Technical report
ULM A-009/2021

Accident on 22 May 2021,
involving a privately operated IRIS aircraft,
registration EC-XEA, in the vicinity of Bigastro
(Alicante, Spain)

Please note that this report is not presented in its final layout and therefore it could include minor errors or need type corrections, but not related to its content. The final layout with its NIPO included (Identification Number for Official Publications) will substitute the present report when available.

GOBIERNO DE ESPAÑA
MINISTERIO DE TRANSPORTES, MOVILIDAD Y AGENDA URBANA
UNDERSECRETARIAT
CIVIL AVIATION
ACCIDENT AND INCIDENT
INVESTIGATION COMMISSION

Notice

This report is a technical document that reflects the point of view of the Civil Aviation Accident and Incident Investigation Commission regarding the circumstances of the accident object of the investigation, its probable causes and its consequences.

In accordance with the provisions in Article 5.4.1 of Annexe 13 of the International Civil Aviation Convention; and with Articles 5.6 of Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010; Article 15 of Law 21/2003 on Air Safety; and Articles 1 and 21.2 of RD 389/1998, this investigation is exclusively of a technical nature, and its objective is the prevention of future aviation accidents and incidents by issuing, if necessary, safety recommendations to prevent their recurrence. The investigation is not intended to attribute any blame or liability, nor to prejudge any decisions that may be taken by the judicial authorities. Therefore, and according to the laws detailed above, the investigation was carried out using procedures not necessarily subject to the guarantees and rights by which evidence should be governed in a judicial process.

Consequently, the use of this report for any purpose other than the prevention of future accidents may lead to erroneous conclusions or interpretations.

This report was originally issued in Spanish. This English translation is provided for information purposes only.

CONTENTS

ABBREVIATIONS

° ' "	Sexagesimal degrees, minutes and seconds
°C	Degrees Celsius
AEMET	Spain's State Meteorological Agency
AESA	Spain's National Aviation Safety Agency
ft	Feet
h	Hours
Hp	Horsepower
kg	Kilogrammes
km	Kilometres
km/h	Kilometres/hour
kt	Knots
l, l/h	Litres, Litres/hour
LAPL	Light aircraft pilot license
LELG	ICAO code for Los Garranchos San Javier Aerodrome - Murcia
m	Metres
mm	Millimetres
m/s	Metres/second
m^2	Metres squared
MAF	Multi-axis fixed-wing aircraft
METAR	Aviation routine weather report
MTOW	Maximum take-off weight
N	North
s/n	Serial number
O	West
rpm	Revolutions per minute
SAR	Search and Rescue Service
TULM	Motorised ultralight pilot license
ULM	Motorised ultralight aircraft
UTC	Coordinated universal time
VFR	Visual flight rules

Technical report

ULM A-009/2021

Owner and Operator:	Private
Aircraft:	IRIS, registration EC-XEA (Spain)
Date and time of accident:	22 May 2021; 08:35 UTC
Site of accident:	In the vicinity of Bigastro (Alicante)
Persons on board:	1 (crew)
Type of operation:	General aviation - Private
Phase of flight:	On route
Flight rules:	VFR
Date of approval:	**October 27, 2021**

Synopsis

Summary:

On Saturday, 22 May 2021, the amateur-built IRIS ultralight aircraft, registration EC-XEA, lost engine power during a private flight from Los Garranchos San Javier Aerodrome - LELG (Murcia) to Catral Aerodrome (Alicante). The pilot was forced to make an emergency landing in a crop field in Bigastro (Alicante).

The aircraft sustained significant damage to its propeller, landing gear and parts of its structure.

The pilot was unharmed and able to exit the aircraft without assistance.

The investigation has revealed as a probable cause of the accident, the performance of an emergency landing following an engine stoppage due to an insufficient fuel supply.

It is considered that the inadequate maintenance of the fuel lines may have allowed air to enter the circuit, causing an in-flight failure of the fuel supply and the consequent engine stoppage.

The report does not contain any operational safety recommendations.

1. THE FACTS OF THE INCIDENT

1.1. Overview of the accident

On 22 May 2021, at 10:00 local time, the pilot owner of the amateur-built ultralight IRIS aircraft, registration EC-XEA, took off for a private flight from Los Garranchos - San Javier Aerodrome (Murcia) - LELG.

The flight plan consisted of flying to the Catral Aerodrome (Alicante). According to the pilot's statement, before starting the flight, the aircraft was carrying approximately 10 litres of fuel per wing, and he filled both tanks with two 20-litre jerry cans, which meant it had about 60 litres in total for the flight.

Approximately 45' into the flight, while flying over the municipality of Bigastro in the province of Alicante, he noticed the engine performing irregularly and then it suddenly cut out without any prior malfunction. When the stoppage happened he was at approximately 1,000 ft. Due to the impossibility to re-start the engine, he decided to look for a place to make an emergency landing.

As the area was full of citrus trees, he had to glide for several minutes before finding a suitable landing site. He selected a cleared field next to an orange grove, configured the

Photograph 1. Aircraft at the accident site

plane with “full flaps” and headed towards it to land. However, he eventually landed about 62 m short of it in the adjacent orange grove.

The aircraft hit some of the trees, incurring significant damage to the propeller, nose, landing gear, right wing, and horizontal stabiliser, causing fuel to spill onto the ground.

The pilot was unharmed and able to exit the aircraft without assistance.

A witness in the area saw the aircraft gliding without an engine (with the propeller stopped, in his words) and, after seeing the impact, called 112. The Valencian government’s emergency room, the Civil Guard, and Search and Rescue were alerted.

Due to the heavy rain that fell in the days after the accident, the aircraft could not be transferred to a hangar at LELG until several days later, which made some tampering with the aircraft wreckage and crash site by third parties inevitable.

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Others
Fatal				
Serious				
Minor				
Unharmed	1		1	
TOTAL	1		1	

1.3. Damage to the aircraft

The aircraft sustained significant damage to its landing gear, the lower front part of the fuselage, the propeller, the right wing and the horizontal stabiliser.

1.4. Other damage

The aircraft made an emergency landing on agricultural farmland planted with orange trees in full production, resulting in third-party damage to a total of four fruit-bearing orange trees. Two of the trees were severed, two were partially damaged, and fuel leaked onto the surrounding ground.

1.5. Personnel information

The 73-year-old pilot was the owner of the aircraft and had an ultralight pilot license (TULM) issued by Spain’s National Aviation Safety Agency (AESA) on 05/05/2008, with the multi-axis fixed-wing aircraft rating (MAF), valid until 31/01/2022.

He had a class 2 medical certificate valid until 22/01/2021 and a LAPL medical certificate valid until 22/01/2022.

He had a total of 1,110:45 hours of flying time, of which 09:15 hours were in the type of aircraft involved in the incident, accumulated over 16 flights.

His recent flight experience between 01/01/2017 to 03/06/2021 was 16:08 hours over 24 flights. This includes the 09:15 hours in the type of aircraft involved in the incident, as well as flights made in other aircraft such as a TECNAM P96-G and AEROPRAKT A-22.

The pilot's last flights prior to the event were two local flights lasting 45' and 30' on 13/03/21.

1.6. Aircraft information

1.6.1. General information

The amateur-built IRIS aircraft is a variant of the Spanish-made Moragón aircraft. It's a single-engine, two-seater ultralight with a carbon fibre monocoque fuselage, a carbon fibre and glass fibre high-wing monoplane and a fixed tricycle-type landing gear.

Structure:

- Wingspan: 10 m
- Length: 6.45 m
- Wing area: 12.50 m^2
- Maximum height: 2.40 m
- Empty weight: 313.4 kg
- MTOW: 450 kg

Performances:

- Cruise speed: 195 km/h
- Never exceed speed: 220 km/h
- Stall speed: 65 km/h
- Take-off speed: 80 km/h

Power plant:

Jabiru piston engine model 2200A, s/n: 22A-2740.

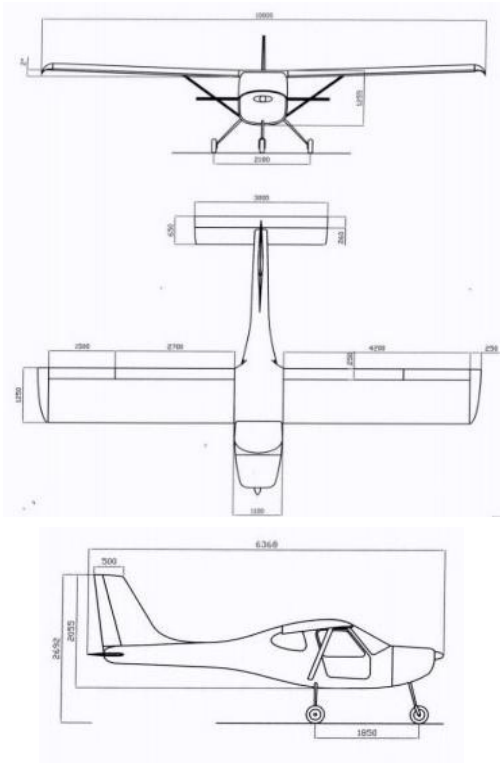


Figure 1. IRIS aircraft

Characteristics:

- Four-stroke, four horizontally opposed cylinders, with a 1-3-2-4 firing order and central camshaft
- Electric start and double ignition system (magnetos).
- Mechanical fuel pump.
- One pressure-compensated BING carburettor, where the air/fuel mixture is preheated before entering the cylinder heads.

- Air-cooled engine through front inlets.
- Maximum power: 85 Hp at 3,300 rpm
- Consumption: 21 l/h

Fuel:

The aircraft has two wing-mounted fuel tanks near the wing attachment, each with a capacity of 47 l, plus an auxiliary tank that holds 5 l (total capacity of 99 l). It's a gravity-fed fuel system. The fuel level is read by looking at the fuel level through translucent pipes.
The authorised fuel is AVGAS 100LL and AVGAS 100/130.

Propeller:

The propeller is a D.U.C. measuring 1,650 mm in diameter with a variable pitch of 16º on land.

Instrument panel:

Photograph 2. Instrument panel of the incident aircraft at the accident site

Operational procedures

The IRIS aircraft does not have a flight manual, but given that it is a variant of the MORAGÓN model, the procedures for that aircraft can be applied. Of interest to the investigation is the emergency procedure for an "in-flight engine stoppage", which is outlined below:

After an in-flight engine stoppage:

- Maintain a speed of around 100 km/h and try to re-start using the starter if necessary.
- If the propeller has stopped, the engine cools quickly, so it may be necessary to shut off the air.
- If you are unable to start the engine, maintain 75 km h to provide a higher glide ratio of 14:1 m and locate an appropriate site for landing.

1.6.2. Maintenance information

The aircraft was built in 2009 with serial number: 09036-2442. The current owner and pilot acquired the aircraft in 2018 and, according to his statement, carried out a complete inspection of the aircraft at the time of acquisition, although there is no documentation to support this. The airworthiness review process lasted until 2020, and the maintenance was performed at all times by the owner, who confirmed he carried out the basic oil, oil filter and spark plug checks. According to his statement, the fuel pump has not been serviced since he bought the aircraft.

The aircraft had an approved maintenance programme dated 25/09/2020 specifying the following maintenance overhauls:

- Pre-flight inspection
- Basic Inspection every 50 flight hours or 6 months.
- Intermediate inspection every 100 flight hours or 12 months.
- General inspection every 200 flight hours or 24 months.

At the time of the accident, the aircraft had a cumulative flight time record of 44:40 hours, and the engine had 47:45 hours.

The last two flights prior to the event were made on 13/03/2021, two months before the event, with a duration of 45 and 30 '. The flight before those was a 30’ flight on 06/03/2021.

The last maintenance check noted in the engine logbook was on 20/02/2021, when the engine had 45:44 flight hours. It indicates that the aircraft’s 8 spark plugs were replaced with new ones. This would mean the spark plugs had only been in operation for two hours at the time of the accident.

The inspection before that was also carried out by the owner on 19/12/2020 when the engine had 45:25 flight hours, during which he changed the oil and oil filter.

Engine preservation instructions

The maintenance manual for the Jabiru 2200A engine provides specific instructions that must be followed to preserve the aircraft during periods of inactivity.

The instructions for correct preservation during periods of inactivity not exceeding 30 days, referred to as “flyable storage”, specify that the fuel valve must be closed and there should

be no fuel in the carburettor float bowl. In addition, the propeller must be turned through 5 revolutions once every seven days without running the engine.

Periods longer than 30 days but not exceeding 90 days are considered a temporary stoppage of the aircraft's activity: During these periods, the instructions specify that, in addition to the previous measures, the fuel tank must be filled to prevent the accumulation of humidity. The spark plug wires should be disconnected and the spark plugs removed from each cylinder. Lubricating oil should be sprayed through the spark plug holes with the piston facing down; then, the cylinder should be rotated until both valves are open and oil sprayed again to cover the induction and exhaust system. When all the cylinders have been treated, the propeller should be left in a horizontal position.

Furthermore, in periods of inactivity not exceeding 90 days, the interior of at least one cylinder must be inspected through the spark plug hole at least once a month. If the aircraft is to remain inactive at the end of the 90-day period, the previous inspections must simply be repeated.

Between the date the pilot acquired the aircraft and obtained the airworthiness certificate to fly it on 08/08/2020 and the date of the accident, he made 16 flights totalling 09:15 hours, flying on two days approximately every 2 months. Aside from those flights, the aircraft was inactive, and there is no evidence that he preserved the engine as per Jabiru’s instructions during that time.

1.6.3. Airworthiness status

The incident aircraft was registered with AESA’s record of active registrations on 09/12/2009, with registration number 8683.

The amateur-built aircraft had a restricted certificate of airworthiness, ref. A-1352, issued on 19/10/2020 by AESA, with the manufacturer and former owner named as “José Chaves González-Nicolás”. It is described as an “IRIS” in the “Private (3) Special ULM” category. It also had an airworthiness review certificate valid until 19/10/2022 or 200 flight hours, which was issued when the aircraft had 38 flight hours.

The aircraft had the original aircraft and engine logbooks, both dated 03/02/2010, with notes on the maintenance performed by the owners.

From the time the current owner purchased the aircraft and renewed its airworthiness certificate in 2018 to the time of the event, the aircraft flew 6:50 hours in total, making its first flight on 22/10/2020. One of the annotations made in the aircraft’s logbook refers to an emergency landing on 11/12/2020, which, according to the pilot's statement, was caused by a lack of fuel.

The aircraft had a station license approved during its manufacturing process, including an ICOM IC-A200 communications equipment.

1.7. Meteorological information

The general meteorological information provided by AEMET for 22/05/2021 highlighted the presence of low relative pressures at medium and high levels in the western Mediterranean, extending to the eastern third of the peninsula.

The closest meteorological station to the accident site in the municipality of Bigastro (Alicante) was in Rojales, about 18 km to the east. The station does not measure surface pressure.

Table 1 shows the data from the meteorological variables recorded by the Rojales meteorological station between 8:00 UTC and 10:00 UTC (the accident took place at 8:35 UTC). No rainfall was recorded in the surrounding area at the time of the event.

Datos meteorológicos de Rojales (7261X)						
Hora (UTC)	Viento		Racha		T (°C)	HR (%)
	Intensidad (km/h)	Dirección (°)	Intensidad (km/h)	Intensidad (°)		
8:00	16.2	075	27.4	075	21.4	76
8:10	14.4	073	27.0	070	21.5	76
8:20	17.3	089	27.7	097	21.5	74
8:30	16.9	079	30.6	100	21.5	74
8:40	18.0	092	29.5	097	21.5	74
8:50	19.1	077	29.2	047	21.5	75
9:00	13.3	093	26.3	092	21.9	73
9:10	17.3	079	27.7	082	21.9	73
9:20	16.9	092	27.7	095	22.0	73
9:30	17.3	086	27.4	107	22.2	72
9:40	18.4	097	30.6	090	22.1	72
9:50	19.8	092	36.7	097	21.9	73
10:00	16.6	092	34.2	090	22.1	71

Table 1. Meteorological variables around the time and location of the accident

No significant phenomena were detected in the area around the accident site.

1.8. Aids to navigation

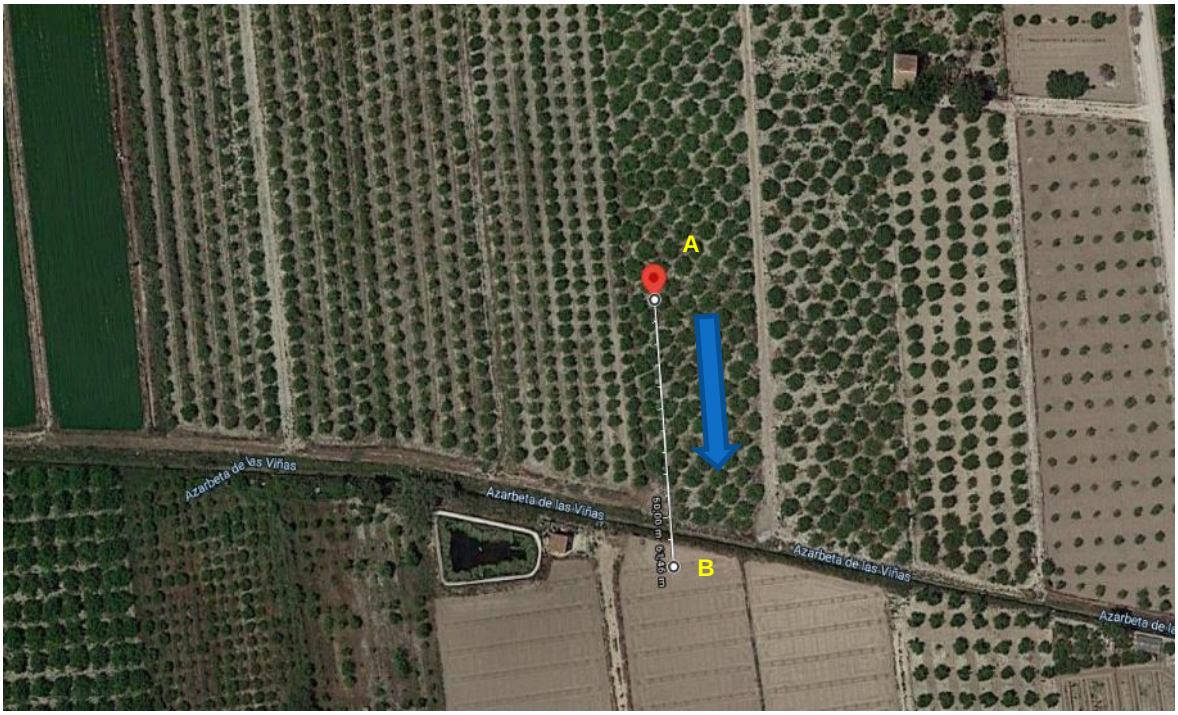
Not applicable.

1.9. Communications

Not applicable.

1.10. Information about the accident site

The accident occurred in the municipality of Bigastro (Alicante), at a location with geographic coordinates 38º 4 ’9.84” N - 0º 54 ’21” W and an elevation of 19 m above sea level. The area was flat and practically entirely covered with citrus trees at the time of production.



Photograph 3. Accident site

In photograph 3, it can be seen point A, which is where the aircraft impacted and stopped after the emergency landing. Point B, about 60 m from the crash site, is the closest point in the uncultivated field the pilot had been aiming for.

1.11. Flight recorders

The aircraft was not equipped with a flight data recorder or a cockpit voice recorder, as the aeronautical regulations in force do not require any recorders on these types of aircraft.

1.12. Aircraft wreckage and impact information

The pilot made the emergency landing in the direction of the crop, trying to land in the space between the rows of fruit trees but hitting the four that stopped the aircraft. Two of the trees were severed at the trunk, and the other two sustained branch damage. Spilt fuel was also observed on the ground.

Photograph 4. Aircraft at the accident site

Photograph 5. Right wing

- Left wing: several minor impacts, particularly to the wing lower surface.
- Horizontal stabiliser: left surface with a central transversal breakage and detachment of the structure.

Photograph 8. Main landing gear

To minimise the damage to the crop field, which was in full production, after all the wreckage had been identified at the point of impact, the aircraft's wings were removed and disassembled for transfer to the LELG aerodrome.

The damage caused to the aircraft was as follows:

- Right wing: fracture with a transverse tear in the section located at 2/5 of its length, from the wingtip, completely detached. Deformed wing-root area. Flap at end near wing-root damaged with wing covering detached. Strut from the lower anchor to the fuselage detached.

Photograph 6. Right wing joint

Photograph 7. Horizontal stabiliser

- Underside of fuselage deformed and scratched along its entire length.
- Nose landing gear: detached
- Main landing gear: right leg detached and left leg damaged.

- Engine: cowlings deformed.
- Propeller: one of the blades fractured in the first third of its length from the attachment. Minor impacts to the other blade.

Photograph 9. Engine

Photograph 10. Damaged propeller

- Instrument panel: the fuel gauges showed the tanks were empty and the fuel valve was closed.

Photograph 11. Gauges on left-hand panel

Photograph 12. Gauges on right-hand panel

1.13. Medical and pathological information

Not applicable.

1.14. Fire

Not applicable.

1.15. Survival aspects

Not applicable.

1.16. Tests and research

According to the pilot's statement, the engine stopped in flight and could not be re-started. The engine was therefore dismantled and inspected at LELG, in the hangar the aircraft was transported to after the accident.

1.16.1. Engine inspection

The engine was found disassembled from its mount in the hanger at the LELG aerodrome, where it was inspected. There were no visible external impacts or deformations, the propeller was disassembled, and one of its blades was broken. There were no signs of oil or fuel leaks or spills.

Photograph 13. Disassembled engine

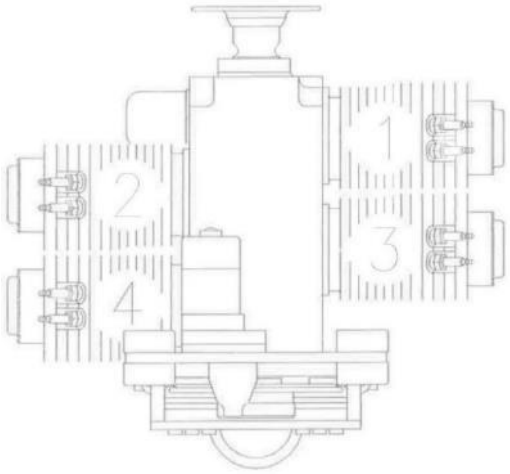


Figure 2. Sketch of the engine

Photograph 14. Spark plugs from the accident

The engine was checked for seizure, and the propeller was installed and turned by hand with little resistance.

The engine's compression was checked and found to be correct.

The spark plugs were disassembled. The pipettes were in good condition. Of the eight plugs, four were new, and four appeared to be older. The plugs for cylinders 1 and 3 had been replaced recently. All were the make and model recommended by the engine manufacturer, NGK D9EA.

All the spark plugs were white in colour except for the two belonging to cylinder 2, which were darker. This discrepancy is consistent with cylinder 2's position in the engine, which makes it the one most cooled by the propeller. The spark plugs were calibrated and fitted correctly. There were no signs of engine overheating or mixture decompensation, and the mixture was neither too rich nor too lean as there were no traces of carbon, oil or melted droplets.

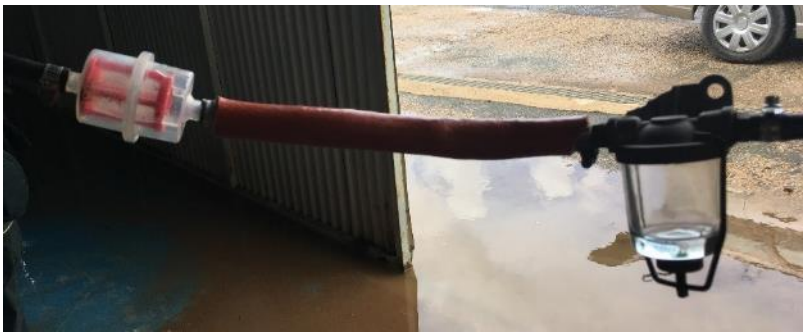
The fuel system, which has a single carburettor that feeds all four cylinders and two tanks on the wings, was inspected.

Photograph 15. Fuel shut-off valve

The wings had been disassembled to facilitate their removal from the scene of the accident. The fuel tanks were completely empty.

The condition of the other components was checked, observing the following:

- Fuel shut-off valve: had only two positions, open and closed, and worked properly.
- Fuel filter: a mesh type filter in good condition.
- Gascolator: no presence of water and in good condition.
- There were cracks in the intake hose.



Photograph 16. Fuel filter and gascolator

- Some sections of the fuel hoses were newer than others. Although the section between the fuel filter and the gascolator was protected by Stratoflex, it wasn't a tight fit and didn't reach the ends, where pores and cracks were visible. A vacuum test was carried out, and air entered, which showed that air was getting into the fuel circuit.
- The overall condition of the carburettor was adequate; it was clean and fitted correctly. The carburettor float bowl contained fuel, and there was no dirt or contamination of any kind.

Photograph 17. Cracked intake hose

Photograph 18. Cracked fuel filter intake hose

However, as it could have fallen into the float bowl when the aircraft was transferred to the hangar, this does not prove there was fuel in it at the time of the accident. The needle was found to be worn.

Photograph 19. Carburettor

Photograph 20. Carburettor float bowl

- The overall condition of the fuel pump was acceptable, and although the sealing gaskets were deformed, they functioned correctly.

Photograph 21. Fuel pump

1.17. Organisational and management information

Not applicable.

1.18. Additional information

The aircraft was involved in a similar accident on 11/01/2013 at the LELG aerodrome. That accident was also investigated by the CIAIAC, with reference ULM-002/2013. At that time, the aircraft belonged to the aerodrome. The cause of the accident was an in-flight engine stoppage that forced the pilot to make an emergency landing that resulted in the aircraft flipping over. The pilot and occupant were unharmed. The investigation was unable to determine the reason for the engine stoppage.

The aircraft was repaired at the airfield and purchased by the current pilot and owner in 2018. We have not been able to obtain any documentation for that repair or the maintenance carried out on the aircraft at that time.

1.19. Useful or effective investigation techniques

Not applicable.

2. ANALYSIS

2.1. Analysis of the meteorological conditions

The meteorological conditions in the area and around the time of the event were suitable for the flight and, therefore, it is not considered that there were any adverse conditions contributing the accident.

2.2. Operational analysis

After verifying that he could not re-start the engine, the pilot's actions were appropriate in deciding to make an emergency landing as soon as possible.

According to the pilot, he had enough fuel for the planned flight because he had added 40 litres to the roughly 20 litres already in the tanks. Under normal conditions, this engine consumes 21l/h. So assuming he flew, as per his statement, for about 45' and nothing happened to increase the consumption rate, he would have had enough fuel to fly for about 3 hours. Therefore, it seems appropriate to rule out an engine stoppage due to poor fuel management or insufficient fuel supply due to poor estimation.

Given that he had sufficient height (about 1,000 ft) when the engine stoppage occurred, he glided for a time while looking for a suitable field to land on. This information is consistent with that provided by a witness who confirmed to the Civil Guard that he had seen the aircraft flying with the propeller stopped for several minutes.

Considering that most of the fields in the area were planted with fruit trees, it was difficult to find an appropriate site, but, once identified, he configured the aircraft with "full flaps" and headed towards it. Unfortunately he overestimated his range and fell short of it by about 60 m, landing in the field in front, which was planted with citrus trees.

2.3. Analysis of the aircraft wreckage

The aircraft wreckage is consistent with the pilot's statement, and the damage to just one of the propellers proves that the engine was not running when the aircraft landed.

Given the fracture in the right wing and the left side of the horizontal stabiliser, we can deduce that the aircraft was travelling with hardly any speed at all when it landed and stopped between two parallel rows of trees that impacted both sides of the aircraft without scattering debris around the field.

Although the fuel supply valve was closed, fuel spilt onto the field. The exact amount is difficult to determine given the ground's ability to absorb it, but it does confirm that there was fuel in the wing tanks.

The spillage was caused by the collision with the trees, which ruptured the tank on the right wing. Furthermore, when the aircraft came to a stop, it was leaning towards its right side. This position caused both the tanks, which are connected, to drain.

The nose landing gear breakage occurred during the destabilised aircraft's initial impact with the ground and the trees, and the main landing gear sustained damage due to impacting various irregularities in the terrain. The damage and wreckage are consistent with these types of impacts.

2.4. Analysis of the aircraft's maintenance

The aircraft's low number of flight hours meant that its overhauls were carried out according to date, i.e., according to the time that had elapsed since the last overhaul rather than the aircraft's accumulated flight hours. This fact meant that because the fuel lines, hoses, gaskets, etc., did not reach the number of flight hours specified for their review or replacement they were not checked with sufficient diligence and no consideration was given to the fact that the parts had surpassed their useful life, as their deterioration and general poor condition would seem to imply.

As there was no water or dirt in the gascolator, the possibility that the fuel was contaminated by water was ruled out.

According to the maintenance records, all 8 spark plugs were replaced with new ones 3 months before the accident. However, this is inconsistent with the findings of the post-accident inspection that found 4 appeared to have more wear than the others, which had only operated for 2 hours at the time of the event. The pilot eventually corroborated this fact. Nevertheless, the spark plugs were in good condition and calibrated adequately, so we can assume they were working correctly at all times.

Given that the engine inspection confirmed the ignition system was working and the type of fuel was correct and uncontaminated, the aircraft had fuel available at the time of landing. We can therefore conclude the engine did not stop due to a shortage of fuel. Moreover, this was demonstrated by the fuel spillage after landing and the presence of fuel in the carburettor float bowl, which might have got in during the transfer but proves, at least, that there was fuel in the aircraft's tanks (except for the air intake).

There were no internal spillages or leaks of oil or fuel, and the engine had not seized. Nor were there any signs of overheating, so in-flight losses of both fuel and lubricating oil were ruled out.

What could be verified was the presence of pores and cracks in the section of the fuel line between the fuel filter and the gascolator, as well as the deteriorated condition of the intake rubber, which could allow air to enter the fuel circuit and cause air bubbles to form. This effect reduces the effectiveness of the fuel pump, sending less pressure and causing the engine to stop.

Furthermore, the investigation found that the engine was not adequately preserved during frequent periods of inactivity.

3. CONCLUSION

3.1. Conclusions

- The wreckage of the aircraft is consistent with the pilot's statement and the performance of an emergency landing with an inoperative engine.
- The fuel tanks contained fluid that leaked onto the ground after the impact, although the investigation has been unable to determine the amount.
- With regard to the maintenance of the aircraft, the investigation revealed the existence of cracked and porous fuel hoses and rubber seals.

3.2. Causes

The investigation has revealed as a probable cause of the accident, the performance of an emergency landing following an engine stoppage due to an insufficient fuel supply.

It is considered that the inadequate maintenance of the fuel lines may have allowed air to enter the circuit, causing an in-flight failure of the fuel supply and the consequent engine stoppage.

4. RECOMMENDATIONS

No operational safety recommendations are proposed.