CIAIAC

COMISIÓN DE
INVESTIGACIÓN
DE ACCIDENTES
E INCIDENTES DE
AVIACIÓN CIVIL

Report
ULM A-009/2016

Accident involving an Avid Flyer Stol aircraft, registration EC-YEM, flown by a private operator, at the La Llosa aerodrome (Castellón), on 25 March 2016

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MINISTERIO DE FOMENTO

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SUBSECRETARÍA
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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.º 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.

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Abbreviations

00° 00′ 00″	Sexagesimal degree(s), minute(s) and second(s)
00 °C	Degree(s) centigrade(s)
AEMET	Spain's National Weather Agency
AESA	Spain's National Aviation Safety Agency
CIAIAC	Comisión de Investigación de Accidentes e Incidentes de Aviación Civil
DGAC	Dirección General de Aviación Civil
h	Hour(s)
HP	Horse power
hPa	Hectopascal(s)
km	Kilometer(s)
km/h	Kilometer(s)/hour(s)
kW	kilowatt(s)
LAPL	Light Aircraft Pilot License
m	Meter(s)
min	Minute(s)
N	North
QNH	Altimeter subscale setting to obtain elevation when on the ground
rpm	Revolutions per minute
s	Second(s)
TULM	ULM pilot license
ULM	Ultralight
UTC	Coordinated Universal Time
VFR-HJ	Daylight Visual Flight Rules, from sunrise until sunset
W	West

Synopsis

Owner and operator:	Private
Aircraft:	Avid Flyer Stol, registration EC-YEM
Date and time of accident:	Friday, 25 March 2016; at 9:30[1]
Place of accident:	La Llosa Aerodrome (Castellón)
Persons onboard:	1, seriously injured
Type of flight:	General Aviation – Private
Flight phase:	Landing
Date of approval:	25 January 2017

Summary of accident

On Friday, 25 March 2016, the owner and pilot of an amateur-built Avid Flyer Stol aircraft, registration EC-YEM, took off from the La Llosa aerodrome in Castellón on a local flight that included several landings and take-offs in the dirt runway.

He made two landings without any incident but during his third landing, with a speed lower than the one used in the two previous landings, the airplane collapsed from a height of 3 m on the threshold of the runway.

The ultralight hit the terrain and the front wheel of the landing gear was bent. The aircraft moved about 10 m until it was stopped. It caused the aircraft to nose over. It was 10:00 h.

The aircraft had significant damages: the landing gear was bent and the struck and the wings were deformed.

The pilot was taken to a hospital for monitoring and had to be operated on due to the injuries suffered in the accident including four broken vertebrae. He had to stay in the hospital for 7 weeks.

The investigation has concluded that this accident was caused when the pilot lost control of the aircraft while attempting to land at a speed lower than the stall speed for this type of ultralight that caused the aircraft stalled.

[1] All times in this report are local. To obtain UTC, subtract 1 hour from local time.

1. FACTUAL INFORMATION

1.1. History of the flight

On Friday, 25 March 2016, the owner and pilot of an amateur-built Avid Flyer Stol aircraft, registration EC-YEM, took off from the La Llosa aerodrome in Castellón on a local flight that included several landings and take-offs in the dirt runway.

He made two landings without any incident but during his third landing, with a speed lower than the one used in the two previous landings, the airplane collapsed from a height of 3 m on the threshold of the runway.

The ultralight hit the terrain and the front wheel of the landing gear was bent. The aircraft moved about 10 m until it was stopped. It caused the aircraft to nose over. It was 10:00 h.

The aircraft had significant damages: the front wheel of the landing gear was bent and the struck and the wings were deformed.

The pilot was taken to a hospital for monitoring and had to be operated on due to the injuries sustained in the accident including four broken vertebrae. He had to stay in the hospital for 7 weeks.

1.2. Injuries to persons

Injuries	Crew	Passangers	Total in the aircraft	Others
Fatal				
Serious	1		1	
Minor				Not applicable
None				Not applicable
TOTAL	1		1	

1.3. Damage to aircraft

The aircraft sustained significant damage.

1.4. Other damage

There was no other damage, with the exception of marks left by the aircraft as it traveled on runway 14/32 at the aerodrome, which is made of dirt.

1.5. Personnel information

The pilot, a 67-year old Spanish national, had had an ultralight pilot license (TULM) since 20 July 1990, and a daytime visual flight rules (VFR-HJ) rating since 21 June 2002. It had last been renewed on 4 August 2015. The license contained the restriction, "Must use corrective lenses and carry a spare".

He also had a LAPL medical certificate that was valid until 27 May 2017.

When he last renewed his license, the pilot had 72 h 49 min of total flight time. It is not known how many total flight hours the pilot had on the day of the accident, since he did not write them down. Although he stated that he estimated that he would have flown about 400 or 500 h.

1.6. Aircraft information

The aircraft, an Avid Flyer Stol, registration EC-YEM and serial number 31/89, was built in 1991 and registered in Spain's Aircraft Registry on 25 January 1993. The aircraft was outfitted with a ROTAX 503 engine at the time of its registration. This engine provides a power output of 37 kW (50 HP) at 6,800 rpm.

The aircraft had a Special Restricted Certificate of Airworthiness of the type "Private (3) Special – ULM", issued in May 2012 by Spain's National Aviation Safety Agency.

As detailed in section 1.18.1, "Previous accident", in November 2013 this aircraft experienced another accident that damaged the wing, landing gear, tail and front section, with the propeller breaking down the middle. The pilot stated that the aircraft was rebuilt due to the damages. The rebuilding was made by a mechanical. In spite of the great repair required by the aircraft, it was released to service without prior approval from AESA.

The aircraft was overhauled on 5 May 2014 with 1,164 h on the aircraft, as per approved maintenance program n.º 2 of 30 April 2012.

Then, on 18 July 2014, the Certificate of Airworthiness was renewed. The certificate was valid until 17 July 2016 (or 200 h from the renewal). The aircraft had 1,171 flight hours when the certificate was renewed. At the time of this renewal, the aircraft was outfitted with a ROTAX 582 engine, with serial number 4016304. This engine provides a power output of 48 kW (64.4 HP) at 6,500 RPM.

It is not known how many hours the aircraft and pilot had flown between the aircraft's construction and the day of the accident, since he did not write them down. Although he stated that he estimated that the aircraft have flown about 900 h due to when he

bought it, the aircraft had 800 h. Regarding the engine, it had about 450 h. When he changed it, he took it from a Tango ultralight.

With regard to the engine maintenance, the pilot indicated that it was being revised by an Aviasport mechanic. Aviasport is a company dedicated to aeronautical supplies. In addition, there is a mechanic in La Llosa aerodrome that can review it.

1.7. Meteorological information

A powerful ridge dominated the Iberian Peninsula with a high-pressure ridge on the surface, meaning there were clear skies and winds from variable directions throughout the Peninsula.

Spain's National Weather Agency (AEMET) does not have weather data for La Llosa, but in light of the data from the automated station in Segorbe (some 25 km west), satellite and radar images and adverse phenomena warnings, the most likely weather at the accident site was:

- Wind from the north, around 360°, at 10 km/h and gusting up to 20 km/h.
- Visibility on the ground was good.
- The sky was clear.
- The temperature was around 19 °C.
- The relative humidity was 30%.
- The pressure (QNH) was 1,020 hPa.
- There was no precipitation or adverse phenomena warnings.

1.8. Aids to navigation

There are no aids to navigation for this type of flight.

1.9. Communications

None.

1.10. Aerodrome information

The aircraft was on a local flight around the La Llosa aerodrome in Castellón, owned by the La Llosa Air Club. This aerodrome is located at coordinates 39° 45' 0" N, 0° 10' 56" W and is at an elevation of 2 m. It has two runways, 14/32, a 285-m long dirt runway, and 18/36, a 350-m long grass runway.

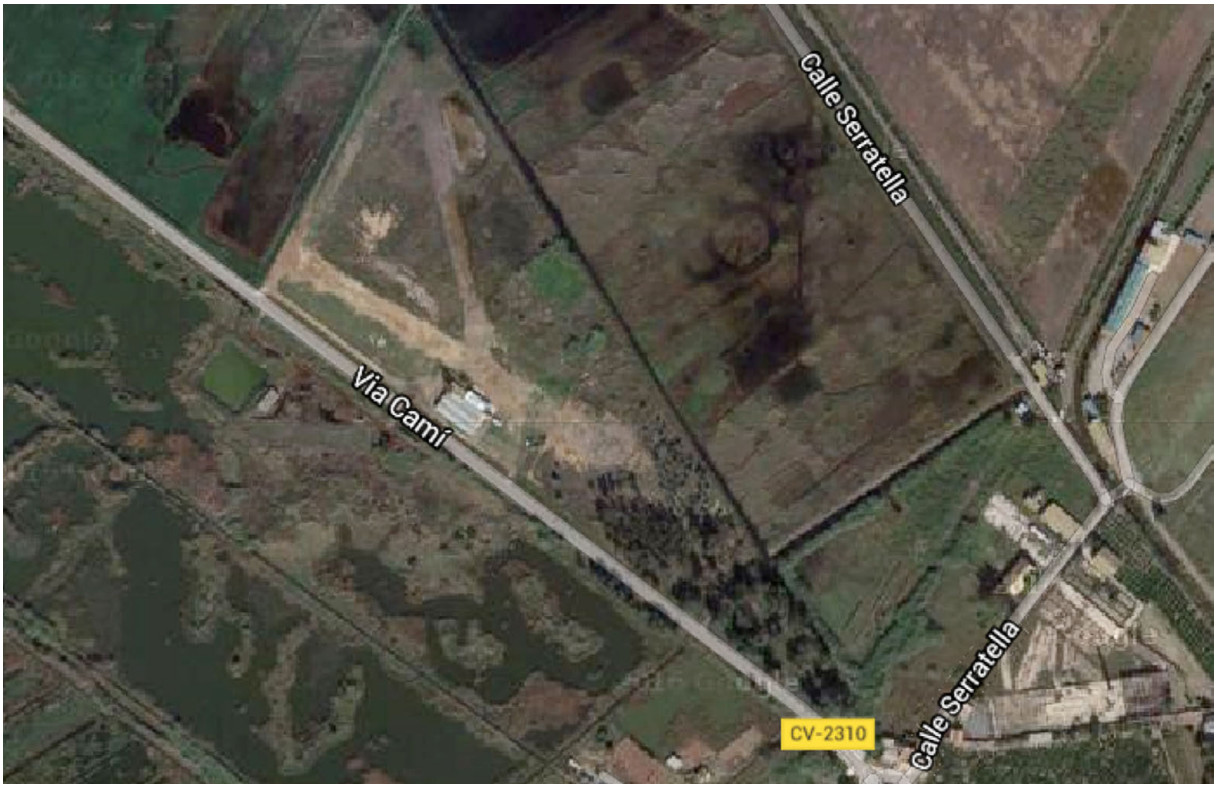


Figure 1. Aerial view of the La Llosa aerodrome

1.11. Flight recorders

Not applicable.

1.12. Wreckage and impact information

The photographs below show the damage sustained by the ultralight. The landing gear was destroyed, its nose wheel bent backwards, and the wings and tail were also bent and deformed. The fuselage was warped and the propeller detached.

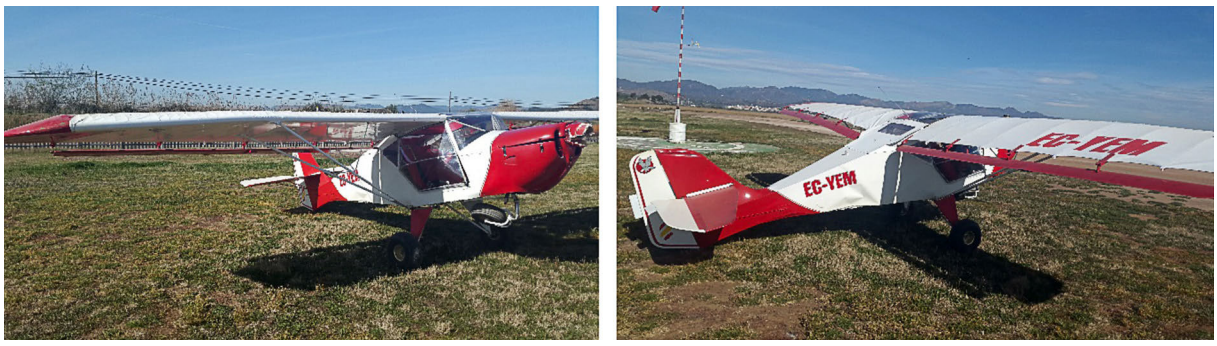
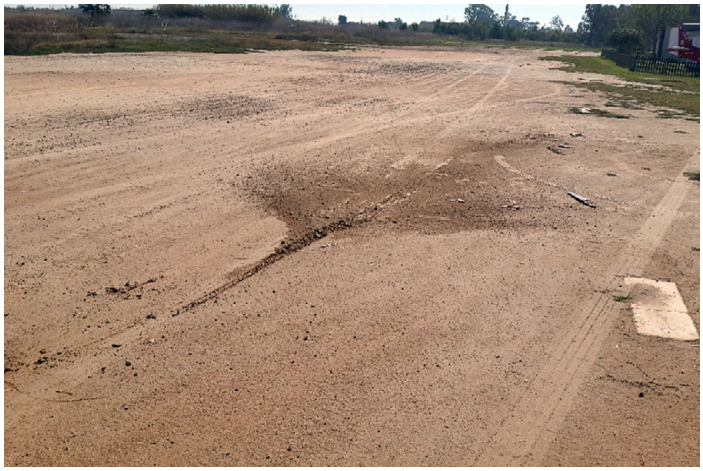


Figure 2. Damage to the aircraft after the accident

These other photographs show the path that the aircraft took on the runway. The photograph on the right reveals that the aircraft scraped along the runway for several meters, and the one on the left shows a close-up of the point where the aircraft came to a stop and subsequently flipped over.



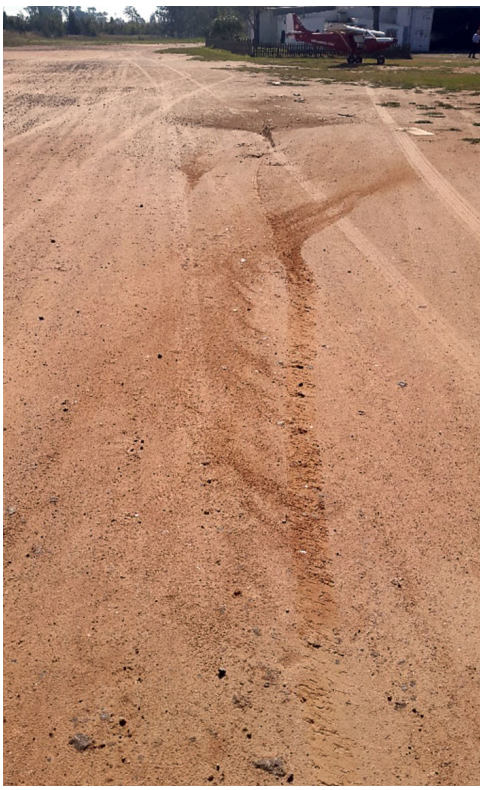


Figure 3. Marks left by the aircraft on the runway

1.13. Medical and pathological information

As stated earlier, the pilot's license contained the following restriction: "Must wear corrective lenses and carry a spare". Aside from this aspect, there is no record of any other physiological factors or disabilities that may have affected the pilot's actions.

1.14. Fire

There was no fire.

1.15. Survival aspects

The accident was observed by some individuals who were driving on the CV2310 road near the La Llosa aerodrome. These individuals helped the pilot exit the aircraft and called an ambulance. A few minutes after the accident, the pilot was taken to a hospital, where he was admitted due to the injuries he had received, including several fractured vertebra. The pilot was operated on and remained hospitalized for 7 weeks.

1.16. Tests and research

1.16.1. *Statement from the pilot*

The pilot stated that he used to fly on Saturdays with his friend. The last flight he made before the accident was in February, although he did not remember exactly the date. He said that he knows well La Llosa aerodrome. According to his opinion, the runway is short, its length is about 200 or 220 m, and it is necessary to adjust the landing since before the threshold there is a cane that covers the runway and at the end of the runway there are some trees.

The day of the accident he checked, with his mobile phone, the weather conditions in the airfield. In his opinion, the weather conditions were ideal for the flight. The wind was 10 km/h and the visibility was good as the day was clear.

He took off from the La Llosa airfield in order to make take-offs and landings. The landings are made towards the sea. He made two landings without any problem. On the third landing, the pilot approached the runway at a speed lower than the one used in the two previous landings and when it was on the threshold of the runway at a height of about 3 m, the aircraft "due to the lack of wind" collapsed. He indicated that during the landing he noticed that the wind sleeve did not move.

The pilot added that the ultralight does not have a stall warning and that the stall speed of the ultralight is 32 miles/h (or 51.5 km/h).

The ultralight hit the ground. In the first impact with the ground, the front wheel of the landing gear was broken and the ultralight overturned and rolled over. The pilot estimated that the distance from the first impact to the aircraft was stopped was about 10 m. In addition to the breakage of the front wheel, a struck and the wings were damaged in the accident.

The pilot suffered serious physical damage, despite wearing the belt, and he had to be operated. He stayed hospitalized for 7 weeks. He was assisted by a person who circulated with his car near the aerodrome and observed the accident.

1.16.2. *Statement from the flight director at the La Llosa aerodrome*

The pilot took off from the La Llosa aerodrome to make a local flight, and he returned to the same aerodrome at around 9:25 to land.

At the time of the accident, there were no aerodrome personnel on the runway. However, in light of the landing point and the marks left on the dirt runway, as well as the statements that the pilot himself made to another pilot, the flight director stated

that the airplane landed with the engine running and that the contact point with the runway was suitable considering the distance remaining to stop the aircraft. The airplane bounced several times on the runway, one of which caused the front leg of the tricycle landing to bend. The airplane scraped along the runway and traveled a few meters until the broken leg acted as a brake, causing the airplane to nose over and come to a stop upside down. There was no fire.

He stated that there was no fuel leak, since he checked for the loss of gasoline and then moved the airplane away from the runway to allow other aircraft to land. He saw that the lights on the control panel were on and he disconnected the battery from the aircraft.

He further stated that the engine had been checked and tuned up recently. In fact, the owner had told him that the engine was running better than ever.

He said that the dirt runway was in perfect condition and that weather situation was good, with no wind, at the time of the accident.

Some people who were driving on the CV2310 road, 100 m away from the runway, saw the accident and stopped to help the pilot exit the aircraft. A few minutes later the pilot was taken by ambulance to the hospital in Sagunto for a medical evaluation.

As a result of this accident, the Flight Director made the following safety observations to the CIAIAC:

- He often sees that over time, pilots forget what they have learned without being cognizant of it. As a result, he proposed testing the pilots every few years to decide if they can continue flying or if they have to take a refresher course.
- The repairs made to aircraft that have sustained considerable damage should be properly verified by the aviation authority, and the certificate of airworthiness should be suspended until this verification is complete.

1.17. Organizational and management information

Not applicable.

1.18. Additional information

1.18.1. *Previous accident*

In November of 2013, the same pilot and aircraft, EC-YEM, were involved in another accident. On that occasion, the engine stopped while over the town of Marines

(Valencia), forcing the pilot to make an emergency landing on a field. During the landing, the front gear dug into the terrain and broke, causing the aircraft to flip over and land on its backside. The aircraft's wings, landing gear, tail and front sections were all damaged, and the propeller broke in half.

A complete investigation could not be conducted after the accident because the event was not reported to the CIAIAC until several days later.

When the engine was analyzed in detail, evidence was found that it had not been properly maintained. For example, the tubing going to the radiator had been replaced with lines made from materials used in plumbing installations.

Although nothing conclusive was found to explain the engine stoppage, investigators did find some signs that, in certain conditions, could account for an engine stoppage. For example, the dirt that had built up at the bottom of the tray in one of the two carburetors could have clogged the tube at the outlet, causing the engine to stop.

In conclusion, the CIAIAC's investigation could not determine the exact cause of the engine stoppage, but it did note the engine's deficient maintenance, which made it prone to malfunction.

After the investigation, the CIAIAC published report ULM A-17/2013.

As detailed in Section 1.8, Aircraft information, the damage caused to the aircraft in this accident meant that the aircraft had to be rebuilt. The aircraft's pilot and owner contracted a mechanic specialized in this reparation. In spite of the main reparation required by the aircraft, it was released into service without prior approval from AESA. Later, on 18 July 2014, the certificate of airworthiness was renewed.

1.18.2. *Applicable regulation: Royal Decree 123/2015 of 27 February.*

Royal Decree 123/2015 of 25 February was recently published. It regulates the licenses and ratings for ultralight pilots.

Article 5 specifies the theoretical and practical instruction needed to obtain an ultralight pilot license.

Article 9 defines different ratings for an ultralight license. All of them, with the exception of radio operator, which is valid indefinitely, are valid for two years. Articles 10, 11 and 12 specify how to revalidate or renew these ratings. Except when renewing an expired instructor rating or when unable to certify the minimum number of hours to renew an instructor rating, the applicant must pass a theory exam.

1.18.3. *Applicable regulation: Order of 31 May 1982*

The Order of 31 May 1982 and its successive revisions approve the Regulation for Amateur-Built Aircraft.

Article 15 states that once built, and after successfully completing the tests specified in the Regulation, a Restricted Certificate of Airworthiness for 2 years or 200 flight hours will be issued. Renewing it requires an overhaul of the aircraft, except for that aeronautical material or equipment that has its own potential.

Article 17 states that if modifications are made that affect the results of the tests needed to issue the Restricted Certificate of Airworthiness, and in particular the aircraft's aerodynamic qualities, its balance, its characteristics or the structure, said modifications require the approval of the AESA. Otherwise, the Certificate will be revoked until the causes that gave rise to its suspension are corrected.

1.19. Useful or effective investigation techniques

Not applicable.

2. ANALYSIS

On Friday, 25 March 2016, the owner and pilot of an amateur-built Avid Flyer Stol aircraft, registration EC-YEM, was on a local flight to make take-offs and landings in the runway 14 at La Llosa airfield (Castellón, Spain).

From the pilot's statement, he thought that the runway 14 was short and he needed to reduce the approach speed to stop the aircraft in the runway. The day of the accident, the wind was from the north, so the pilot was making take-offs and landings with some wind tail. With wind tail, the ground speed is higher and it is needed more runway length to stop the aircraft on it.

During the third landing, the pilot decided to reduce the speed so he would need less runway length to landing. When he reduced the speed, the airplane stalled and collapsed from a height of 3 m on the threshold of the runway. The aircraft bounced several times on the dirt runway. The front landing gear leg bent backwards. The airplane continued to scrape along the ground until the broken leg acted as a brake by digging into the ground, causing the airplane to nose over and end up on its back.

The investigation also considered the safety observations made by the Flight Director as a result of this accident. Royal Decree 123/2015 of 27 February was published to regulate the licenses and ratings of ultralight pilots. Before proposing a change to this Royal Decree to enhance the theoretical and practical knowledge of ultralight pilots, the Decree must first be in place long enough to evaluate the effectiveness of the measures proposed therein. As a result, the CIAIAC has ruled out issuing any safety recommendations in this regard.

The CIAIAC, however, believes that the current regulation on continuing airworthiness should be improved, and will propose the following recommendations:

- It is recommended that the AESA take the regulatory initiative to improve the current legislation on the continuing airworthiness of ultralights, and specifically that it introduce the requirements needed to track and inspect the maintenance and the continuing airworthiness actions carried out by the owner of an aircraft.
- It is recommended that the DGAC make the appropriate changes to the regulation, as proposed by the AESA, to improve the current legislation on the continuing airworthiness of ultralights, and specifically that it introduce the requirements needed to track and inspect the maintenance and the continuing airworthiness actions carried out by the owner of an aircraft.

3. CONCLUSIONS

3.1. Findings

- The pilot had a valid license and medical certificate.
- The aircraft had its documentation in order and it was airworthy.
- Weather conditions were not limiting for visual flight.

3.2. Causes/contributing factors

The investigation has concluded that this accident was caused by the pilot's loss of control of the aircraft caused by attempting to land at a speed lower than the stall speed for this type of ultralight, which caused the aircraft stalled.

4. SAFETY RECOMMENDATIONS

REC 04/17. It is recommended that the AESA take the regulatory initiative to improve the current legislation on the continuing airworthiness of ultralights, and specifically that it introduce the requirements needed to track and inspect the maintenance and the continuing airworthiness actions carried out by the owner of an aircraft.

REC 05/17. It is recommended that the DGAC make the appropriate changes to the regulation, as proposed by the AESA, to improve the current legislation on the continuing airworthiness of ultralights, and specifically that it introduce the requirements needed to track and inspect the maintenance and the continuing airworthiness actions carried out by the owner of an aircraft.