessed by a fellow Paraglider pilot, who he had met earlier with the intention of them both attempting cross-country flights as far as Wexford. The Pilot gained height and then proceeded in a south-easterly direction towards the Glenmalur Valley. A mobile phone application used by the Pilot showed the entire flight, from the launch point to the north slope of Ballinacor Mountain (Mt), Co. Wicklow. The Pilot did not reply to a phone message sent at 14.18 hrs and was declared missing later that day. The deceased Pilot was located at 07.30 hrs the following morning (12 May 2019) on Ballinacor Mt; the Paraglider wing was still attached to the Pilot's seat harness. Recorded data showed that the Paraglider had been airborne for 1 hour and 33 minutes.

NOTIFICATION

Following notification, two Inspectors of Air Accidents deployed to the scene. The Paraglider and associated equipment were recovered by the AAIU.

1. FACTUAL INFORMATION

1.1 History of the Flight

3

The Pilot had arranged to meet a fellow Paraglider pilot at 08.30 hrs, and they then proceeded to a car park at Lacken, Co. Wicklow⁵. From there they hiked with their paragliding equipment to a launch point on Sorrel Hill, which took approximately 30 minutes, arriving there at approximately 10.00 hrs. While waiting for some low cloud to clear, the two pilots set up their equipment and completed safety checks.

The Pilot launched at 11.33 hrs and routed in a southerly direction towards Black Hill. The Paraglider remained in the general vicinity of Black Hill and made a series of turns, in order to gain altitude. At 12.25 hrs, the Paraglider proceeded in a south-easterly direction towards Mullaghcleevaun, gaining more altitude as the flight progressed, achieving a maximum altitude of 1,706 m (5,600 ft) at approximately 12.40 hrs. The flight continued towards Tonelagee and to the east of Camaderry where a gradual descent began. The flight continued south towards Mullacor, reaching the Glenmalur Valley at an altitude of approximately 700 m (2,300 ft). The Paraglider made a left turn and proceeded along the direction of the valley before making a right turn on to a southerly direction towards Ballinacor Mt. A final right turn was made prior to the Paraglider returning to the ground on the north slope of the mountain at 13.05 hrs. The track that the Paraglider followed from the point of launch to the end of the flight is reproduced in **Appendix A**.

⁵ All geographic points referred to on the flight are located in Co. Wicklow, Ireland.
Air Accident Investigation Unit Report 2019-010



1.2 Witnesses

1.2.1 Witness No. 1 (Second Paraglider Pilot)

The second Paraglider pilot stated that they *'would be methodical when it comes to safety'* and noted that the Pilot *'took his time to carry out safety checks'*. He watched the Pilot launch and head south before he launched from the same site at 11.52 hrs and also routed to the south. The second pilot was in radio contact with the Pilot until about 12.45 hrs on frequency 143.950 MHz. Both pilots flew together for approximately 50 minutes on the west face of Black Hill overlooking Blessington lakes. The second Pilot noticed the first Pilot had found a thermal, (recorded data shows this at approximately 12.25 hrs); climbed this thermal back over Mullaghcleevaun, while the second pilot didn't leave Black Hill until approximately 15 minutes later, taking the same route over Mullaghcleevaun. At this point, the second pilot lost contact with the first Pilot.

Due to the cloud base, the second pilot stopped climbing at 1,300 m (4,200 ft) above Mullaghcleevaun. The second pilot then continued flying south towards Tonelagee, whilst twice attempting to make radio contact with the first Pilot. At 13.20 hrs, after gliding from Tonelagee over Mullinacor and unable to gain sufficient height to continue, he landed at the Spink, a point between Mullinacor and the Upper Lake at Glendalough.

The second pilot stated that he subsequently launched again and landed at about 14.00 hrs. At 14.18 hrs, he sent a message by phone to the first Pilot, but when it was not delivered he presumed that the Pilot was still airborne. The second pilot sent another message at 16.00 hrs, when he considered that most flying would have been finished for the day. At 16.30 hrs, he arrived back at his car at Lacken. At 20.30 hrs, the Pilot's wife contacted the second pilot, concerned that she had not been contacted by her husband. The Pilot was then reported missing to the Gardaí.

1.2.2 Witness No. 2

This Witness was walking with a group in the Mullacor area between 12.00 hrs and 13.00 hrs. He observed a Paraglider proceeding towards the Spink in an easterly/south-easterly direction and was not circling. He remarked that it was very high up and didn't appear to be in difficulty. He thought that it was 600 feet above Mullacor. Two of the group thought it was coloured green, another orange.

1.3 Injuries to Persons

The Pilot was found the following day (12 May 2019) at 07.30 hrs by members of the Dublin-Wicklow Mountain Rescue Team and was pronounced deceased later that morning by a Doctor who attended the scene.

	Crew	Passengers	Others
Fatal	1	0	0
Serious	0	0	0
Minor /None	0	0	

1.4 Damage to Aircraft

Minor abrasion to some of the Paraglider canopy lines.

FINAL REPORT

1.5 Personnel Information

1.5.1 General

Prior to becoming involved in paragliding, the Pilot had been a skydiving instructor operating in Poland, Ireland and the United States. In April 2015, he commenced Paragliding training in Slovakia. On 17 April 2015, he obtained his Paragliding licence (issued by the LAA SR) and also held an International Pilot Proficiency Identity (IPPI) card issued by the *Fédération Aéronautique Internationale* (FAI). At the time of the accident, he was a member of the Irish Hang-gliding and Paragliding Association (IHPA) and held a Para Pro 3 Rating, i.e. the practical and knowledge requirements necessary to fly without being under the supervision of an instructor.

The Investigation was unable to ascertain the number, or duration of flights he undertook during training, within either the Slovak Republic or any of the other flights the Pilot made prior to 13 February 2016. Since that date, the Pilot maintained a detailed record of his Paraglider flights using commercial flight analysis and planning software. For each flight, this particular software records the date, pilot, take-off location, duration of the flight, open distance covered and the cross-country distance covered.

From 13 February 2016, the Pilot recorded a total of 185 flights on this system. Of these flights, 91 took place from launch sites in Ireland, 40 from sites in Italy, 40 from sites in Spain, nine from sites in the United Kingdom and five from sites in the Slovak Republic. The log also showed that the Pilot had considerable experience in long duration flights with several flights in excess of seven hours. Including the accident flight, his logged flight time is shown in **Table No. 1**:

5

Year:	Time recorded:
2016	142 hours 29 minutes
2017	117 hours 38 minutes
2018	146 hours 13 minutes
2019 (4 months)	29 hours 18 minutes
Total:	435 hours 38 minutes

Table No. 1: Pilot's recorded flight time between 2016 and 2019

As the Investigation was unable to ascertain the Pilots hours from April 2015 to early February 2016 and the fact that some local flights of short duration may not have been recorded, his total experience probably exceeded the known total of 435 hours logged on cross-country flights. His experience of 177 hours on the Ozone Delta 3 (of which he was the owner) was estimated solely from his recorded flight hours since the Paraglider's date of manufacture in January 2018.

1.6 Aircraft Information

1.6.1 General

The Ozone Delta 3 is a sport, performance class Paraglider with an intermediate to advanced wing designed for performance cross-country flight. The Manufacturer stated that the design is not suitable for beginner pilots, tandem flights or for performing aerobatic manoeuvres.



In addition, the type exhibits no unusual flying characteristics, turns are smooth and coordinated and it remains solid and well pressured on glide, even through the accelerated speed range. The wing has a very high resistance to collapses⁶ and stalls. The Manufacturer warns against undertaking flight in conditions of rain, snow, strong wind, turbulent weather conditions or cloud. A file photo of an Ozone Delta 3 in flight is reproduced in **Photo No. 1**.



Photo No. 1: File photo of an Ozone Delta 3 in flight (*Delta 3 Pilots Manual*)

The accident Paraglider, Serial No. D3L-S-44E-169, was ordered by the Pilot from the Manufacturer on 26 January 2018 with a green/yellow coloured canopy. The information panel on the Paraglider wing showed a manufacturing and conformity date of 30 January 2018. The Manufacturer recommended that the wing should be checked by a qualified professional initially after 24 months, or 100 hours, and if flown more than 100 hours per year, that the wing should be checked annually.

The Delta 3 is certified for a defined weight range, which in the case of the accident wing (Size L) is 95 to 115 Kg. On the accident flight, the Paraglider was operated within the approved weight range. The Pilot was also equipped with an emergency parachute which was found in its fully packed configuration and had not been deployed.

1.7 Meteorological Information

Met Éireann, the Irish Meteorological service, provided the Investigation with the following aftercast for the Ballinacor area, Co. Wicklow, for 13.05 hrs on 11 May 2019:

⁶ **Collapse:** Due to its flexible nature, a Paraglider canopy may, under certain circumstances, deflate either asymmetrically or completely resulting in loss of lift.

FINAL REPORT

Meteorological Situation:	A moderate northerly airflow over Ireland slackened as pressure increased from the west
Wind: (at surface)	North to northwest 5 Kts
(at 2,000 ft)	Northwest 10 kts
(surface to 300 ft)	There was a slack pressure gradient, which would have resulted in little to no difference in speed and direction in this layer. Given the proximity to high ground, local or terrain effects would have been minimal as wind speeds were light.
Visibility:	30 kilometres plus
Weather:	Sunshine and fair weather cumulus
Cloud:	Few (1/8 to 2/8 of sky) fair weather cumulus with cloud bases between 2,500 and 3,000 ft and scattered (3/8 to 4/8 of sky) cloud with cloud bases between 4,000 and 5,500 ft.
Surface Temp/Dew Point:	Temp 13 °C, Dew Point 2 °C
Mean Sea Level Pressure:	1026 hectoPascals (hPa)
Freezing Level:	7,000 ft

The aftercast also included the following comment requested by the Investigation regarding mountain wave activity: *'There was very weak mountain wave activity in the area, in the order of 100 – 150 ft/min. (For reference, moderate is 500 – 700 ft/min and severe is 700 ft/min)'*.

7

1.8 Flight Recorders

Flight recorders were not carried nor were they required. The Pilot, however, carried two mobile phones which contained commercial flight-planning and tracking software. Both mobile phones were recovered intact by the Investigation. The data obtained from one of the phones showed that the Pilot launched at 11.33 hrs and headed south where he flew locally at an altitude of approximately 600 m (2,000 ft) for approximately 30 minutes. At 12.20 hrs, the Pilot gained altitude and proceeded in a south-east direction climbing to an altitude of 1,704 m (5,600 ft) at 12.35 hrs. This was followed by a descent to 1,100 m (3,600 ft) at 12.42 hrs, and by some shorter climbs and descents, before descending from 950 m (3,100 ft) at 12.52 hrs. The recorded data ended at 13.05 hrs.

1.9 Wreckage and Impact Information

The last recorded flight location was on the north side of Ballinacor Mt. The Pilot's body was recovered a short distance away while still attached to the Paraglider by its harness. The Paraglider wing was recovered, deflated on the ground – all lines lay on the surface untangled and undamaged. The reserve parachute was still packed and the activation handle was in its normal stowage position.



1.10 Medical and Pathological Information

The Post-mortem Report for the Pilot was made available to the Investigation by the Coroner for Wicklow East (Report No. A, 19.0000574.V). The Report stated that *'no fractures were identified'* in the musculoskeletal system. Toxicology tests found that ethanol was not detected nor was the presence of drugs detected on preliminary screen.

The Final Anatomical Diagnosis found:

1. *Severe three vessel coronary atheromatous disease with stenosis and occlusion of the left anterior descending coronary artery by thrombus.*
2. *Established (months old) and recent (three days to two weeks old) myocardial infarction.*
3. *Pulmonary oedema.'*

The Clinicopathological Correlation stated:

'Post mortem examination demonstrated severe three vessel coronary artery disease with occlusion of the left anterior descending coronary artery by thrombus. There was evidence of established and recent myocardial infarction⁷. The cause of death in this case is acute myocardial infarction due to coronary artery thrombosis with atheroma.'

The Post-mortem Report concludes with the opinion that the cause of death was *'1. Disease of condition directly leading to death, (a) Acute myocardial infarction, due to (or as a consequence of), (b) occlusive coronary artery thrombosis with atheroma.'*

1.11 Tests and Research

The Paraglider wing and lines were packed and shipped to an approved service centre for Paragliders in the United Kingdom for the purposes of an inspection and condition report. The inspection included the following: Inspection of the lines, measurement of the porosity of the canopy (wing) material, inspection of the risers and an overall assessment of the gliders overall condition. The lines were measured between the carabiner attachment loops at the bottom of the risers to the top of each line where it attaches to the canopy. The measurements were made using a laser measure with a standard 5 kg load on the line, in accordance with standard practice. The measurements were compared to the dimensions stipulated by the Manufacturer. The Inspection Report concluded the following:

'In the course of our examination we found nothing that might cause or contribute to the Paragliders performance deviating from the flight characteristics intended by the manufacturer. In summary:

- *The lines measurements were well within manufacturer's specification*
- *Porosity of the canopy fabric is excellent*
- *Inspection of the risers, canopy and lines did not reveal anything of concern.*
- *Taking the results of all our findings into account, the overall condition was assessed as very good.'*

⁷ **Myocardial infarction:** Death of a segment of heart muscle which follows interruption of its blood supply, the individual experiences what is commonly referred to as a 'heart attack'.

FINAL REPORT

2. AAIU Comment

The Paraglider was 14 months old at the time of the accident. A report obtained from an approved service centre in the United Kingdom, concluded that the Paraglider was generally in very good condition and that there was nothing identified that might cause or contribute to the Paraglider's performance deviating from the flight characteristics intended by the manufacturer.

The Pilot held a Para Pro 3 licence, and while this shows he had the minimum experience necessary to conduct flights without the supervision of an instructor, his experience was above this minimum level. The Pilot was experienced in Paragliding, with a considerable amount of cross-country flights of long duration, both in the State and abroad.

The Post-mortem Report of the Pilot stated that: *'no fractures were identified'* in the Musculoskeletal System which indicates that the descent rate before contact with the ground was relatively low. The Post-mortem report found that the Pilot experienced an *'acute myocardial infarction'*, a condition that led directly to death; *'due to (or as a consequence of) occlusive coronary artery thrombosis with atheroma'*.

Recorded data shows that the Paraglider commenced a slow descent at the Vale of Glendalough and continued along the Glenmalur Valley towards Ballinacor Mt. The acute myocardial infarction probably occurred while the Pilot was still airborne, and the Paraglider descended until it reached the ground on the north slope of Ballinacor Mt.



Appendix A

Route and Altitude data

Data recovered from the Pilot's mobile phone showing the route flown and altitude changes

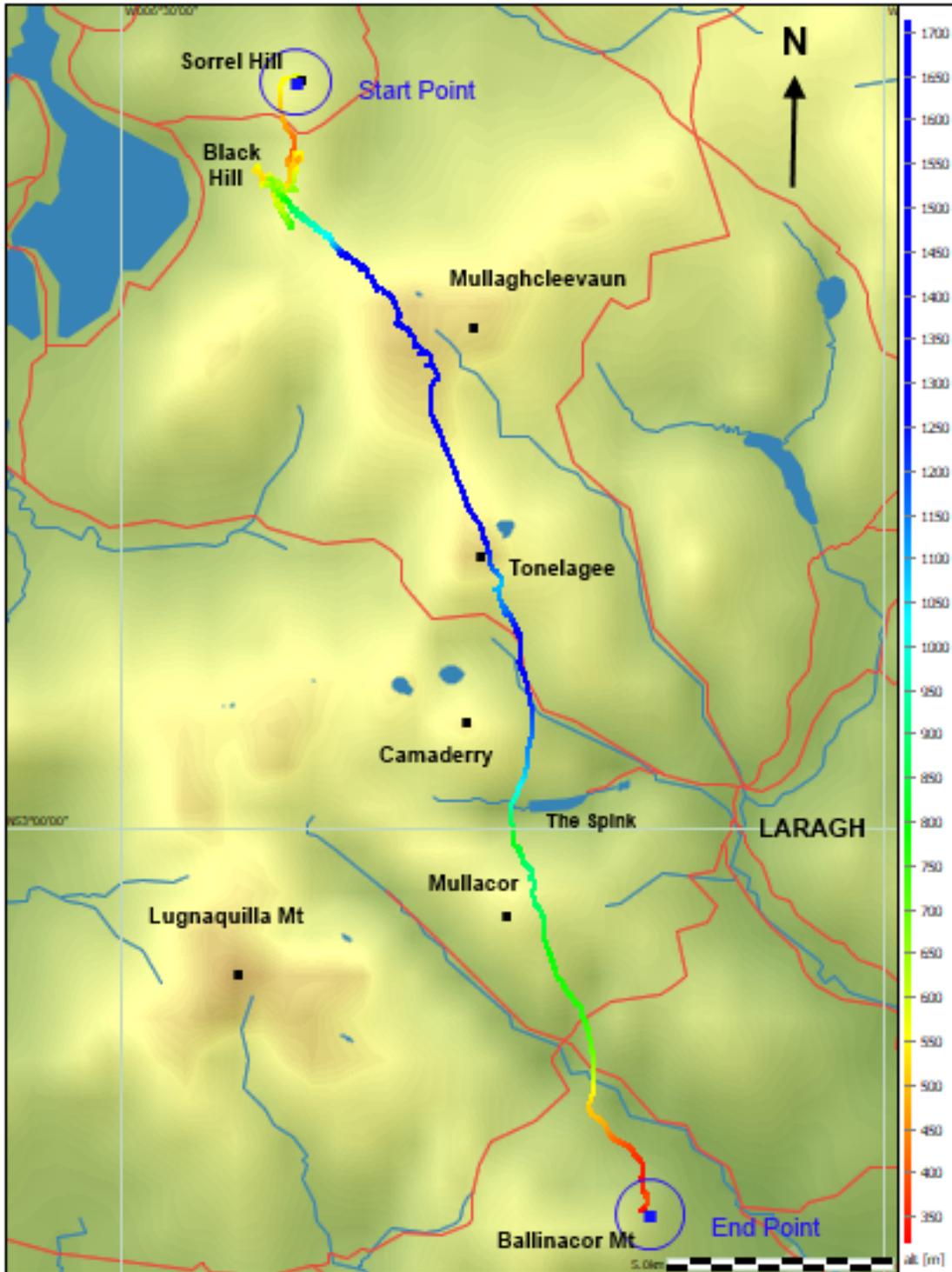


Photo No. 2: Recorded Route with Altitude Data in metres (m), start and end points indicated

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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.

10
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23
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38

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