



Air Accident Investigation Unit Ireland

PRELIMINARY REPORT

ACCIDENT

Partenavia, P68, F-HIRD

Near Carnsore Point, Co. Wexford

23 September 2021



An Roinn Iompair
Department of Transport

PRELIMINARY 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 **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: 2021 - 009
 State File No: IRL00921026
 Report Format: Preliminary Report
 Published: 12 November 2021

This Investigation is conducted 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. This Preliminary Report contains information, as known at this time, and does not contain Analysis or Conclusions. This information is therefore subject to change, and may contain errors; any errors in this Report will be corrected in the Final Report. The sole purpose of this Investigation is the prevention of aviation accidents and incidents. It is not the purpose of this Investigation to apportion blame or liability.

Aircraft Manufacturer:	Partenavia	
Model:	P68 Victor	
State of Manufacture:	Italy	
Registration:	F-HIRD	
State of Registry:	France	
Serial Number:	14	
Year of Manufacture:	1973	
Type of Operation:	Survey Operations	
Date / Time (UTC)⁴:	23 September 2021 @ 16.10 hrs	
Location / Position:	Near Carnsore Point, Co. Wexford	
Persons on Board:	Crew – 1	Passengers – 3
Injuries:	Crew – 1	Passengers – 3
Damage:	Aircraft destroyed	
Investigator-In-Charge:	Kate Fitzgerald	

⁴ **UTC:** Co-ordinated Universal Time. All times in this report are quoted in UTC; Local time was UTC + 1 hour at the time of the accident.

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1. HISTORY OF THE OCCURRENCE

The twin-engine aircraft, a Partenavia P68 Victor, with one Pilot and three passengers on board, departed Waterford Airport (EIWF) at 11.08 hrs. All of the passengers were part of an environmental research team and the purpose of the flight was to record sightings of a variety of marine wildlife. During the occurrence flight, one passenger was seated in the front right seat next to the Pilot, and the two other passengers were seated in the row directly behind.

The plan for the flight was to fly at low altitude along 16 pre-defined survey lines. Each line was approximately 45 km in length and the lines were spaced approximately 4 km apart. The planned 16 survey lines were completed after 4 hours and 30 minutes of flying. Following a discussion with the passengers, and after assessing the remaining fuel, the Pilot determined that there was approximately 1 hour and 45 minutes of fuel remaining and they decided to complete two more survey lines before returning to EIWF (**Figure No. 1**).



Figure No. 1: Aircraft Track (Spider Tracks and Google Earth)

The Pilot informed the Investigation that two minutes after commencing the final survey line (i.e. the 18th survey line), an abnormal drop in the indicated fuel quantity was observed, the right engine stopped, and within approximately four minutes the indicated fuel quantity in the right tank dropped to zero.



The Pilot advised that he switched on the fuel pump and pushed the throttle, fuel mixture and propeller levers forward, in an attempt to re-start the engine, which was unsuccessful. At the time of the right engine stoppage, the aircraft was travelling at approximately 108 knots (kts). Recorded data shows that the aircraft then climbed to approximately 500 feet (ft). The Pilot said he carried out the actions required to secure the right engine including feathering the right propeller. The Pilot noted that the left engine and left fuel quantity indicator at this point were stable. The Pilot decided to fly directly to EIWF which he estimated was approximately 20 minutes away. However, the Pilot informed the Investigation that he had difficulty gaining and maintaining altitude on one engine, and that he did not believe the left engine was delivering full power. He said that he verified that the left fuel selector and fuel pump were on, and that he moved the fuel tank cross feed to ON, waited and then turned it OFF again, but it did not make any difference to the engine power. He decided to fly close to the shore so that a forced landing could be carried out if necessary.

The Pilot reported that when the aircraft was turned towards EIWF at an altitude of approximately 250 ft, the left engine stopped. The Pilot attempted to re-start the left engine several times. The Pilot said that the engine did re-start but each time it re-started, it stopped again within a few seconds. The Pilot then flew directly to the shore and when the aircraft reached the shore, he banked the aircraft to the left and carried out a forced landing on the beach. The beach surface consisted of loose shale causing the aircraft to decelerate rapidly on touchdown. This caused the aircraft to pitch down, and the nose of the aircraft impacted heavily with the surface, causing significant structural damage to the cockpit and forward cabin areas. The Pilot informed the Investigation that immediately after landing, the left engine spontaneously re-started and accelerated to full power. The Pilot said he pulled the engine mixture lever back to stop the engine. The passengers exited the aircraft through the aircraft door and the Pilot exited the aircraft through the windscreen which had broken during the impact. The Pilot and one passenger sustained serious injuries during the impact sequence and were airlifted to hospital by two Coastguard helicopters that attended the scene. The two other passengers sustained injuries and were taken to hospital by ambulance.

1.1 Previous Flights

The aircraft had travelled from Rennes, France, to Ireland on 18 September 2021. A Mandatory Occurrence Report (MOR) submitted to the Irish Aviation Authority (IAA) by Waterford Airport Air Traffic Control stated that during the flight from Rennes the Pilot reported that his right engine had stopped. Waterford ATC assisted the Pilot with relevant landing information, put the Airport Fire Service on a '*Local Standby*' and notified the Waterford Coastguard Search and Rescue Base. The Pilot continued the flight and landed at EIWF with the left engine operating. The Pilot subsequently informed the Investigation that during this occurrence the aircraft lost approximately 130 litres of fuel in 10 minutes. Following the single-engine landing, a local engineer examined the right engine and identified the problem as a loose connection on the fuel hose to the mechanical fuel pump. The fuel hose connection was tightened, a successful test flight was carried out by the Pilot, and the aircraft was returned to service.

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2. NOTIFICATION AND RESPONSE

The AAIU on-call duty Inspector was notified of the accident by Shannon Air Traffic Control (ATC) at 17.30 hrs on 23 September 2021. Three Inspectors of Air Accidents deployed to the accident site where Gardaí with the assistance of local people had secured the aircraft, which had come to rest in the intertidal zone of the beach. During the night of 23 September, an initial examination of the aircraft and site was carried out. At low tide the aircraft was moved to a position above the high water mark. The following morning further examinations of the aircraft and accident site were completed before recovery of the aircraft to the AAIU's secure wreckage examination facility at Gormanston, Co. Meath for further examination.

3. ACCIDENT SITE

The forced landing was performed on a beach near Carnsore Point, Co. Wexford. The surface of the beach consisted of loose shale and sloped towards the sea. **Photo No. 1** was taken by a passenger of the aircraft shortly after the accident occurred.



Photo No. 1: Aircraft position shortly after the accident (*courtesy of aircraft passenger*)
[Operator de-identified]



4. AIRCRAFT INFORMATION

4.1 General

The aircraft was a Partenavia P68 Victor manufactured in 1973. It was powered by two Lycoming IO-360-A1B engines, each of which was fitted with an MTV-12, 3-bladed, variable pitch, constant speed propeller. The aircraft cabin could accommodate a maximum of six people (one pilot plus five passengers) with seating arranged in three rows of two seats. Each seat was fitted with a 'lap-strap' style seatbelt. The two front seats were also fitted with a single shoulder strap. Cabin access and egress was provided by a door on the left side of the aircraft.

The aircraft had a Certificate of Airworthiness issued by the French Direction Générale de l'Aviation Civile (DGAC) on 11 April 2018. The most recent Airworthiness Review Certificate was dated 29 October 2020 and had an expiry date of 02 December 2021.

4.2 Engine Examination and Testing

A preliminary examination of both engines was carried out at the accident site and at the AAIU wreckage examination facility. The preliminary examination found that:

- There was no evidence of a fuel leak on either engine.
- The fuel hose that was identified as the source of the fuel leak on 18 September 2021 was found in place, with the connection secure.
- A small amount of fuel was present in the gascolator⁵ bowl for each engine.
- The fuel injector manifold which divides the fuel between the four cylinders of the engine, was found to be dry for both engines.

The right engine was then removed from the aircraft and shipped to a UK engine test facility approved by the European Union Aviation Safety Agency (EASA). The fuel hose at the inlet to the mechanical fuel pump was left undisturbed. The test was witnessed by a Senior Inspector of Air Accidents from the UK Air Accidents Investigation Branch (AAIB). The test report made the following observations:

- The engine was connected to a dynamometer to replicate a propeller.
- The engine was connected to the test rig using the engine's own fuel and oil hoses.
- The engine started normally.
- Test points from the Engine Manufacturer's engine run-in sheet were completed. Test points included 1,200, 1,500, 1,800, 2,000, 2,200, 2,400 and 2,700 revolutions per minutes (rpm).
- During the test runs the engine achieved 164-172 Brake Horse Power (BHP). The engine is rated at 200 BHP and a newly overhauled engine might typically be expected to achieve 182-200 BHP.
- Both magnetos showed a 50 rpm mag drop⁶ when checked.
- The engine had no oil or fuel leaks at the time of the test.

⁵ **Gascolator:** An aircraft component usually located at the lowest point of the aircraft fuel system whose purpose is to filter water and small particles of sediment from the fuel.

⁶ **Mag Drop:** The reduction in engine rpm when one of the engine magnetos is switched off.

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4.3 Aircraft Fuel

The occurrence aircraft was operated on AVGAS⁷. **Table No. 1** shows the fuel capacity of the aircraft as stated in the Aircraft Flight Manual.

Total Fuel Capacity Per Tank	54 US Gallons [204.4 litres]
Unusable Fuel Per Tank	2.5 US Gallons [9.5 litres]
Total useable Fuel Per Tank	51.5 US Gallons [194.9 litres]
Total Fuel Capacity (Both Tanks)	108 US Gallons [408.8 litres]

Table No. 1: Aircraft Fuel Tank Capacity

The aircraft technical log which was recovered at the accident site, included details of fuel uplifts to the aircraft. The last entry in the technical log was dated 22 September 2021 and indicated that following an uplift of 270 litres of fuel, the aircraft had 410 litres of fuel on board.

Fuel dockets from the AVGAS refueller station at EIWF stated that on the 22 September 2021, 271 litres of AVGAS fuel was uplifted to the aircraft fuel tanks prior to a short test flight being undertaken. The following day a further 43 litres of fuel was added. The refueller at EIWF informed the Investigation that the Pilot's preference was to fuel the aircraft himself to ensure the correct balance of fuel between the tanks.

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The Pilot informed the Investigation that the fuel tanks were full prior to departure of the accident flight and that he used a fuel consumption value of 62 litres per hour for flight planning purposes. He said that in his experience, the fuel gauges on this aircraft were reliable.

At the accident site, the Investigation removed the refuel caps from both wings and noted that there was a quantity of fuel in each fuel tank. A sample of 1 litre was taken from each tank. No fuel leaks from the fuel tanks were observed at the accident site, and the fuel tanks were re-secured for transit to the AAIU wreckage examination facility. The aircraft was re-examined on arrival at the facility and no fuel leaks were observed. Both fuel tanks were then drained and the quantity of fuel was measured. The total quantity of fuel, including the samples taken previously, was 74 litres; approximately 42 litres from the right tank and approximately 32 litres from the left tank.

4.3.1 Fuel Test

A sample of fuel drained from the occurrence aircraft was tested by a specialist laboratory. The laboratory informed the Investigation that the sample met DEFSTAN 91-090, which the testing facility advised is an industry standard for AVGAS.

⁷ **AVGAS:** Aviation gasoline used in spark-ignited, internal combustion aircraft engines.



4.4 Aircraft Flight Manual

The limitations section of the Aircraft Flight Manual states:

‘Avoid rapid taxi turns before take-off or excessive nose-up attitude with $\frac{1}{4}$ fuel or less in each tank.’

4.5 Aircraft Maintenance Records

The maintenance records for the aircraft show that the aircraft underwent a 200 hours check on the 01 September 2021. This included a check of the condition and operation of the fuel selector transmitter and receiver, an inspection of the fuel system plumbing and component mounting, a check of the flexible fuel lines and a check of the fuel tank for leaks.

4.6 Aircraft Maintenance Manual and Service Bulletin

In 2002, the UK AAIB issued bulletin No: 5/2002 which included a Safety Recommendation to the aircraft Manufacturer:

‘It is recommended that [aircraft Manufacturer name], in conjunction with the RAI and the CAA, conducts an early review of the operation and airworthiness of the fuel valve selector system on all Partenavia P68 models, with a view to corrective actions to prevent inadvertent mis-positioning of fuel selector valves and resultant inadvertent fuel transfer and engine supply problems.’

In July 2002, the aircraft Manufacturer issued Service Bulletin No. 113 which gave detailed instructions for the operational check of the fuel selector control system, which was scheduled every 100 hours in the approved maintenance programme. In September 2017, the aircraft Manufacturer updated the Aircraft Maintenance Manual fuel system procedures to *‘check the correct correspondence between fuel selector handle and fuel selector valve positions and to set the control.’*

5. RECORDED DATA

Flight Data Recorders were not installed on the aircraft and were not required to be installed. The aircraft carried the following recording devices:

- Garmin Aera 796 GNSS⁸ device – recovered in a damaged condition
- Spider Tracks device – recovered in a damaged condition
- Bad Elf GPS device – recovered in a damaged condition
- Zoom H1 Handy Voice Recorder – not recovered

The Investigation downloaded flight path data that had been uploaded from the Spider Tracks Device to the provider’s website (**Figure No. 1**). This device recorded and transmitted the position, altitude, speed and track of the aircraft every 15 seconds. The first recorded data point is on the ground at EIWF prior to the flight and the final data point is recorded approximately 2.5 km south-south-east (SSE) of the accident site.

⁸ GNSS: Global Navigation Satellite System

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The damaged Garmin Aera 796 GPS device was sent to the Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile (BEA), the National Air Safety Investigation Authority of France. Work to recover any data on that device is on-going.

6. THE OPERATION

The aircraft was operating in Ireland as part of an Irish research project to survey marine birds, marine mammals, and other species. The aircraft operator was a partner in the project.

The aircraft operation was designated as EASA Part SPO (Specialised Operations⁹). The operator is based in France and the operation was approved by the French Competent Authority, the DGAC. Due to the risks associated with carrying out this type of survey flight, a specific risk assessment was carried out by the Operator. The risk assessment was approved by the DGAC and shared with the Irish Aviation Authority (IAA).

7. METEOROLOGICAL INFORMATION

The Irish Meteorological Service, *Met Éireann* (Aviation Services Division) provided the Investigation with an aftercast of the weather conditions at the time and location of the accident (**Table No. 2**).

Wind:	Surface:	West-northwest 5-8 knots (kts)
	2000 feet (ft):	Northwest 10 -12 kts
	Between surface and 300 ft:	Similar to surface
Visibility:	30 kilometres (km)	
Weather:	Dry and sunny	
Cloud:	Largely clear skies, isolated fair weather cumulus with bases around 2,500 ft	
Surface Temperature/Dew Point Temperature:	19/12 degrees Celsius	
Mean Sea Level (MSL) Pressure:	1019 hectoPascals (hPa)	
Freezing Level:	11,000 feet	
Other Comments:	Nil	

Table No. 2: Met Éireann Aftercast

8. SURVIVAL ASPECTS

The passengers stated that they were wearing the lap strap seatbelts provided in the aircraft as well as life jackets and immersion suits. A life raft and a crash axe were also carried on board. The passengers reported that the Pilot carried out regular safety drills as well as briefings before each flight. The passengers also informed the Investigation that prior to the start of the research project, they had completed a course of training in aircraft underwater emergency egress at the National Maritime College of Ireland.

⁹ Introduced by Commission Regulation (EU) No 379/2014 amending Commission Regulation (EU) No 965/2012



9. FURTHER INVESTIGATION

The Investigation is on-going and a Final Report will be published in due course.

- END -

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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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