DATA SUMMARY

LOCATION

Date and time	**Sunday, 27 October 2002; 12:40 hours**
Site	**1 km from the aerodrome of Castellón**

AIRCRAFT

Registration	**D-EIGB**	**EC-YQH**
Types and models	**MOONEY M-20E**	**Pow. microlight vehicle**

Engines

Types and models	**LYCOMING IO-360-A1A**	**FIREWALL CAM-125***
Number	**1**	**1**

CREW

Pilots in command

Age	**65 years**	**39 years**
Licence	**Private aircraft pilot**	**None**
Total flight hours	**3000 hours**	**Not applicable**
Flight hours on type	**150 hours**	**Not applicable**

INJURIES

	Fatal	Serious	Minor/none
Crew	**1**		**1**
Passengers	**1**		**1**
Other persons			

DAMAGES

Aircraft	**Important**	**Destroyed**
Others parties	**None**	

FLIGHT DATA

Operation	**General aviation – Private**
Phase of flight	**Approach – Intermediate approach – In route**

* Engine found among wreckage

1. FACTUAL INFORMATION

1.1. History of the flight

Aircraft D-EIGB took off from Perpignan Airport at approximately 09:20 hours UTC[1], with destination the Castellón aerodrome. The crew's intention was to make a stop-over of indeterminate duration in Castellón and then continue to the Málaga region. The complete journey was from Germany to Málaga and it was a private flight (holidays). As the aircraft was making the approach to runway 18 of the aerodrome, its left wing collided with a microlight autogyro, registration EC-YQH, and the latter fell to the ground. The aircraft succeeded in landing on the said runway approximately a minute and a half after the impact, which occurred at around 12:40 local time.

Microlight autogyro EC-YQH had taken off from runway 36 of the same aerodrome approximately 30 minutes before the impact. It appears that the crew's intention was to make a series of local flights along the coast in a northward direction.

1.2. Injuries to persons

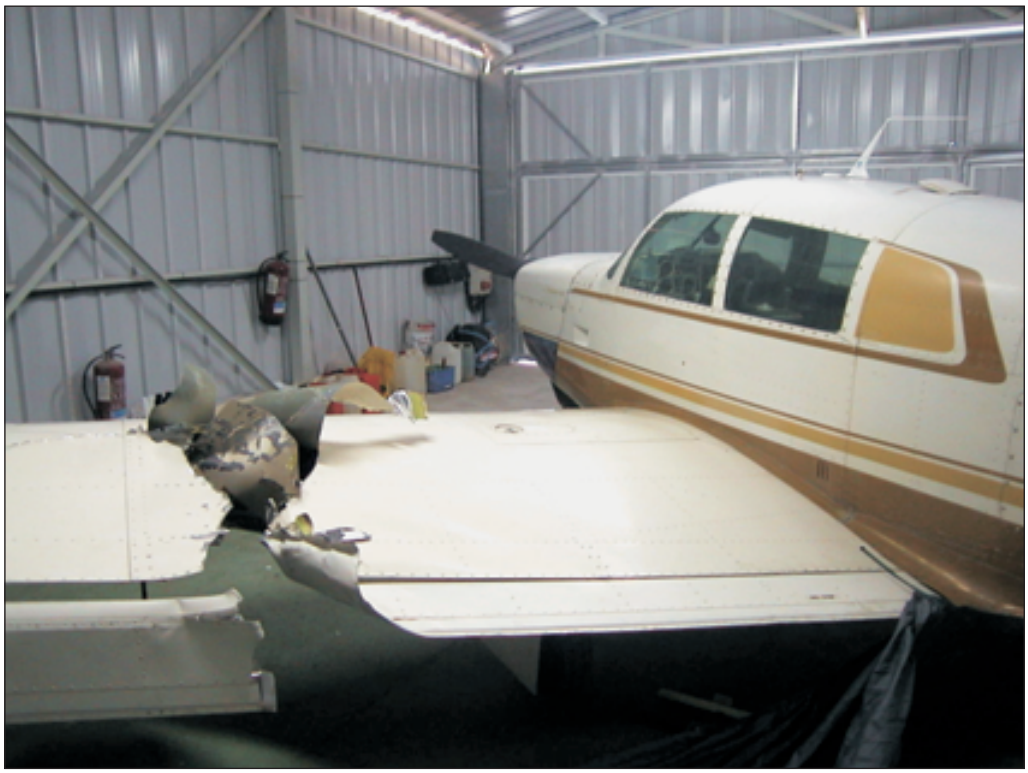
The occupants of aircraft D-EIGB were uninjured; those of microlight EC-YQH were fatally injured.

1.3. Damage to aircraft

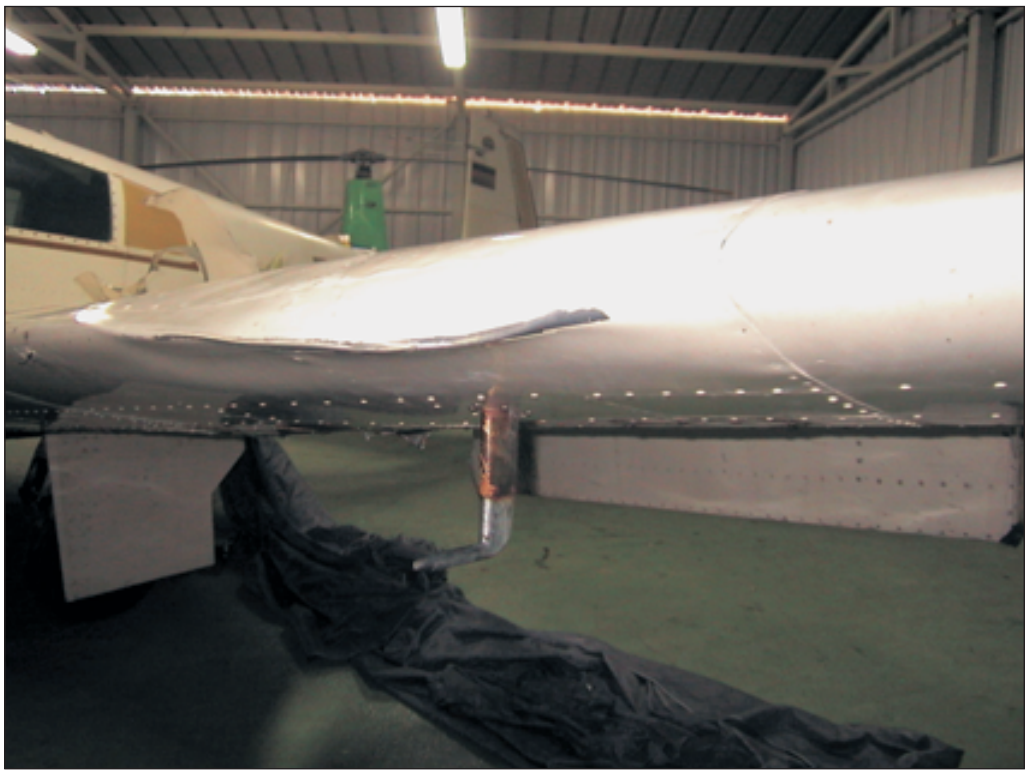
Aircraft D-EIGB sustained damage to the left wing consisting in a tear in the skin, on both the upper and lower surfaces, which affected almost all of the chord, from the trailing edge to the back part of the main spar, and breakages of the ribs and longerons over a length of approximately a metre and a half (see photograph 1). The tear began at the trailing edge of the flap of the left wing (approximately halfway along the span of the flap) and continued towards the leading edge of the wing, in a direction almost perpendicular to its span, until reaching the main spar of this wing. At this point the tear changed direction, continuing along the rear section of the core of the main spar towards the wingtip. This section was a little over half a metre long. In addition, the left wing showed blows and dents on the leading edge (see photograph 2).

Microlight autogyro EC-YQH was totally destroyed and practically consumed by the fire that broke out after its collision with the ground (see photograph 3). The fire service of the city of Castellón proceeded to the accident site and had to act to fully extinguish the flames.

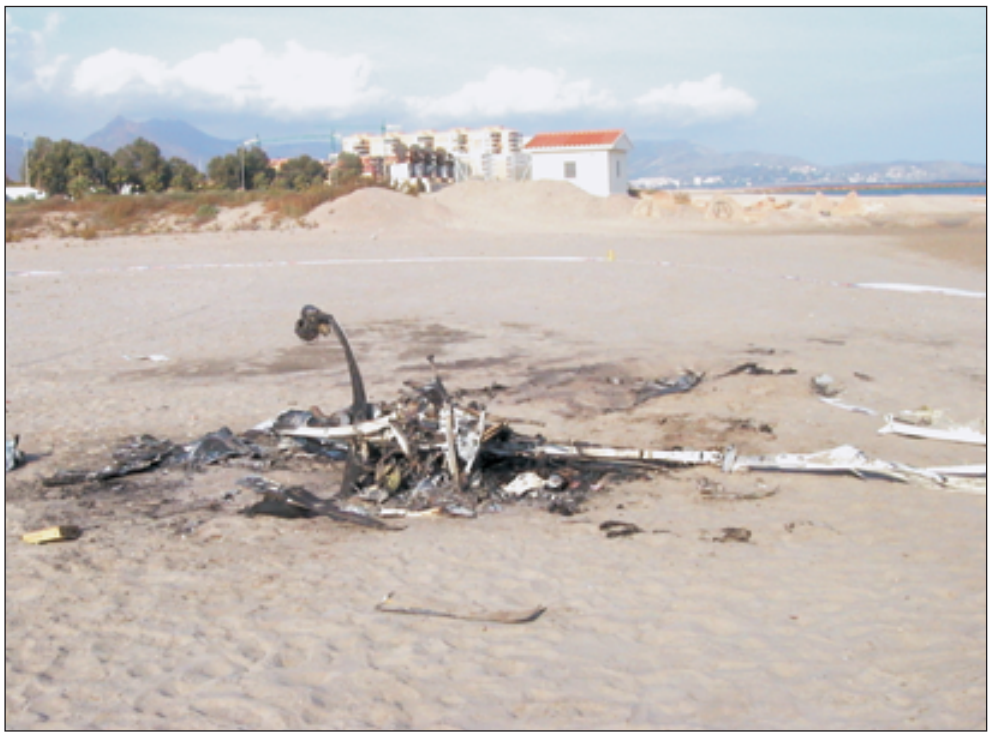
[1] To obtain the local time in the place and on the day of the accident, add 1 hour to the corresponding UTC.



Photography 1. Damages to the left wing. Aircraft D-EIGB



Photography 2. Damages to the left wing aircraft D-EIGB. Detail of the leading edge



Photography 3. General view of the microlight

1.4. Other damage

There was no significant third-party damage.

1.5. Personnel information

The pilot of aircraft D-EIGB had a total experience of some 3000 flying hours, approximately 150 on the type. He held a licence qualifying him for the flight and was physically fit for it.

The pilot of microlight EC-YQH had obtained a Microlight Pilot's permit and licence on 8 October 1996. The licence had expired on 9 November 2001. On the date of the accident he did not hold a valid licence. The opinions gathered from other users of the Castellón aerodrome indicated that he was a pilot with ample experience in handling microlight autogyros.

1.6. Aircraft information

Aircraft D-EIGB had a certificate of airworthiness, number L13036, issued on 07 November 1996. The last certificate of inspection was dated 22 October 2002 and was valid

until October 2003. From the information obtained from the aircraft log, it was confirmed that it underwent the corresponding maintenance inspections, the last being performed on 22 October 2002.

Microlight autogyro EC-YQH was an aircraft designed and constructed by its proprietor, who was the pilot at the moment of the accident. It had model identification VM-002 and serial number 96/020-970, which in fact corresponded to the amateur construction authorisation number. On 13 August 1997 it was issued the provisional certificate of airworthiness, number A-408, with a validity of six months. This certificate covered the performance of the necessary in-flight tests to obtain the definitive certificate of airworthiness, which were to be conducted under the control of the Civil Aviation Authority. These tests were never performed, and consequently at the moment of the accident the microlight did not hold a certificate of airworthiness.

1.7. Meteorological information

The witnesses confirmed that the visibility was excellent and there were no meteorological complications.

1.8. Communications

The control tower of Castellón aerodrome maintained communications in English and on the frequency 123.50 megahertz with aircraft D-EIGB, without problems. There is no recording of these communications because there is no recording equipment at this aerodrome.

The control tower attempted to establish communications with microlight EC-YQH after the conversation with aircraft D-EIGB, but without success.

1.9. Wreckage and impact information

Aircraft D-EIGB succeeded in landing at Castellón aerodrome with the damage described above.

The wreckage of microlight EC-YQH fell onto the beach, practically in the vertical of the point of impact, some 2,100 metres from the aerodrome control tower, in a north-northeast direction. The wreckage was grouped in a radius of some 15 metres, except for one of the rotor blades, which appeared some 200 metres away in the same direction. Among the wreckage of the microlight were a radio unit and headphones with connection for the radio. The radio was separated from the headphones and these, in turn, from the bodies of the occupants of the microlight. Few parts of the wreckage of

the ultralight could be fully identified. One of them was the engine, a CAM-125, which did not correspond to the type and model stated in the documentation of the microlight, which dated from the year 1996.

1.10. Tests and research

1.10.1. *Statement of the pilot of aircraft D-EIGB*

He took off from Perpignan, where he had presented a VFR flight plan to Castellón. When the aircraft had been flying for some two hours and fifteen minutes and was close to the destination aerodrome, the pilot contacted the control tower. The tower instructed him to approach in a direction perpendicular to runway 18. When he was close to the end of the perpendicular leg, the tower gave him permission to land. The tower told him nothing about the presence of other traffic, nor was any present in the aerodrome's radio use frequency. When the pilot was completing his approach, 1 km from the threshold of runway 18 and at a height of some 600 or 700 feet, he saw a vehicle equipped with a rotor above his position, to the left and at a distance of some 10 metres. The pilot did not recall any details of the path that vehicle had followed to that point. It seemed to him that the plane of the rotor was very inclined, in an attitude which could correspond to an aerobatic manoeuvre, not normal flight.

The pilot also stated that during the flight he only saw one other aircraft, some 15 kilometres from the aerodrome, flying low over the sea, and affirmed that it was not the same aircraft with which he collided later.

The pilot had used this aerodrome many times in his flights, always in passing, travelling to or from his holiday destination.

1.10.2. *Statement of the person who was in the control tower of Castellón aerodrome*

In his conversation with aircraft D-EIGB, he authorised it to land on runway 18. After this conversation he attempted to contact the microlight, but without success.

1.11. Additional information

1.11.1. *Organisation of flights at Castellón aerodrome*

Castellón aerodrome does not have authorisation as a microlight flying centre, and therefore it does not have a Flight Director. As is stated in the Order of the Ministry

of Transport, Tourism and Communications of 24 April 1986 regulating microlight flying, the Flight Director has, among others, the following functions:

— To verify that flights are conducted in accordance with the current regulations.
— To determine the operational procedures.
— To establish ground-to-air communications and vice versa or the placing of the pertinent signals.

The DGAC has informed that the functioning of the private aerodromes is autonomous according with the «Reglamento de Circulación Aérea» («Air Traffic Regulations»). In the DGAC's opinion, the coexistence of several types of air traffic, as per example conventional aircraft and microlight vehicles, in the private aerodromes, only needs coordination, which is the mission of the Flight Director in accordance with the current regulations.

Regarding the regulation of the aerial activity in private aerodromes and ultralight aircraft flight centres, the DGAC considers that «*the regulations of the ultralight flights set up the role of Flight Director to compensate for the more relaxed requirements regarding aircraft equipment and pilot qualifications*».

2. ANALYSIS

2.1. Discussion

On the basis of the known information, the following considerations can be made:

— The pilots of both aircraft were familiar with the aerodrome and its surroundings: in the case of the microlight pilot because it was his habitual base, and in the case of the airplane pilot because he had used it on several occasions, although more sporadically.
— The meteorological conditions were not a determining factor, since the visibility was good. The occupants of aircraft D-EIGB said that they detected the presence of another aircraft of a similar size to their own and that it was flying low when they were some 15 km from the aerodrome.
— The engine found among the wreckage of microlight EC-YQH was a CAM-125, when the authorised engine, according to the only existing documentation, was a Rotax 532 with serial number 3722301. No justification has been found for this change, in view moreover of the very different performances and characteristics of the two engines. However, it is not considered that the fact that the microlight was fitted with a different engine was a relevant circumstance in the accident.
— The difference in the actions of the two aircraft makes it possible to suppose that it was aircraft D-EIGB that hit the microlight, since the maximum speed of the microlight was probably less than the approach speed of the other aircraft. The only reasonable possibility for thinking that the microlight may have hit the other aircraft is that the former fell practically vertically onto the latter, but this supposition is con-

sidered improbable in view of the evidence of the marks left by the collision, mainly on the left wing of aircraft D-EIGB.

— The examination of the wreckage of the microlight and of the damage to the left wing of airplane D-EIGB shows that the microlight autogyro was very probably underneath the other aircraft at the moment of impact. The microlight's rotor blade struck the wing of the other aircraft from behind, cutting the flap and reaching the main spar of the wing. At that point it began to move along this spar towards the wingtip, until in its downward movement it fell out of the lower surface of the wing. This sequence only seems possible if the microlight was underneath the other aircraft and with the rotor blades rotating in a plane having an appreciable angle with the horizontal. This scenario indicates that the microlight may have been maneouvring at the moment of impact. It cannot be determined whether this was a normal flying manoeuvre or if the pilot was attempting to avoid impact. Nor is it possible to determine the attitude of the microlight's fuselage with regard to the other aircraft because of the multiple possibilities offered by the flying characteristics of an autogyro.
— Microlight EC-YQH, due to its small size, absence of fixed surfaces and covering elements, and also its low speed, is more difficult to see than a typical light airplane, particularly if it is below the line of sight.
— Aircraft D-EIGB is a much more visible object in principle, but in its approach it would present the microlight with its front view, which is the smallest of all. Moreover, its colour (see photos) does not contrast appreciably with the background of the sky on a clear day. Finally, given the path it was following at the moment of impact, it would have the sun at some 60°, high to the left.
— In view of the state of the wreckage of the autogyro, it cannot be determined whether or not the radio carried on board was switched on at the moment of the accident, nor to what frequency it was tuned if in fact it was switched on. Neither can it be determined whether the headphones were connected to the radio before the impact, nor whether either occupant of the microlight was wearing them at that moment.
— No restrictions are known for microlight flying in the airspace and at the height above the ground in which the contact between the two aircraft occurred. It cannot be determined with total certainty whether the autogyro was passing through the point of the accident en route to another place or if it was manoeuvring in that zone. The witnesses' opinions display too many discrepancies on this point to make it possible to affirm one hypothesis or the other. If it was manoeuvring, it must be considered that it is not prudent, from the point of view of operational safety, to use as manoeuvre zones those areas where it is to be expected that aircraft operating at that aerodrome will make their approaches. In contrast, the data available are congruent with the intention of aircraft D-EIGB to land at Castellón aerodrome.

2.2. Considerations on operations at uncontrolled private aerodromes

All of the foregoing statements have used the terms «controller», «tower», «authorisation», etc., because these are the terms used by the witnesses and the terminology

habitually used in the world of aviation. It must be pointed out that the site where the accident occurred constitutes uncontrolled airspace and that both aircraft were operating in suitable meteorological conditions for visual flying, and that the above-mentioned terms must be understood in this context.

In uncontrolled airspace, air traffic issues are primarily the responsibility of the aircraft crews, who must be aware of what is happening around them to decide on their actions in the appropriate manner. According to this principle, and on the basis of the information recorded in the AIP Spain (Aeronautical Information Publication), the use of radio, for example, is not required in operations conducted under VFR in this type of airspace. In practice, however, the aerodrome has a frequency (123.50 megahertz) for ground-to-air communications. The fact that the aerodrome's control tower did not succeed in contacting autogyro EC-YQH was probably a relevant fact in the accident. If contact had been possible, the microlight crew might have been able to observe the presence of the other aircraft in time and changed course. As was previously commented, the use of radio is not mandatory, but since the aerodrome has this aid it would have been highly advisable for microlight EC-YQH to use it. In the absence of data confirming either hypothesis, several alternatives can be considered admissible to explain the lack of response to the radio contacts attempted from the ground: a failure occurred in the radio unit on board the microlight, or it was not set to the aerodrome's frequency, or the occupants of the microlight were not listening to the communications.

The person who was in charge of the «control tower» of Castellón did not hold the necessary diplomas and qualifications to perform the functions of air traffic controller responsible for providing air traffic services in controlled airspace. Even if this person were a controller holding those diplomas and qualifications who collaborated with the aerodrome on a private basis, no regulatory reference has been found concerning the obligation of having some kind of control or supervision of aircraft operations at this aerodrome. Consequently, the presence of this person in the aerodrome's control tower must be interpreted merely as an additional aid for aircraft crews in taking their decisions. Nevertheless, the transmission of «clearance to land» to the aircraft D-EIGB, could cause the pilot to be in an excessive feeling of confidence that might reduce the attention on the surrounding traffic. The pilot of D-EIGB could have thought that the clearance was issued from an aerodrome service entitled to control the operations, while the conditions to access and use of communications in private aerodromes are not actually defined. It therefore seems that there is no precise knowledge among users of the operational rules that apply to private aerodromes. The few references in this area could favour that lack of knowledge.

Generally speaking, the procedures each aircraft uses to operate at an uncontrolled aerodrome (procedures of take-off, climb, approach in its various phases, landing, taxiing, etc.) must be conducted in accordance with the rules of the air, as established with a general nature by the «Air Traffic Regulations» (Book Two, Chapter Three, refe-

rring to rights of way, operations close to aerodromes, convergence, range, etc.) In simplified terms, in the vicinity of an aerodrome of the characteristics of that of Castellón, these rules speak of observing the traffic present in order to adapt to it and take all necessary precautions. The proprietors and operators of these aerodromes may establish certain procedures for the guidance and information of the users. There is no record of such specific procedures existing in the case of Castellón, nor by what means they are disseminated if they exist.

The non-existence of a Microlight Flight Director, on the basis of which Castellón aerodrome is not an authorised Microlight Flight Centre, means in practice the absence of supervision of the activities conducted by this type of aircraft at this aerodrome. The figure of the Microlight Flight Director, whose functions are stipulated in the Order of the Ministry of Transport, Tourism and Communications of 24 April 1986, does not have an equivalent in installations designed to be used as private aerodromes, like Castellón, where aircraft like D-EIGB operate. At least, it has not been possible to establish the existence of specific rules defining functions in relation with operations in this type of installations. It is possible, therefore, to infer a certain regulatory imbalance on this point, with the control of flying activities being regulated in the case of microlight centres but not for aerodromes where aircraft of higher category and characteristics may operate. According to the DGAC, this unbalance could be explained by the intention of compensating the less stringent requirements that apply to equipment ultralight aircraft and qualifications of their pilots.

Although, as mentioned above, in this case the operation of ULM was not authorised in the Castellón Aerodrome, it could be understood that the facilities complied with the requirements to allow that kind of operations, because they were authorised to accept aircraft of higher category. The DGAC stated that, with the necessary coordination through the Flight Director, the common operation of conventional aircraft and microlight aircraft may be guaranteed in the aerodrome. However, the requirements applicable to a flight director do not establish that he has to have a specific training and knowledge regarding operation of aircraft other than ULM, and therefore safety problems could arise due to the mixture of several kinds of traffic. It is considered that a common control of every aircraft operating in a private aerodrome would be justified in view of the great variaety of aerial activities (ULM, amateur built aircrat, paramotor, paragliders, and parachutes, gliders, radio control models and virtually every kind of general aviation including aerial work) that take place in such aerodromes.

In the case of this accident it has been considered, as previously commented, that the establishment of ground-to-air communications between the aerodrome and the microlight might have reduced the risk of collision. Also, the setting-up of operational procedures, suitably disseminated to the users, might have restricted the occupation of the approach airspace and permitted the operations to be conducted in greater safety. These issues are included in the missions assigned to the Microlight Flight Director only as it pertains to ULM flights. It seems advisable, therefore, that similar tasks be established

in the case of private aerodromes, where several kinds of civil aviation operatios take place at the same time.

3. CONCLUSIONS

It can be concluded that the most probable cause of the aerial collision of aircraft D-EIGB and microlight EC-YQH was the non-awareness on the part of each crew of the presence of the other aircraft during the approach to the aerodrome being made by aircraft D-EIGB and the indeterminate manoeuvres being executed by microlight EC-YQH. The lack of radio contact between the aerodrome and microlight EC-YQH and the absence of a effective supervision of the flying operations at the aerodrome are believed to be factors that may have contributed to the occurrence of the accident.

4. SAFETY RECOMMENDATIONS

REC 22/04. It is recommended that the Civil Aviation Authority (DGAC) draft provisions permitting the regulation of the control and supervision of flying operations at private aerodromes.