

CIAIAC

COMISIÓN DE
INVESTIGACIÓN
DE ACCIDENTES
E INCIDENTES DE
AVIACIÓN CIVIL

Report ULM A-002/2018

Accident involving an Evektor EV-97
Eurostar aircraft, registration EC-EZ3,
at the Cordoba Airport (Spain) on 13
January 2018



GOBIERNO
DE ESPAÑA

MINISTERIO
DE FOMENTO

Report

ULM A-002/2018

**Accident involving an Eveztor EV-97 Eurostar aircraft,
registration EC-EZ3, at the Córdoba Airport (Spain)
on 13 January 2018**



GOBIERNO
DE ESPAÑA

MINISTERIO
DE FOMENTO

SUBSECRETARÍA

COMISIÓN DE INVESTIGACIÓN
DE ACCIDENTES E INCIDENTES
DE AVIACIÓN CIVIL

© Ministerio de Fomento
Secretaría General Técnica
Centro de Publicaciones

NIPO Línea: 161-19-057-9

NIPO Papel: 161-19-052-1

Deposito Legal: M- 7503-2019

Maquetación: ASAP Global Solution S.L.

Impresión: Centro de Publicaciones

COMISIÓN DE INVESTIGACIÓN DE ACCIDENTES E INCIDENTES DE AVIACIÓN CIVIL

Tel.: +34 91 597 89 63
Fax: +34 91 463 55 35

E-mail: ciaiac@fomento.es
<http://www.ciaiac.es>

C/ Fruela, 6
28011 Madrid (España)

Foreword

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

In accordance with the provisions in Article 5.4.1 of Annex 13 of the International Civil Aviation Convention; and with articles 5.5 of Regulation (UE) n° 996/2010, of the European Parliament and the Council, of 20 October 2010; Article 15 of Law 21/2003 on Air Safety and articles 1., 4. and 21.2 of Regulation 389/1998, this investigation is exclusively of a technical nature, and its objective is the prevention of future civil aviation accidents and incidents by issuing, if necessary, safety recommendations to prevent from their reoccurrence. The investigation is not pointed to establish blame or liability whatsoever, and it's not prejudging the possible decision taken by the judicial authorities. Therefore, and according to above norms and regulations, the investigation was carried out using procedures not necessarily subject to the guarantees and rights usually used for the evidences in a judicial process.

Consequently, any use of this report for purposes other than that of preventing 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 vi

Synopsis vii

1. FACTUAL INFORMATION 1

 1.1 History of the flight 1

 1.2 Injuries to persons 2

 1.3 Damage to aircraft 2

 1.4 Other damage 2

 1.5 Personnel information 3

 1.6 Aircraft information 3

 1.6.1 Fuel system designed by the aircraft manufacturer 5

 1.6.2 Fuel system for ROTAX 912 engines 6

 1.6.3 Fuel system on the accident aircraft 7

 1.7. Meteorological information 12

 1.8. Aids to navigation 12

 1.9 Communications 12

 1.10 Aerodrome information 12

 1.11 Flight recorders 13

 1.12 Wreckage and impact information 13

 1.13. Medical and pathological information 14

 1.14 Fire 14

 1.15 Survival aspects 14

 1.16 Test and research 15

 1.16.1 Pilot’s statement 15

 1.16.2 Passenger’s statement 17

 1.16.3 Statement from the flight operations officer at the Club Aéreo de Córdoba 17

 1.16.4 Checklist 18

 1.17 Organizational and management information 19

 1.18 Additional information 19

 1.18.1 Previous accident 19

 1.18.2 Previous incident 20

 1.18.3 Regulatory situation involving introductory flights 20

 1.18.4 Applicable regulation for registering civil aircraft from 1 December 2015.. 20

 1.18.5 Applicable regulation for registering civil aircraft prior to 1 December 2015... 21

 1.18.6 Applicable regulation on the minimum documentation that a builder must deliver to the user 22

1.18.7	Applicable regulation on ultralight flights.....	22
1.18.8	Applicable regulation on the airworthiness of ultralight aircraft and their maintenance	23
1.18.9	Question sent to Evezor-Aerotechnik a.s about the aircraft with serial number 2007 2932.....	23
1.19	Useful or effective investigation techniques.....	24
2.	ANALYSIS.....	25
2.1	Analysis of the operation of the aircraft.....	25
2.2	Analysis of the identity of the aircraft.....	26
2.3	Analysis of the regulatory situation applicable to the aircraft registry following an accident	26
2.4	Analysis of the regulatory situation applicable to the change of ownership of an aircraft.	27
2.5	Analysis of continuing airworthiness, and in particular of the fuel system installed on the aircraft.....	28
2.6	Analysis of the regulatory situation applicable to introductory flights with ultralight aircraft	29
3.	CONCLUSIONS.....	30
3.1	Findings.....	30
3.2	Causes/Contributing factors.....	30
4.	SAFETY RECOMMENDATIONS.....	31

Abbreviations

° ' "	Sexagesimal degrees, minutes and seconds
°C	Degrees centigrade
AESA	National Aviation Safety Agency
AGL	Above ground level
ARO	Air traffic services reporting office
DGAC	Civil Aviation General Directorate
ft	Feet
h	Hours
hPa	Hectopascals
ICAO	International Civil Aviation Organization
Kg	Kilograms
Km	Kilometers
l	Liters
LEBA	ICAO code for the Córdoba Airport
m	Meters
MAF	Multi-axis fixed wing
METAR	Aviation routine weather report
Min	Minutes
MSL	Mean sea level
N/A	Not affected
NOTAM	Notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations;
QNH	Altimeter sub-scale setting to obtain elevation when on the ground
RTC	National radio operator
s	Seconds
SB	Service Bulletin
SN	Serial number
THR	Threshold
ULM	Ultralight
UTC	Coordinated universal time
VFR	Visual flight rules

Synopsis

Owner:	Club Aéreo de Córdoba
Operator:	Private ¹
Aircraft:	Evektor EV-97 Eurostar, registration EC-EZ3
Date and time of accident:	13 January 2018 at 12:10 ²
Site of accident:	Córdoba Airport, Spain
Persons on board:	2, 1 with minor injuries and 1 with serious injuries ³
Type of flight:	General aviation – Other – Unauthorized operation ⁴
Phase of flight:	Takeoff – Initial climb
Type of operation:	VFR
Date of approval:	January 30, 2019

Summary of event:

On Saturday, 13 January 2018, the pilot was preparing to go on a local flight with a passenger, from and to the Córdoba Airport.

The flight had a dual purpose. The pilot, who was a member of the Club Aéreo de Córdoba, wanted to gain more flying experience, and the passenger wanted to receive an introductory flight on this type of aircraft from the Club Aéreo de Córdoba, which is an ultralight flight school.

The fuel system on this aircraft had been modified and did not correspond to the one originally installed by the manufacturer. Although the aircraft had a fuel fill nozzle in

¹. The operator of the accident aircraft is the Club Aéreo de Córdoba. On the day of the accident, the aircraft was being piloted by a member of the Club Aéreo de Córdoba.

². All times in this report are in local time. To obtain UTC, subtract one hour.

³. Investigators were unable to determine the severity of the passenger's injuries, since there were contradictory statements in this regard.

⁴. According to the statements, the flight had a dual purpose: to increase the accident pilot's flying experience and to give an introductory flight to the passenger.

"An introductory flight is any flight against remuneration or other valuable consideration consisting of an air tour of short duration, offered by an approved training organisation or an organisation created with the aim of promoting aerial sport or leisure aviation for the purpose of attracting new trainees or new members".
(Definition taken from Commission Regulation (EU) No 965/2012 of 5 October 2012.)

The National Aviation Safety Agency does not allow the conduct of introductory flights in Spain with ultralight aircraft, which is why the flight is classified as unauthorized.

the main tank, this nozzle was not used; in its place, the fuel was loaded through the auxiliary tank fill nozzle located on the engine cover. The fuel was transferred from the auxiliary to the main tank by gravity by opening a cock valve that had been installed when the fuel system was modified. To keep the mechanical fuel pump on the engine from sucking in air instead of fuel and stopping the engine, it was necessary to close the cock valve before the fuel in the auxiliary tank was depleted.

On the day of the accident, the cock valve mentioned in the above paragraph was open, allowing fuel to be transferred from the auxiliary tank to the main tank. The checklists, written by the operator, contain items reminding the pilot of the requirement to close the cock valve both before takeoff and when the engine is turned off after landing. However, those actions were not carried out on that day.

As the aircraft was on the upwind⁵ leg of the traffic pattern at an approximate altitude of 300 ft, the engine stopped when the fuel flow to it was interrupted.

The pilot reported the emergency situation and tried to make an emergency landing at the Córdoba Airport, but he was unable to reach the airport, landing instead some 30 meters away from runway 03.

The landing gear was damaged and the left wing was bent upwards.

The pilot and passenger were treated by medical personnel.

The cause of the accident was the performance of an emergency off-field landing following an engine stoppage caused by improper management of the fuel supply.

A contributing factor was the inadequate and unauthorized modification of the fuel system, which placed the operation at high risk.

⁵. According to Royal Decree 552/2014 of 27 June, which implements the Rules of the Air, the upwind leg is defined as the flight path parallel to and in the direction of the landing runway.

1. FACTUAL INFORMATION

1.1. History of the flight

On Saturday, 13 January 2018, the pilot was preparing to go on a local flight with a passenger, from and to the Córdoba Airport.

The flight had a dual purpose. The pilot, who was a member of the Club Aéreo de Córdoba, wanted to gain more flying experience, and the passenger wanted to receive an introductory flight on this type of aircraft from the Club Aéreo de Córdoba, which is an ultralight flight school.

The fuel system on this aircraft had been modified and did not correspond to the one originally installed by the manufacturer. The investigation revealed that the accident aircraft had had up to two auxiliary fuel tanks, though the current owner, after purchasing the aircraft, removed one of these two auxiliary tanks. The aircraft manufacturer was asked about this fuel system design, and he replied that although the aircraft manual considered the possibility of installing an auxiliary fuel tank, he had not done it on any of its aircraft. The fill nozzle on this aircraft's main fuel tank was not used; instead, the fuel was loaded by using the fill nozzle on the auxiliary fuel tank. When a cock valve, installed when the fuel system was modified, was opened, fuel gravity drained from the auxiliary tank to the main tank. To keep the mechanical fuel pump on the engine from sucking in air instead of fuel and stopping the engine, it was necessary to close the cock valve before the fuel in the auxiliary tank was depleted.

The current owner of the aircraft lacked a diagram of the fuel system on the accident aircraft, nor did he have documentation describing its operation.

This modification to the aircraft's fuel system had already resulted in a prior incident on 24 September 2012. The aircraft had been forced to make an emergency off-field landing when the engine stopped during a training flight.

On the day of the accident, the flight operations officer flew a training flight with a student at the school and, according to his statement, previously he had loaded 21 liters into the auxiliary fuel tank. According to his calculations, before going on the training flight, the total fuel volume between the two tanks would have been 30 liters.

During the first part of this training flight, the flight operations officer flew with the cock valve open to allow the fuel to gravity drain from the auxiliary tank to the main tank. He closed the cock valve before the auxiliary tank was completely empty. After landing, the flight operations officer opened the cock valve again to finish transferring fuel from the auxiliary tank to the main tank, and he did not close it afterward.

When the pilot involved in the accident boarded the aircraft, there was practically no fuel left in the auxiliary tank. The checklist, prepared by the operator, contains an item noting the requirement to close the cock valve (which allows fuel to gravity drain from the auxiliary tank to the main tank) before starting the flight. The pilot did not do this, however. As a result, the pilot took off with the auxiliary tank practically empty and the cock valve open.

By the time the aircraft was in the upwind leg of the traffic pattern, it had consumed the small amount of fuel remaining in the auxiliary tank and, at an approximate altitude of 300 ft, the engine stopped when the fuel flow to it was interrupted. This is because the mechanical fuel pump was drawing a suction on the air in the lines, which are higher, rather than on the fuel in the main tank.

The pilot reported the emergency situation and tried to make an emergency landing at the Córdoba Airport, but he was unable to reach the airport, instead making an off-field landing some 30 meters away from runway 03.

The landing gear was damaged and the left wing was bent upwards.

The pilot and passenger were treated by medical personnel.

1.2. Injuries to persons

Injuries	Crew	Passengers	Total in the aircraft	Other
Fatal				
Serious		1 ⁶	1	
Minor	1		1	N/A
None				N/A
TOTAL	1	1	2	

1.3. Damage to aircraft

The aircraft sustained significant damage during the off-field emergency landing. The landing gear on the aircraft was damaged and the left wing was bent upwards.

1.4. Other damage

There was no other damage.

⁶. Investigators were unable to determine the severity of the passenger's injuries, since there were contradictory statements in this regard.

1.5. Personnel information

The pilot, a 29-year old Spanish national, had had an ultralight pilot license since 13 June 2016, with RTC (Spanish radio operator) and MAF (fixed-wing multi-axis) ratings that were valid until 30 June 2018.

He had a class-2 medical certificate that was valid until 6 May 2020.

On the day of the accident he had 125 flight hours in total and 53:30 flight hours on the type. He flew weekly and the last flight before the accident had been on 3 January 2018.

1.6. Aircraft information

The Evektor EV-97 Eurostar aircraft, registration EC-EZ3 and serial number 2007 2932, was manufactured in 2007. The aircraft was equipped with a Rotax 912 ULS engine, its empty weight was 273 kg and its maximum weight 450 kg.

The Spanish Aircraft Registry indicated that the aircraft had had three owners up to the date of the accident:

1. It was first recorded in the registry on 13 June 2007. A short time later, on 25 July 2007, the aircraft was in an accident in Cidamon (La Rioja) and was destroyed.

The investigation was unable to determine if, after this accident, the aircraft was repaired and returned to service again.

If it was, neither AESA nor the current owner know which organization could have been responsible for rebuilding the aircraft.

2. In any event, the Aircraft Registry shows that on 5 June 2008, the aircraft had a new owner.
3. And lastly, on 14 June 2011 the aircraft was registered to the current owner, the Club Aéreo de Córdoba.

When the aircraft was acquired by the Club Aéreo de Córdoba, the Club did not have the training school. Later, as the Club Aéreo de Córdoba wanted to set up a training school and to use the aircraft to provide flight training on ultralights, a new certificate of airworthiness had to be issued. The Special Restricted Certificate of Airworthiness in the "Normal Private School (3)⁷" category was issued on 15 July

⁷. The (3) indicates that an aircraft is only suited for visual flight.

2011 by the National Aviation Safety Agency. The certificate of airworthiness was issued pursuant to Type Certificate 280-I, which indicates that the fuel capacity of the EV-97 Eurostar (approved on 18 May 2005) is 65 liters, of which 2.9 is “not usable”.

The ULM technical report released by the National Aviation Safety Agency on 15 July 2011 details the steps taken in order to issue the Certificate of Airworthiness. Said report states, among other aspects, that:

- *The aircraft had a 65-liter fuel tank.*
- *During an inspection of the aircraft, the tanks and fuel lines were deemed to be acceptable.*
- *The result of the flight test was satisfactory.*

AESA stated that it did not take photographs of the aircraft and its systems during these checks⁸. AESA also did not log which maintenance documentation on the aircraft it analyzed in order to issue the Certificate of Airworthiness. Moreover, the ULM technical report does not contain the serial number for either the aircraft or the engine.

On 20 October 2015, AESA inspected the aircraft in order to check its registration records. The report states:

- *The aircraft was equipped with a ROTAX 912 ULS engine, whose serial number did not match that noted on the aircraft’s bill of sale. According to AESA, “the engine was theoretically replaced⁹ after the purchase of 8 April 2011, before the new Restricted Certificate of Airworthiness was issued for it, or it was replaced before the sale and not recorded on the bill of sale or reported to the new owner”.*
- *“Barring hidden defects, the aircraft’s airworthiness is acceptable. There are no signs of any defects that affect its safety”.*
- *“There is no repair report for the 2007 accident. At the time, it had a different owner. With the above information, we cannot be certain that the*

⁸. However, the owner of the aircraft has indicated that AESA did, in his presence, an exhaustive photographic report of the aircraft during the aircraft inspection to issue the new Certificate of Airworthiness.

⁹. According to AESA, the expression “theoretical engine replacement” indicates that if at the time of purchase the engine had SN 5648443, and when the certificate was issued it was SN 4425628, the replacement would have to have occurred some time between the two events. This assumption cannot be verified with the available data since, as the AESA report states, the engine could have been replaced before the purchase date without this fact being noted in the bill of sale prepared for the occasion.

aircraft is the one described on the nameplate. We believe that the manufacturer would be able to certify if the aircraft is the one identified on the nameplate or not, as it has more manufacturing data”¹⁰.

1.6.1. Fuel system designed by the aircraft manufacturer

The description of the fuel system designed and installed by the aircraft manufacturer was taken from the aircraft manual titled “Airplane Technical Description Operating, Maintenance and Repair Manual”:

“The standard fuel tank volume is 65 liters. The tank is located behind the seat backrests. Fuel is pulled from the fuel tank through the fuel valve located inside the cockpit on the left-hand side, below the instrument panel.

The fuel tank filler neck is placed on the right-hand side of the fuselage”.

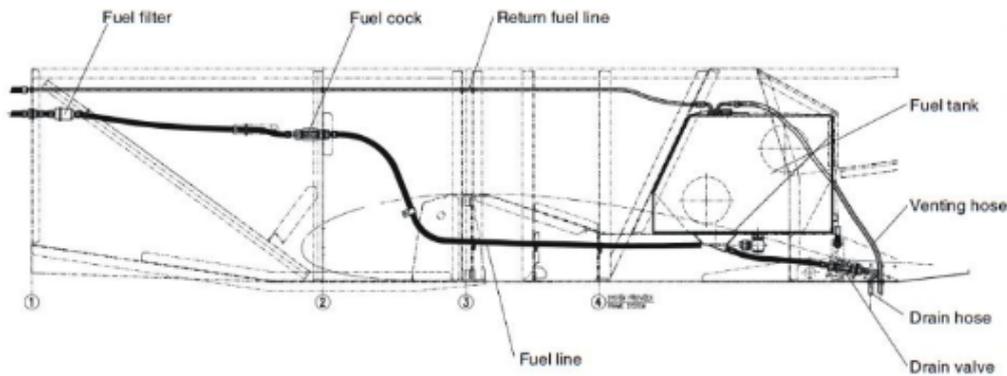


Illustration 1. Fuel supply system designed by the aircraft manufacturer

The photograph below shows the location of the fill nozzle for the fuel tank.



Illustration 2. Location of the main fuel tank fill nozzle

¹⁰. Since no information was provided in this regard, it is not known if AESA took any steps after identifying these details during this inspection.

The Manual also states that the aircraft can optionally be outfitted with an additional fuel tank:

“If the additional fuel tank is installed (in the front of the fuselage), both tanks are connected. The filler neck is located on the upper surface of the additional fuel tank (not on the right-hand side of the fuselage) and tanked fuel flows into the standard fuel tank first of all. From here, the fuel is sucked up by the engine pump”.

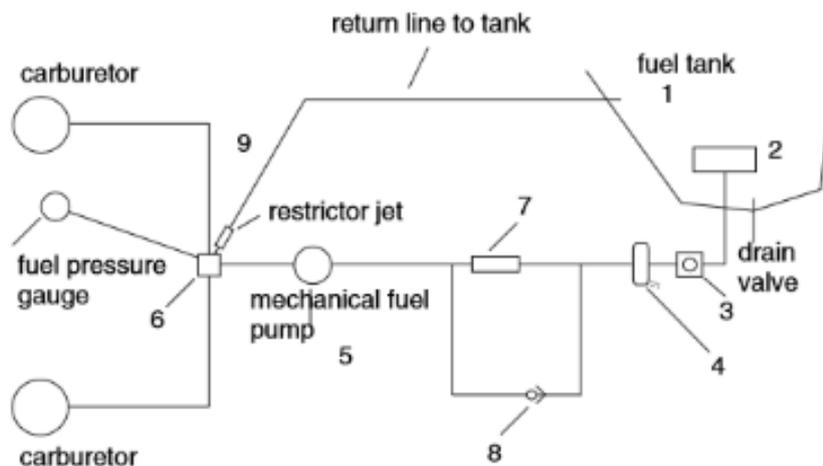
Investigators contacted the manufacturer of the aircraft, Evektor-Aerotechnik a.s., which provided the following clarifications:

- 1 – As concerns the design of the fuel system on ultralights that feature an auxiliary fuel tank, he confirmed that a single fill nozzle is installed in the fuselage, forward of the cockpit. The two tanks are connected by a line with no fuel cock valve.
- 2 – He indicated, however, that it had not installed an auxiliary fuel tank on any of its aircraft.
- 3 – He concluded that the fuel system had been modified by the owners of the aircraft, since it had two fuel fill nozzles and two extra fuel cock valves in the cockpit to manage the fuel in the two auxiliary tanks.

1.6.2. Fuel system for ROTAX 912 engines

The manufacturer of the ROTAX 912 engine, in its “Installation Manual for ROTAX engine type 912 series”, describes how to install the fuel system to ensure the proper operation of its engine. It warns that the aircraft manufacturer is responsible for the design of the fuel system. Specifically, the airplane manufacture has to install the fuel system from the tank to the suction of the fuel pump.

The diagram below shows the components in the fuel system for the ROTAX engine:



Part	Function
1	Fuel tank
2	Coarse filter
3	Fire cock
4	Fine filter/water trap
5	Mechanical fuel pump*
6	Fuel pressure control*
7	Electrical fuel pump
8	1x check valve
9	Return line from engine to tank (with integrated adapter sleeve)
	* Standard version

Illustration 3. Components of the fuel system in the ROTAX engine

The fuel flows from the fuel tank (1) through a coarse filter (2) and a fire cock (3). It then continues through a fine filter/water trap (4) and the mechanical fuel pump (5) before passing through the fuel pressure control (6) to the two carburetors.

The aircraft manufacturer must install the following connections:

- The suction lines for the mechanical fuel pump (5).
- The lines connecting the discharge of the mechanical fuel pump to the fuel pressure control (6).
- The return line from the fuel pressure control to the fuel tank.

1.6.3. Fuel system on the accident aircraft.

The fuel system on the accident aircraft had been modified, meaning it was not the same as that originally installed by the aircraft manufacturer.

When the aircraft was purchased by its current owner, it had three fuel tanks; that is, in addition to the main tank, installed by the aircraft manufacturer, there were

two auxiliary fuel tanks. One of these two auxiliary fuel tanks (identified as auxiliary tank #2 in this report) had been removed by the aircraft's current owner before the accident. The other auxiliary tank, however (identified as auxiliary tank #1 in this report), with a 42-liter capacity, maximum of 50 liters, was being used by the current owner.

The sketch below shows the fuel tanks on the accident aircraft and the lines joining these tanks to the mechanical fuel pump on the engine. The flow of fuel from these tanks to the engine is regulated by the associated fuel cocks.

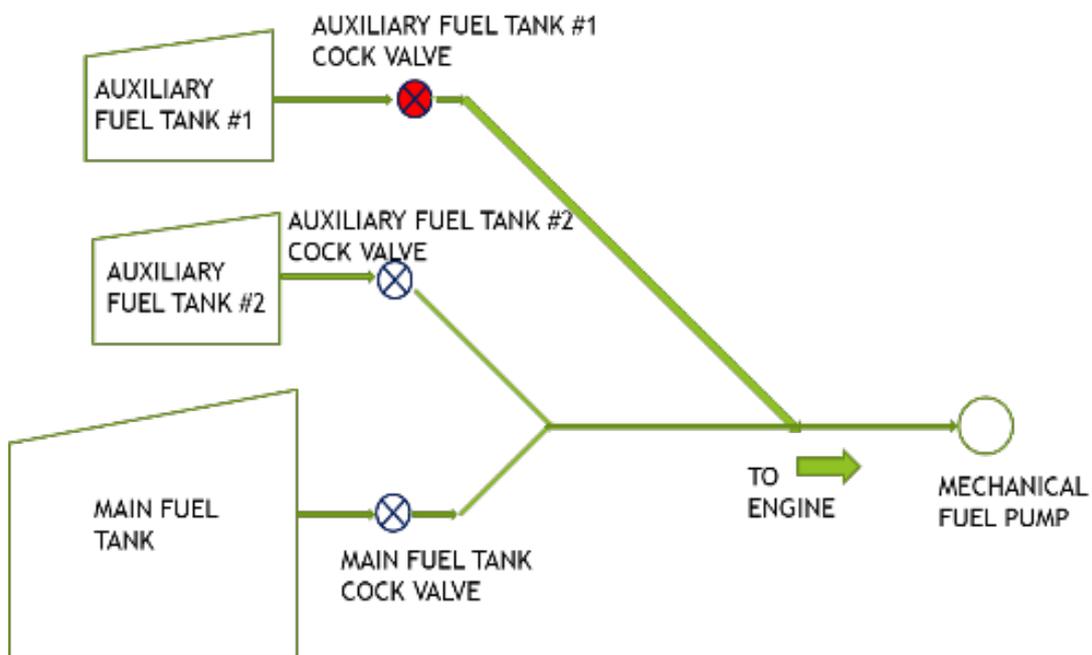


Illustration 4. Diagram of the tanks and connecting lines in the fuel system of the accident aircraft

A second fuel fill nozzle had also been installed at the front of the fuselage, forward of the cockpit. This fill nozzle was for auxiliary tank #1. The photograph below of the accident aircraft shows a fuel fill nozzle on the right side of the fuselage, below the cockpit, which supplies the main tank, and this second fill nozzle above the engine, which supplies auxiliary tank #1¹¹.

¹¹. The current owner uninstalled auxiliary tank #2 after purchasing the aircraft, so its fill procedure is not provided. The associated lines and valves were left installed on the aircraft.



Illustration 5. Fuel fill nozzles on the accident aircraft

The photographs below show how the fuel supply to the engine is controlled in the cockpit. The photograph on the left shows the three fuel cocks that control the flow of fuel from the various tanks to the engine, and the photograph on the right shows the two fuel gauges: the top one shows the amount of fuel in auxiliary tank #1, and the bottom one the amount of fuel in the main tank.

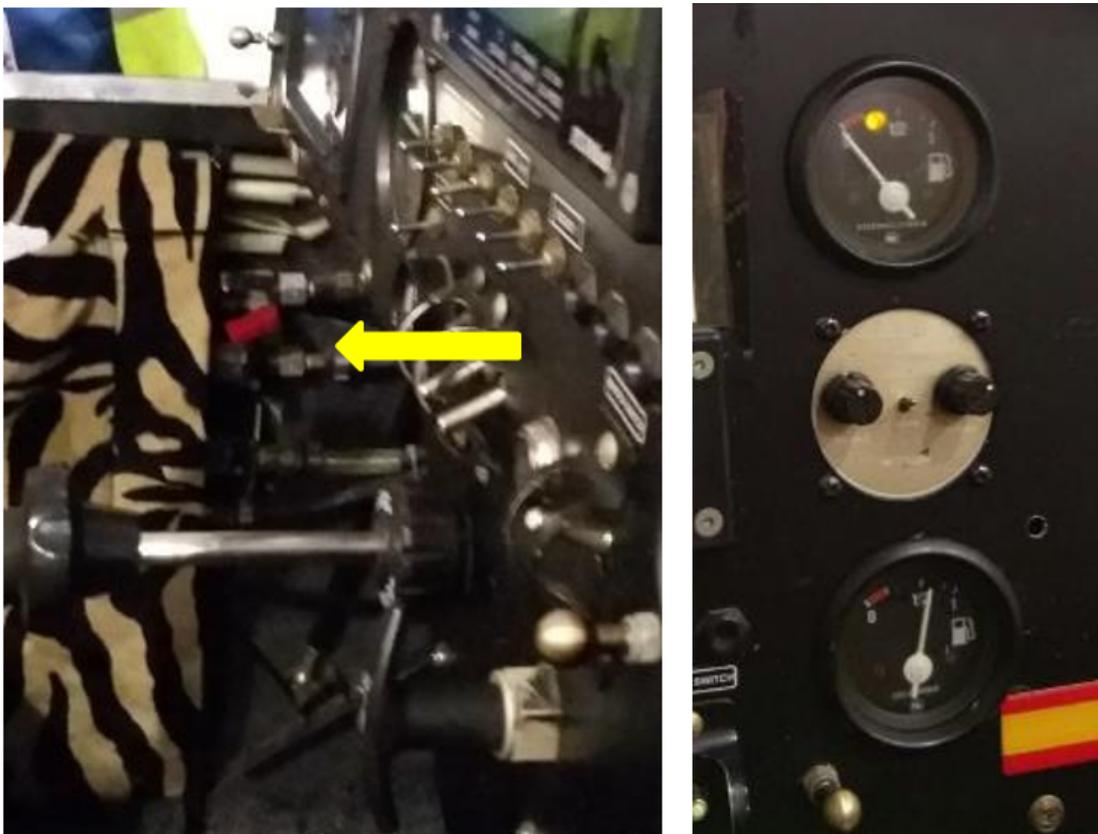


Illustration 6. Close-up in the cockpit: (left) the three fuel cocks that control the three fuel tanks, (right) fuel gauges for the auxiliary and main tanks

Each of the cock valves used to control the flow of fuel from the various tanks to the engine is shown in the photographs below.



Illustration 7. Identification of the three cock valves

The following photographs show how these tanks are connected to one another and to the engine.



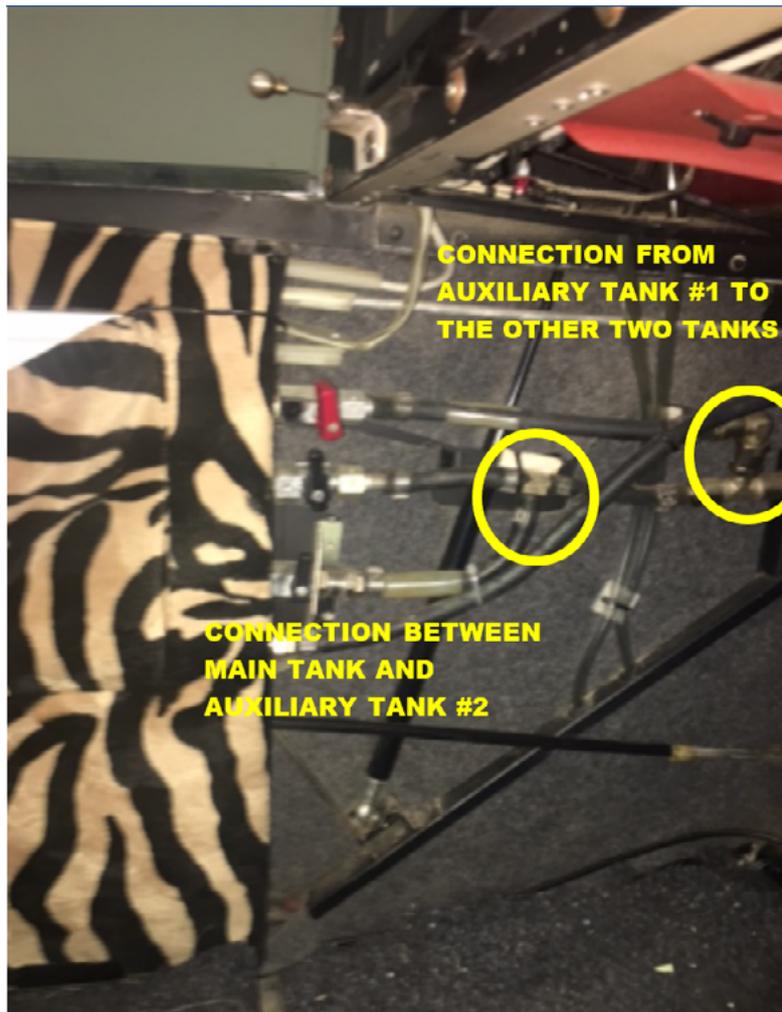


Illustration 8. Close-up of connections between tanks

Auxiliary tank #1, along with the lines connecting the tanks, was installed higher than the main fuel tank and the mechanical fuel pump. This means that the mechanical fuel pump was below auxiliary tank #1 but above the main tank.

The fuel was added through the fill nozzle for auxiliary tank #1 and then transferred through its associated cock valve (painted red) from the auxiliary tank to the main tank. When this cock valve is open, the fuel gravity drains to the main tank. If there is no fuel in auxiliary tank #1 and the cock valve is open, the mechanical fuel pump will suck in air from the lines, which are higher, instead of fuel from the main tank. To keep the air in the lines from stopping the engine, the cock valve must be closed before the fuel in the auxiliary tank is depleted.

The aircraft's current owner had prepared a checklist that required closing the cock valve both before taking off and once the engine was turned off after landing. This would prevent the mechanical fuel pump from sucking in air instead of fuel if the auxiliary tank #1 was empty.

The aircraft's current owner stated that these auxiliary tanks were already installed when AESA issued the Certificate of Airworthiness. He did not know who installed them or when. Since he purchased the aircraft without a maintenance record (or aircraft log book), he did not know the aircraft's maintenance history.

1.7. Meteorological information

The 12:00 METAR for the Córdoba Airport was as follows:

METAR LEBA 131100Z 09005KT 030V130 9999 FEW026 07/04 Q1022=

- Wind from the east, between 030-130°; at 5 knots.
- Good visibility on the surface.
- Few clouds.
- Temperature of 7° C
- QNH of 1022 hPa.

1.8. Aids to navigation

No navigation aids are available for this type of flight.

1.9. Communications

There were air-to-air communications. The pilot reported the emergency situation to other aircraft that were at the Córdoba Airport.

1.10. Aerodrome information

The aircraft was on a local flight, taking off from and landing at the Córdoba Airport (ICAO code LEBA).

The airport is 6 km southwest from the city of Córdoba at an elevation of 94 meters. It has one 45-m wide runway, 03/21. Runway 3 is 2,050 m long and runway 21 is 2,241 m long. The runway 21 THR is displaced 591 m.

100LL and JET A-1 fuels are available at the airport.

The image below shows an aerial view of the Córdoba Airport.



Illustration 9. Aerial view of the Córdoba Airport

1.11. Flight recorders

Not applicable.

1.12. Wreckage and impact information

On the upwind leg at the Córdoba Airport, south of the landing runway, the pilot decided to make an off-field emergency landing upon deciding that he could not fly over the Guadalquivir River and land on runway 03 at the airport.

During the emergency landing, the aircraft impacted with the left wingtip, which caused it to turn sharply left until it came to a stop, some 30 meters away from runway 03.

The photographs below show the final position of the aircraft. The left wing was bent upward, the nose gear gave way below the fuselage and the right main gear was bent. Of the three propeller blades, two were broken.



Illustration 10. Final condition of the ultralight

1.13. Medical and pathological information

There is no indication that physiological factors or incapacitations could have affected the pilot's actions.

1.14. Fire

There was no fire.

1.15. Survival aspects

The operations office at the Córdoba Airport activated the emergency plan and notified emergency services (112) of the accident.

Although the pilot and passenger exited the aircraft under their own power, they were taken by ambulance to the emergency room at the Reina Sofía Hospital in Córdoba for an evaluation.

The pilot sustained a cervical sprain.

Investigators were unable to determine the severity of the passenger's injuries, as there were contradictory statements in this regard.

The photograph shows the kind of safety harness installed by the manufacturer in the accident aircraft. It is a four-point harness with dual shoulder belts, with a strap



Illustration 11. Harness installed by the aircraft manufacturer

passing over both shoulders of the occupant. The straps of the shoulder belts combine to form a “Y” and are attached to a point on the cockpit structure. There is also a lap belt.

1.16. Tests and research

1.16.1. Pilot's statement.

The pilot stated that he was a member of the Club Aéreo de Córdoba. On the day of the accident, he was preparing to make a local flight in order to gain experience and become an ultralight flight instructor. He was accompanied by an individual who had paid the Club to go on an introductory flight.

On the day of the accident, he arrived at the ARO office at the Córdoba Airport early enough to prepare the flight and check the METAR and NOTAMs. He did the pre-flight check (walkaround and cockpit inspection), aided by the checklists provided by the Club and then climbed into the cockpit with the passenger.

Inside the aircraft there is a start-up and before takeoff checklist containing the following item: “RED COCK VALVE CLOSED”. The pilot stated that he read the checklist, but forgot to close it.

He later learned that the “red cock valve” had been left open after the previous flight in order to transfer fuel from the auxiliary to the main tank, and that it had not been closed afterward, even though the checklists instruct doing this before leaving the airplane.

After the checks, he started the engine and warmed it up on the apron. He then taxied to the holding point, where he tested the engine, the result of which was satisfactory. He reported entering the runway to take off.

He started the takeoff and estimated that when he was some 300 feet AGL, the engine stopped. He was in the upwind leg of the traffic pattern. He maintained glide speed by lowering the nose and issued a "mayday"¹² on the frequency. He looked for the problem and realized he had left the fuel cock valve between the auxiliary and main tanks open. He immediately closed the valve and tried to start the engine, but he was unable to do so.

He realized he could not reach the runway, so he stopped trying to complete the pattern. He also realized that with his descent rate, he could not cross the Guadalquivir Rider, so he decided to turn smoothly to the downwind leg, while keeping the speed up so as not to stall.

He lined up parallel to the runway, which was to his right. He attempted to make an off-field landing but due to the slight bank angle, the left wingtip touched the ground. This caused the aircraft to turn sharply left until it came to a stop. In his opinion, it was not a hard landing. The aircraft slid for 28 meters, leaving a mark on the mud. It ended up 30 or 40 meters away from runway 03.

After landing and coming to a complete stop, he turned off the entire electrical and ignition systems, closed the main cock valve for the fuel line and asked the passenger to exit the aircraft.

They both exited the airplane under their own power. The pilot had bruises on his neck from the safety harness and a cervical sprain. He believes that the passenger suffered cuts to one elbow and bruises.

He stated that he had been trained on that same ultralight and he was aware of the need to close the cock valve when the auxiliary tank is empty so that the mechanical fuel pump does not suck in air instead of fuel, stopping the engine.

He added that the Club has a procedure that states that any pilot who goes more than one month without flying must perform a refresher flight with another pilot.

He acknowledged that despite reading the step in the pre-flight checklist to close the cock valve connecting the auxiliary and main fuel tanks, he did not do it. He justified this oversight by explaining that he must have read the checklist items without paying too much attention to them. He thought that the only way to avoid this is to follow the procedure and carry out all the steps in it.

¹². The MAYDAY radio distress signal is used to report a dangerous situation.

1.16.2. Passenger's statement

The passenger stated that he is an aviation aficionado who was given a "voucher" to go on an introductory flight. The introductory flight was advertised with the following characteristics:

- It would be done with a flight instructor.
- A brief presentation would be given to explain the airplane's controls and instruments.
- After taking off, the passenger would be in control of the aircraft at all times, guided by the flight instructor, since it would be a practical flight class.

He stated that as they were flying at an altitude of about 300 feet, the engine stopped. According to him, the pilot did all he could, since at that altitude they had little time to prepare for the landing. They were lucky because they fell on ground that had been softened by the rain in recent days. The right wing impacted first, which is why he had more injuries than the pilot.

He stated that he had a broken rib, his right arm was injured, he could not move his neck (he was wearing a brace) and psychologically he was very traumatized. However, the severity of the passenger's injuries could not be determined given the contradictory statements.

After the impact, the flight operations officer arrived and said he had left the "red cock valve" open on the previous flight.

1.16.3. Statement from the flight operations officer at the Club Aéreo de Córdoba

On the day of the accident, prior to the flight, the flight operations officer had done a training flight with a student at the school lasting one hour.

Before the training flight, he had done the pre-flight check and drained the fuel tank.

He explained that the aircraft has two fuel tanks, the main and reserve tanks. The refueling is always done using the fill nozzle on the reserve fuel tank, which is located next to the engine compartment. The red cock valve located down and to the left of the pilot is then opened to gravity drain the fuel to the main tank. The fuel transfer operation is done on the ground or in the air, as appropriate.

He stated that he had taken on 21 liters of fuel in the reserve tank using a funnel with a chamois cloth to keep any water in the container from entering the tank. The total fuel volume between the two tanks was approximately 30 liters.

In the first half hour of this training flight, the cock valve that allows transferring fuel from the reserve to the main tank had remained open, and he closed it before the reserve tank was completely empty so that the mechanical fuel pump on the engine would not suck in air. This happens because the main tank is below the auxiliary tank and the lines connecting them.

Once the training flight ended, at about 11:20, and with the airplane back on the ground, the flight operations officer opened the cock valve to finish transferring any fuel remaining in the reserve tank. He thus thought that all the gasoline in the reserve tank would have drained into the main tank by the time the accident pilot used the aircraft.

After the accident, the flight operations officer deactivated the emergency transmitter.

He added that the Córdoba Airport activated its emergency plan.

1.16.4. Checklist

The checklist prepared by the aircraft operator, the Club Aéreo de Córdoba, is shown below. The items highlighted refer to the “red cock valve”, meaning the valve that controls the transfer of fuel from the auxiliary to the main tank.

<ul style="list-style-type: none"> - FUNDA TUBO PITOT - COMPROBAR CINTURONES SEGURIDAD - FRENOS PISADOS - COMPROBAR COMPENSADOR EN EL CENTRO - COMPROBAR FLAPS ABAJO Y BLOQUEADOS - COMPROBAR PALANCA DE MANDO - MASTER ON - LLAVE CONTACTO ON - COMPROBAR RECORRIDO ACELERADOR - GIRAR MEDIA VUELTA ACELERADOR - MAGNETOS ON - PRIMER ARRANQUE: STARTER - ARRANCAR - REVOLUCIONES 2.000 DURANTE 2 MINUTOS - BEACON ON (STROBOS) - POS. LIGHTS ON - AJUSTAR CINTURONES SEGURIDAD - COMPROBAR PRESIÓN ACEITE (2-5) - CERRAR PUERTA Y COMPROBAR - PONER CASCOS - COMPROBAR COMUNICACIÓN INTERCOM - RADIO ON - COMPROBAR FRECUENCIA (118.30) Y VOLUMEN - ALTÍMETRO 300' - INDICADORES A CERO - NOTIFICAR - REVOLUCIONES 2.500 	<p>A R R A N Q U E</p>	<ul style="list-style-type: none"> - TEMPERATURA CHT: >75 °C - TEMPERATURA ACEITE: >60 °C - PRESIÓN ACEITE: Entre 2 y 5 Bar. - PRUEBA DE MAGNETOS: 4.000 R.P.M - MAGNETO IZDA OFF: Caída de 100 – 130 RPM - MAGNETO DCHA OFF: Caída de 100 – 130 RPM - REVOLUCIONES 2.500 RPM - COMPROBAR PUERTA CERRADA - INDICADORES A CERO: ANEMÓMETRO Y VARIO GRIFO ROJO CERRADO - CINTURONES DE SEGURIDAD ABROCHADOS - DESPEQUE 	<p>D E S P E Q U E</p>
<ul style="list-style-type: none"> - REVOLUCIONES 1.700 - RADIO OFF - POS. LIGHT OFF - BEACON OFF (STROBOS) - LAND LIGHT OFF - MAGNETOS OFF - ANOTAR HORÓMETRO - LLAVE CONTACTO OFF - MASTER OFF - FIRMAR HOJA DE VUELO DEL ALUMNO - ANOTAR EN LIBRO DEL ALUMNO COMPROBAR GRIFO ROJO GASOLINA OFF - PONER FUNDA PITOT Y CERRAR CON LLAVE 	<p>A P A G A D O</p>		

Illustration 12. Checklists written by the aircraft operator

1.17. Organizational and management information

The aircraft belonged to the Club Aéreo de Córdoba. This club has been an AESA-authorized ultralight flight school since November 2011. The base of operations of this center is the Córdoba Airport.

The statutes of the Club Aéreo de Córdoba, include among other articles, the following:

- Article 1: "Club Aéreo de Córdoba is the name of a private non-profit organization whose main purpose is the practice of air sport"
- Article 5: "The Entity will develop as a main sport activity the promotion of the ultralight flight ..."
- Article 8, paragraph 3: "Subscribers or collaborators are natural or legal persons who collaborate in the development of the club's activities, either through the provision of financial funds, or by contributing their own unpaid work"

1.18. Additional information

1.18.1. Previous accident

On 25 July 2007, the Evezor EV-97 Eurostar aircraft, registration EC-EZ3, was involved in an accident in Cidamon (La Rioja). The aircraft was destroyed and the pilot seriously injured.

The most likely cause of the accident is that the pilot ignored his piloting duties while he attempted to fix a problem with the lock on the canopy, which distracted his attention. The airplane then stalled as the pilot turned in an effort go back to the runway. The low altitude available impeded the pilot from executing a recovery maneuver.

Investigators were unable to ascertain if the aircraft was repaired or not after the accident that occurred on 25 July 2007. The current owner initially stated that the aircraft had not been repaired and that the aircraft registration (EC-EZ3) and the nameplates



Illustration 13. String used in the aircraft to keep the canopy from opening in flight

on the aircraft and engine were used to replace the existing ones on his aircraft, the one involved in this investigation. However, he later stated that his aircraft was the same as the accident aircraft from 2007.

He added that a string had been added to keep the canopy from opening in flight again¹³, as had happened during the 2007 accident. Even though the manufacturer had developed a solution (SB EV97-033a) to address this problem, it had not been implemented on this aircraft. The photograph shows the string installed in the aircraft of concern to this investigation.

1.18.2. Previous incident

On 24 September 2012, the aircraft involved in this investigation had to make an emergency off-field landing when the engine stopped during a training flight.

This incident was not deemed serious by the CIAIAC, and thus a formal investigation was not carried out. However, the Club Aéreo de Córdoba did issue a report on the incident. According to the Club, the instructor had asked the student pilot to close the cock valve that is used to control the transfer of fuel from the reserve tank to the main tank, since the latter was almost full. However, the student pilot also closed the main valve, which controls the supply of fuel from the main tank to the engine, starving the engine of fuel and stopping it.

1.18.3. Regulatory situation involving introductory flights

The Order of 24 April 1986 regulates ultralight flight schools and their activity in Spain. This Order does not mention “introductory flights”. The National Aviation Safety Agency was asked about the regulatory status of these flights, and according to AESA, introductory flights on ultralight aircraft are not permitted in Spain.

1.18.4. Applicable regulation for registering civil aircraft from 1 December 2015.

On 1 December 2015, Royal Decree 384/2015 of 22 May went into effect, which approved the regulation for registering civil aircraft. Of interest to the analysis of this accident are the following articles:

Point 3 in Article 28, Change of ownership specifies the documents that the applicant must provide, along with the request:

¹³. It should be noted that in November 2015, Evektor-Aerotechnik issued service bulletin EV97-033a, classified by the manufacturer as mandatory and applicable to all Eurostar and Sportstar aircraft with a metal frame around the canopy. The reason given was that as a consequence of non-observance of procedures, in certain circumstances the cabin lock could be released in flight, causing the canopy to open. The SB requires installing a mechanical latch in the frame of the canopy to act as an additional safety element and keep the canopy from opening if the locking mechanism failed (it would only open a few centimeters).

- a) *“Proof of payment of the required tax for the provision of the requested service.*
- b) *Photocopy of the legal title”*

Article 31, Cancellation of the registration states that the Civil Aircraft Registry, ex officio or at the request of the party, will proceed to cancel an aircraft registration.

A cancellation will be issued at the request of the party for, among other reasons, *“destruction or complete loss of the aircraft” and “inoperability and scrapping of the aircraft”*.

Among other cases, an ex officio cancellation will occur *“In the event that the aircraft is destroyed, or when it is rendered inoperative, if the registration is not cancelled at the request of the party”*.

The same article in the Royal Decree states that *“an aircraft is rendered inoperative when its airworthiness review certificate or equivalent document has not been renewed for five years”*.

1.18.5. Applicable regulation for registering civil aircraft prior to 1 December 2015.

1 - The aircraft was first listed in the Aircraft Registry on 13 June 2007. On 5 June 2008, the aircraft changed owners. And, the current owner acquired the aircraft on June 14, 2011. Ultralights used for non-commercial or non-industrial purposes, as was the case, fall under Royal Decree 2876/1982 of 15 October, which regulates the registration and use of ultralight aircraft. The twelfth article specifies that a change of ownership request must be accompanied by, among others, *“a report from the Regional Material Office on the technical characteristics and airworthiness condition of the ultralight”*.

2 - On 25 July 2007, the aircraft was destroyed in an accident. As indicated earlier, Royal Decree 2876/1982 of 15 October was applicable to it. And the twelfth article stated:

“The change of ownership and any technical or legal administrative vicissitude until its cancellation, will be made through successive annotations, ex officio or at the request of a party as appropriate”

Moreover, according to article 7, the provisions of Decree 416/1969, of March 13, which was established in article 21, were to be applied subsidiarity: *“the cancellation of the aircraft registration in the event of destruction or loss of the aircraft. ”* The cancellation of the registration, according to the aforementioned Decree, can be decreed by the authority

However, as we will analyze later in this report, the aircraft remained active in the Spanish Aircraft Registry.

1.18.6. *Applicable regulation on the minimum documentation that a builder must deliver to the user*

Article 10 of the Order of 14 November 1988, which lays out the airworthiness requirements for Powered Ultralight Aircraft (ULM), specifies the minimum documentation that the builder must provide to the user:

a) *“A user manual describing:*

Normal procedures.

Operating limits.

Emergency procedures.

Performance.

Weight and balance limits, including instructions for adjusting them.

Allowed fuels and lubricants.

Assembly, disassembly and storage procedures.

Instructions for periodic maintenance that indicate the most important operations to perform so as to ensure the airworthiness of the vehicle; specifically, how to care for the anchor points for the lifting elements, engine and landing gear.

b) *A maintenance book in which the user must log any important operations affecting maintenance, such as assemblies, disassemblies, replacement of propellers or engines or repairs of these components. The entry shall indicate the date and hours of operation on the component when the problem occurred.”*

However, as we will analyze later in this report, the current owner of the aircraft stated that he was not given the aircraft’s maintenance records when he purchased it.

1.18.7. *Applicable regulation on ultralight flights*

Article 7 of the Order of 24 April 1986, which regulates ultralight flights, specifies that the flight operations officer must *“determine the operating procedures”*.

However, this Order does not require these “operating procedures” to be presented for evaluation during the authorization process of the flight school.

1.18.8. Applicable regulation on the airworthiness of ultralight aircraft and their maintenance.

The Order of 14 November 1988, which lays out the airworthiness requirements for Powered Ultralight Aircraft, states:

- Article 9. Modifications

“Any modification affecting the specifications of materials, structural elements, powerplant, propeller or design must be reported to the Civil Aviation General Directorate for approval, if applicable.

If these modifications alter the established weights, capacities or limitations, a new certification shall be required”.

- Article 12. Continued airworthiness

“The owner shall be fully responsible for the continued airworthiness of his aircraft.

The Civil Aviation General Directorate reserves the right to inspect the condition of aircraft to check their airworthiness conditions when deemed appropriate.

For this purpose, once the aircraft is registered in the Aircraft Registry, the owner shall be given, in addition to the documents specified in Article 13 of Royal Decree 2876/1982, the Certificate of Airworthiness referred to in Article 36 of the Air Navigation Law, as long as the requirements specified herein are satisfied.

The owner or operator of the ultralight shall, if required to do so by the Material Inspector of the Civil Aviation General Directorate, prove that the vehicle maintains the same airworthiness condition under which it was manufactured. If the aircraft is not in this condition, the Inspector may suspend the validity of the Certificate of Airworthiness referred to in the aforementioned Air Navigation Law, and the aircraft shall not be authorized to fly until the defects observed are corrected”.

1.18.9. Question sent to Evektor-Aerotechnik a.s about the aircraft with serial number 2007 2932

As concerns the aircraft with serial number 2007 2932, the manufacturer indicated that it did not have any maintenance records for this aircraft since the aircraft was delivered new in 2007, and that therefore it did not know if the aircraft that was involved in the 2007 accident was repaired and returned to service.

1.19. Useful or effective investigation techniques

Not applicable.

2. ANALYSIS

2.1. Analysis of the operation of the aircraft

According to the statements and data collected during the investigation, on the day of the flight, prior to it, the flight operations officer had taken the aircraft on a training flight with a student at the school.

During the first half hour of this training flight, the cock valve that is used to transfer fuel from the reserve to the main tank was kept open, and the pilot closed it before the reserve tank was fully drained so that the mechanical fuel pump on the engine would not suck in air, since the main tank is located below the auxiliary pump and the lines between them.

After finishing the training flight, at about 11:20, and with the airplane on the ground, the flight operations officer opened the cock valve to finish transferring the fuel that remained in the reserve tank. The red cock valve was left open even though the checklists state to close it before leaving the airplane. As a result, the gasoline in the reserve tank would have completely drained to the main tank by the time the pilot and his passenger used the aircraft afterward.

The pilot did the pre-flight check and entered the aircraft, along with the passenger. At that time he was unaware that the valve for the auxiliary tank was not in the usual position, as required by the checklists.

Inside the aircraft there is an engine start and pre-takeoff checklist containing the following item: "RED COCK VALVE CLOSED". However, the pilot took off without verifying its position.

After taking off, at an approximate altitude of 300 feet AGL (or 600 feet MSL), the engine stopped during the upwind leg of the pattern.

At that point, the pilot realized that the "red valve" was open. He closed it and attempted to restart the engine several times, to no avail. He then decided to make an emergency off-field landing.

The fuel system on the accident aircraft had been altered, and was not the same as the fuel system originally installed by the manufacturer. This design and modification of the fuel system had already caused a previous incident on this aircraft, on 24 September 2012, due to an error in the operation of the system, thus confirming its inherent operational weakness.

Spanish law specifies, on the one hand, that the manufacturer of an aircraft must provide a manual to the operator with the normal and emergency procedures and, in the case of an ultralight operated by a flight school, that the flight operations officer must determine the operating procedures. However, the Spanish law does not require that the “operating procedures” be evaluated by the relevant Authority during the process to certify the school.

In this case, the operator of the aircraft, the Club Aéreo de Córdoba, had prepared a checklist based on the manufacturer’s but adapted to the specific features of the aircraft, whose fuel system had been altered and was not the same as that originally installed by the aircraft manufacturer.

This Commission has deemed it appropriate to issue a recommendation in this regard to AESA, such that a Training Manual and an Operations Manual be required before an ultralight flight school can be authorised. Among other things, the Operations Manual must contain checklists for operating the aircraft.

2.2. Analysis of the identity of the aircraft

On 25 July 2007, the Evektor EV-97 Eurostar aircraft, registration EC-EZ3, was involved in an accident in Cidamon (La Rioja) that destroyed the aircraft.

This investigation was unable to determine if after that accident, the aircraft was repaired and returned to service, or if that aircraft’s registration was transferred to the aircraft that was involved in the accident of 13 January 2018, considered in this report, since neither AESA nor the current owner have any kind of documentation on the aircraft. The current owner initially stated that the aircraft were different, but he later said that his aircraft was the same one as in the accident of 25 July 2007.

Therefore, this analysis considers both possibilities, that the aircraft was repaired and returned to service, and that it did not undergo this process.

2.3. Analysis of the regulatory situation applicable to the aircraft registry following an accident

The law on the registration of civil aircraft prior to 1 December 2015 states that *“the registration entry for an aircraft shall be cancelled if the aircraft is lost or destroyed”*. The law does not specify whether this cancellation is to be carried out ex officio by the government or at the request of the owner.

The current law on the registration of civil aircraft specifies that the registration shall be cancelled ex officio, when, among other cases, *“In the event that the aircraft is destroyed, or when it is rendered inoperative, if the registration is not cancelled at the request of the party”*.

The aircraft remained active in the Spanish Aircraft Registry. The investigation was unable to determine why AESA, which is responsible for the Aircraft Registry, did not cancel the registration ex officio after the aircraft's destruction in the accident of 25 July 2007, as required by law.

Issuing a recommendation to AESA is ruled out since there is a regulation in effect that, had it been complied with, would have prevented this potential fraud.

2.4. Analysis of the regulatory situation applicable to the change of ownership of an aircraft

The registration EC-EZ3 has been associated with three owners. The regulatory situation applicable to these changes in ownership is analyzed below.

According to the Aircraft Registry, the first such change in ownership occurred on 5 June 2008. The second change in ownership was made on 14 June 2011. On both dates, Royal Decree 2876/1982 of 15 October was in effect, and a change in ownership would have required a *report from AESA on the technical characteristics and airworthiness condition of the ultralight*.

It is not known if AESA wrote the report referred to in the law, during the two ownership changes, since no such report was provided during the investigation. In any event, AESA was asked which maintenance organization had repaired the aircraft, if indeed it had been repaired. AESA did not know.

Under the current law, in effect since 1 December 2015, a change in ownership does not require either a report from AESA on the technical characteristics and airworthiness condition of the ultralight, or a reference to the certificate of airworthiness.

It is considered a good practice to request an airworthiness review certificate any time there is a change in ownership. As a result, two recommendations will be issued, one to DGAC and the other to AESA, to have the current law amended in this regard.

2.5. Analysis of continuing airworthiness, and in particular of the fuel system installed on the aircraft

Investigators were unable to determine when the fuel system on the aircraft was modified, although the current owner assured that he bought the aircraft with the fuel system as is. Moreover, the current owner stated that he purchased the aircraft without the corresponding maintenance book, and was thus unaware of the maintenance activities performed on the aircraft prior to his purchase.

However, the Certificate of Airworthiness was issued pursuant to Type Certificate 280-I. It should be noted that according to the Type Certificate, this aircraft model has a single fuel tank with a 65-liter capacity. Moreover, the ULM technical report issued by AESA on 15 July 2011, which details the actions taken in order to issue the Certificate of Airworthiness, indicates that the aircraft had a 65-liter fuel tank and that the fuel tanks and lines were considered correct.

As a result, either the current owner modified the fuel system after obtaining the Certificate of Airworthiness, or AESA's inspections were not sufficiently detailed to detect that the aircraft had two fuel fill nozzles and three fuel tanks, and that thus its fuel system was not in accordance with the one specified in the Type Certificate.

What is certain is that AESA issued a Certificate of Airworthiness for an aircraft that lacked a maintenance log, meaning that despite not knowing what maintenance actions were performed on the aircraft since its construction, it deemed it to be airworthy.

Moreover, AESA later conducted an inspection of the aircraft and noticed that there was no repair report for the aircraft following the 2007 accident. Once again, we must consider that AESA's actions were not sufficiently detailed when it issued the Certificate of Airworthiness, since it did not make sure that the aircraft's airworthiness had been maintained.

Issuing a recommendation to AESA in this regard is ruled out since there is a regulation in effect that, had it been complied with, would have prevented issuing a Certificate of Airworthiness without ensuring that the applicable continuing airworthiness requirements, both initial (modifications made to the aircraft) and continuing (doing all of the required maintenance on time, in keeping with the approved maintenance program, timely compliance with all airworthiness directives or other requirements for continuing airworthiness), were being observed.

2.6. Analysis of the regulatory situation applicable to introductory flights with ultralight aircraft

According to the Statutes of the Club Aéreo de Córdoba, the pilot, being a member of the Club, did not receive any kind of economic compensation for carrying out the flight.

The owner of the aircraft indicated that the Club only charged the passenger the following expenses: airport taxes, fuel, proportional part of the insurance, maintenance of the aircraft, etc.

The Order of 24 April 1986, which regulates ultralight flight schools and their activity in Spain, makes no mention of "introductory flights". However, according to the National Aviation Safety Agency, introductory flights are not permitted in Spain with ultralight aircraft. That is, introductory flights in which only the expenses incurred by them are charged, as would be the case, are also not allowed in Spain.

Similar situations have been identified in previous investigations involving this type of activity for commercial purposes. As a result, this Commission has deemed it necessary to issue a recommendation to AESA to inform flight schools that introductory flights with ultralight aircraft in Spain are not allowed.

3. CONCLUSIONS

3.1. Findings

- The pilot had a valid license and medical certificate.
- The pilot was not a flight instructor.
- The passenger was engaged in an introductory flight. Introductory flights on ultralight aircraft are not allowed in Spain.
- The aircraft's documentation was in order and it was, on paper, airworthy.
- AESA issued the Certificate of Airworthiness without having access to the aircraft's maintenance records.
- The aircraft's fuel system had been altered and did not conform to the one originally installed by the manufacturer or to the modifications approved for the fuel system.
- The design of the altered fuel system had resulted in an earlier incident.

3.2. Causes/Contributing factors

The accident was caused by the execution of an emergency off-field landing after an engine stoppage caused by improper management of the fuel supply.

A contributing factor was the inadequate and unauthorized modification of the fuel system, which placed the operation at high risk.

4. SAFETY RECOMMENDATIONS

1 - The current regulation specifies that once an aircraft is destroyed or rendered inoperative, its registration in the Aircraft Registry must be cancelled ex officio if the cancellation is not requested by the party. In the case at hand, it is not known why AESA did not cancel registration EC-EZ3 ex officio after the aircraft was destroyed in an accident in 2007 in Cidamon (La Rioja), as required by the applicable regulation. A recommendation to AESA is ruled out since there is a regulation in effect that, had it been complied with, would have prevented this potential fraud.

2 - When an aircraft changes owners, it is considered good practice to request an airworthiness review certificate. Therefore:

REC 01/19 It is recommended that DGAC amend the law that regulates the airworthiness of ultralight aircraft so that it require that an Airworthiness Review Certificate be issued before the change of ownership of the aircraft takes place.

REC 02/19 It is recommended that AESA take the initiative to amend the law that regulates the airworthiness of ultralight aircraft so that it require that an Airworthiness Review Certificate be issued before the change of ownership of the aircraft takes place

3 – During the investigation, it was noted that AESA issued a Certificate of Airworthiness without knowing the aircraft's maintenance history. The aircraft did not have a maintenance log or a repair report (assuming it had been repaired after the previous accident). It is not known why AESA did not require the owner to prove that the aircraft retained the airworthiness condition it had after it was built. However, a recommendation to AESA is ruled out since there is a regulation in effect that, had it been complied with, would have prevented issuing a Certificate of Airworthiness without making sure that the requirements applicable to maintaining the airworthiness, both initial (modifications made to the aircraft) and continuing (doing all of the required maintenance on time, in keeping with the approved maintenance program, timely compliance with all airworthiness directives or other requirements for continuing airworthiness), were being observed.

4 - The national regulation specifies that for ultralights operated by a flight school, the flight operations officer must determine the operating procedures. However, the national regulation does not require that these "operating procedures" be evaluated during the authorization process by the competent Authority, therefore:

REC 03/19. It is recommended that AESA, prior to their authorization, require ultralight flight schools to prepare a Training Manual and an Operations Manual and present them for evaluation.

5 - Even though introductory flights are not allowed in Spain with ultralight aircraft, it is a fact that this type of flight is advertised in the media, therefore:

REC 04/19. It is recommended that AESA inform flight schools and centers that introductory flights with ultralight aircraft are not allowed in Spain.

6 - Although no safety recommendation is made, it is deemed necessary to note that the lack of technical documentation, such as user (or flight) manuals and maintenance books (or aircraft and engine log books), especially when a change of ownership of an aircraft takes place, can pose risks to aviation safety, since the specific features and performance of the aircraft being piloted, and the maintenance history of the aircraft, are not known. This Commission also insists on the benefits of keeping open the channels of communication with the manufacturers/designers of aircraft in order to stay current on those modifications whose implementation affects the operation of the aircraft.

