

Technical report

ULM-A-014/2021

Accident on 10 July 2021 involving a TECNAM P2002-S aircraft, registration number EC-FP2, in the municipality of Castejón de Sos (Huesca).

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



Notice

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 and its 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 5.6 of Regulation (UE) nº 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 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

CONTENTS..... 3

Abbreviations.....4

Synopsis..... 5

1. FACTUAL INFORMATION6

 1.1. History of the flight 6

 1.2. Injuries to persons..... 7

 1.3. Damage to the aircraft 7

 1.4. Other damage 7

 1.5. Information about the personnel 7

 1.5.1. Information about the aircraft crew 7

 1.6. Information about the aircraft..... 8

 1.7. Meteorological information 8

 1.8. Aids to navigation..... 8

 1.9. Communications 8

 1.10. Information about the aerodrome 9

 1.11. Flight recorders 9

 1.12. Aircraft wreckage and impact information 9

 1.13. Medical and pathological information..... 10

 1.14. Fire..... 10

 1.15. Survival aspects 10

 1.16. Tests and research 10

 1.17. Organisational and management information 10

 1.18. Additional information 10

 1.18.1. Information on the aircraft’s Flight Manual 11

 1.19. Useful or effective investigation techniques 12

2. ANALYSIS..... 12

2.1 General aspects 12

2.2 Regarding weather conditions..... 12

2.3 Regarding the wreckage..... 13

2.4 Regarding the operation 13

3. CONCLUSIONS 14

3.1 Confirmed findings 14

3.2 Causes/contributing factors 14

4. OPERATIONAL SAFETY RECOMMENDATIONS 14

Abbreviations

%	Per cent
°C	Degrees Celsius
AEMET	State Meteorological Agency
AESA	National Aviation Safety Agency
CV	Horsepower
ft	Feet
ft/min	Feet per minute
h	Hours
HEMS	Helicopter Emergency Medical Service
hPa	Hectopascals
ISA	International Standard Atmosphere
kg	Kilograms
km	Kilometres
km/h	Kilometres per hour
LAPL	Light aircraft pilot licence
LECJ	Castejón de Sos Aerodrome
LT	Local time
m	Metres
mm	Millimetres
m/s	Metres per second
MAF	Multi-axis fixed-wing
SARGA	Aragon Environmental Management Association
TULM	Ultralight aircraft pilot licence
ULM	Ultralight motorised aircraft
UTC	Coordinated Universal Time
VFR	Visual flight rules

Synopsis

Operator:	Private
Aircraft:	TECNAM P2002-S, registration number EC-FP2
Date and time of the accident:	10 July 2021, 11:25 LT ¹
Site of the accident:	Municipality of Castejón de Sos (Huesca)
Persons on board:	1 fatality, 1 person seriously injured
Type of flight:	General aviation - Private
Flight rules:	VFR
Phase of flight:	On route - Climbing to cruise altitude
Date of approval:	25-May-2022

Summary of the incident:

On Saturday, 10 July 2021, the TECNAM P2002-S aircraft bearing the registration number EC-FP2 took off from Castejón de Sos Aerodrome (Huesca) with the pilot and one passenger on board. Their intention was to fly back to Sallent-Pla de Bages Aerodrome (Barcelona), from where they had departed that same morning.

While climbing to cruise altitude, the aircraft crashed into the mountainside.

Both occupants were seriously injured and the passenger subsequently died.

The aircraft caught fire.

The investigation has concluded that the accident was caused by incorrect or non-existent flight planning, which led to the impact with the mountainside, without taking into account the aircraft's diminished performance.

¹ Unless specified otherwise, all times referenced in this report are local. On the day of the accident, the local time was equivalent to UTC +2 hours.

1. FACTUAL INFORMATION

1.1. History of the flight

On Saturday, 10 July 2021, a TECNAM P2002-S and another aircraft of similar characteristics took off from Sallent Aerodrome (Barcelona) in order to undertake a return flight to Castejón de Sos Aerodrome (Huesca). There were two people on board the TECNAM aircraft.

The outbound flight proceeded without incident and both aircraft landed at the destination aerodrome between 09:30 and 10:00.

They remained at the aerodrome for a little over an hour. During this period, and in line with usual practice for flight crews who are not regulars at the aerodrome, the flight manager informed the visitors of (among other things) how to exit the valley safely.

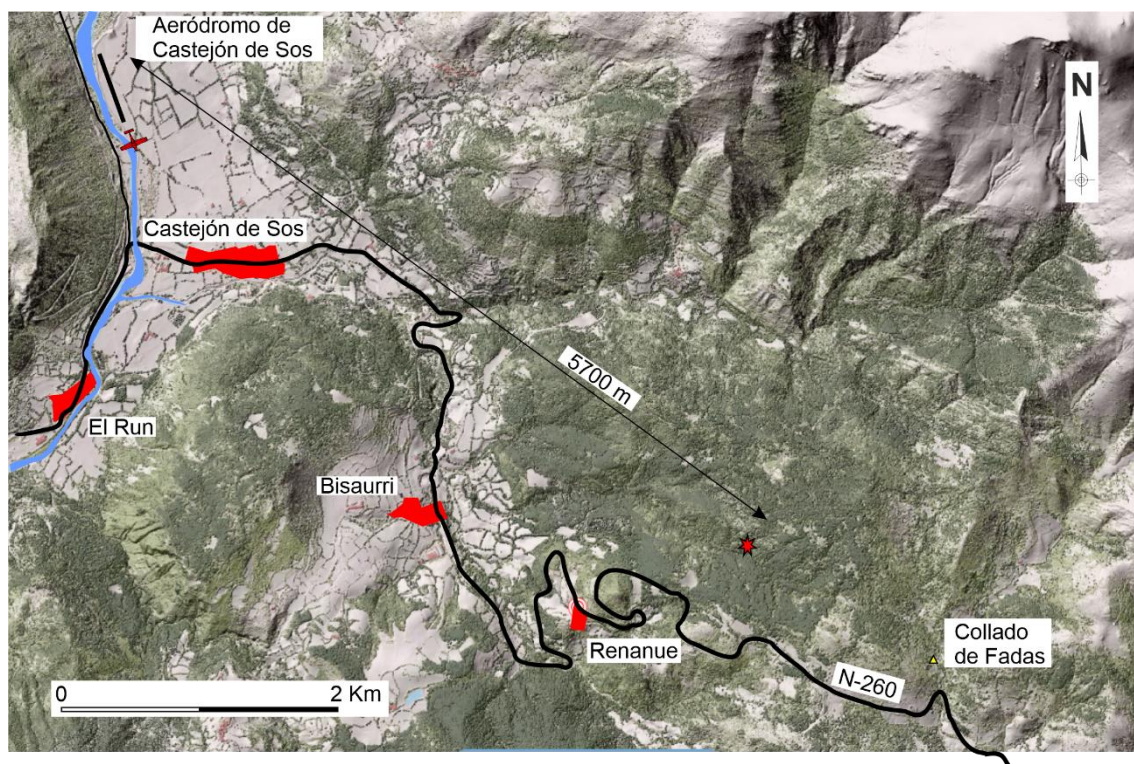


Fig. 1 - Location map of the area

Subsequently, around 11:10, the aircraft involved in the accident took off from runway 16, followed four minutes later by the second aircraft. According to the testimony of one of the pilots, the aircraft remained in radio contact at all times.

While climbing to cruise altitude, the aircraft collided with the mountainside at a point located 5,700 m east of the aerodrome, after having climbed 1,486 ft.

The occupants were seriously injured and the passenger subsequently died as a result of said injuries. The aircraft caught fire.

1.2. Injuries to persons

<i>Injuries</i>	<i>Crew</i>	<i>Passengers</i>	<i>Total in the aircraft</i>	<i>Others</i>
Fatalities		1	1	
Serious	1		1	
Minor				
Unharmmed				
TOTAL	1	1	2	

1.3. Damage to the aircraft

The aircraft caught fire.

1.4. Other damage

N/A

1.5. Information about the personnel

1.5.1. Information about the aircraft crew

The 53-year-old Spanish pilot had an ultralight pilot licence (TULM) for ultralight multi-axis fixed-wing aircraft (MAF), issued by the National Aviation Safety Agency (AESA) and valid until 30 April 2022. He also had a Class LAPL medical certificate, valid until 9 April 2022.

His level of flying experience as a ULM pilot is unknown.

The pilot had flown in the area on other occasions.

The relevant documentation was burned up in the accident.

1.6. Information about the aircraft

The aircraft involved in the accident was a TECNAM P2002 SIERRA model with a maximum take-off weight of 450 kg. The serial number of the aircraft was P2002 050 and it was manufactured in 2008 and registered on 27 January 2009. It was fitted with a ROTAX 912 ULS 2 engine (serial number 5651252) producing 100 CV, and a three-bladed propeller.

It had a Restricted Certificate of Airworthiness issued by AESA on 6 February 2009.

It has not been possible to obtain information on the aircraft's flight hours and maintenance history.

According to the technical report for the aircraft's registration, it had an unladen weight of 300 kg.

1.7. Meteorological information

According to the information provided by the State Meteorological Agency (AEMET), the weather conditions in the area at the time of the accident were characterised by little cloud, good visibility, temperatures around 22°C and light winds. There were no significant phenomena.

The surface analysis map for 12 UTC shows that, like the rest of the Iberian Peninsula, the area was experiencing conditions of low pressure.

1.8. Aids to navigation

N/A

1.9. Communications

N/A

1.10. Information about the aerodrome

Castejón de Sos (LECJ) is a restricted-use aerodrome located in a mountainous environment within the municipality of the same name, in the province of Huesca.

It has a grass runway designated 16/34, measuring 450 m long by 18 m wide.

Its elevation is 2,959 ft.

1.11. Flight recorders

The aircraft was not equipped with a conventional flight data recorder or a cockpit voice recorder. The applicable aeronautical regulations do not require the installation of any type of recorder on this type of aircraft.

1.12. Aircraft wreckage and impact information

The accident occurred during ascent after taking off from runway 16 at Castejón de Sos Aerodrome.

The aircraft was following an upwards trajectory towards the valley located to the east, before impacting with the ground at a point located approximately 5,700 m from the aerodrome and at an altitude of 4,445 ft.

The wreckage was found in a forested area, on a steep mountain slope and concentrated around the point of impact. There were no signs that the aircraft had travelled across the terrain; only a number of bent or broken branches on the foliage surrounding the aircraft, which had caught fire.

The aircraft was found in an inverted position and mostly burned out, except for the tip of the left wing and the empennage. The tail fin and both of the horizontal stabilisers had become detached from the rest of the aircraft.

The left wing was virtually folded in half, while the right wing had suffered a curved deformation throughout its entire length. The central section of the aircraft - i.e. from the engine to the tail - had generally retained its structure and dimensions, despite having caught fire and suffered deformation.

Each of the propeller's three blades had broken off at the base.

1.13. Medical and pathological information

There is no evidence of any physiological factors or disabilities that may have affected the pilot's actions.

1.14. Fire

Virtually all of the aircraft was burned out.

1.15. Survival aspects

According to the information recorded by the Emergency Centre in Aragon, at 11:21 an initial alert was received, indicating the presence of a column of smoke. A second alert was issued at 11:25 by one of the aircraft's occupants.

At 11:28, the 112 Emergency Medical Service notified the Guardia Civil police command post in Huesca, which activated the Mountain Rescue and Operations Group in Benasque.

Assistance at the crash site was also provided by fire-fighting personnel from the Aragon Environmental Management Association (SARGA) and the Helicopter Emergency Medical Service (HEMS).

At the time they were rescued, the aircraft's occupants were conscious, and were taken to Castejón de Sos medical centre to receive first aid. Subsequently, they were transferred to Zaragoza Hospital and Vall d'Hebron Hospital (Barcelona), respectively.

1.16. Tests and research

N/A

1.17. Organisational and management information

N/A

1.18. Additional information

According to the information provided by the pilot of the aircraft that took off approximately 4 minutes afterwards, they took off without incident and at no point heard any radio warnings from the aircraft involved in the accident.

They had flown to this aerodrome on other occasions.

Moreover, and as confirmed by the flight manager, in view of the area's specific conditions he had given the pilots a briefing, in which he drew their attention to the potential presence of paragliders in the area and informed them of the correct procedure for exiting the valley safely: namely, climbing vertically and following the slopes to around 5,000 ft, after which the aircraft would be able to move away safely in any direction.

Additionally, a paraglider with more than 20 years' experience of flying in the area stated that while he was driving up the slope of a mountain further to the north, at an altitude of approximately 5,500 ft, he saw the aircraft in question. It was below his altitude and was climbing gently in an easterly direction, at an abnormally low altitude compared to the aircraft he usually observed in this area.

1.18.1. Information on the aircraft's Flight Manual

The aircraft's Flight Manual specifies the following:

Section 2. Normal Operating Speeds: with a weight of 580 kg, at a pressure altitude of 3,000 ft, in a clean configuration and at a speed of 122 km/h, the aircraft has a rate of climb of 950 ft/min.

Section 4.8. Climb Performance: Tables for calculating the aircraft's performance.

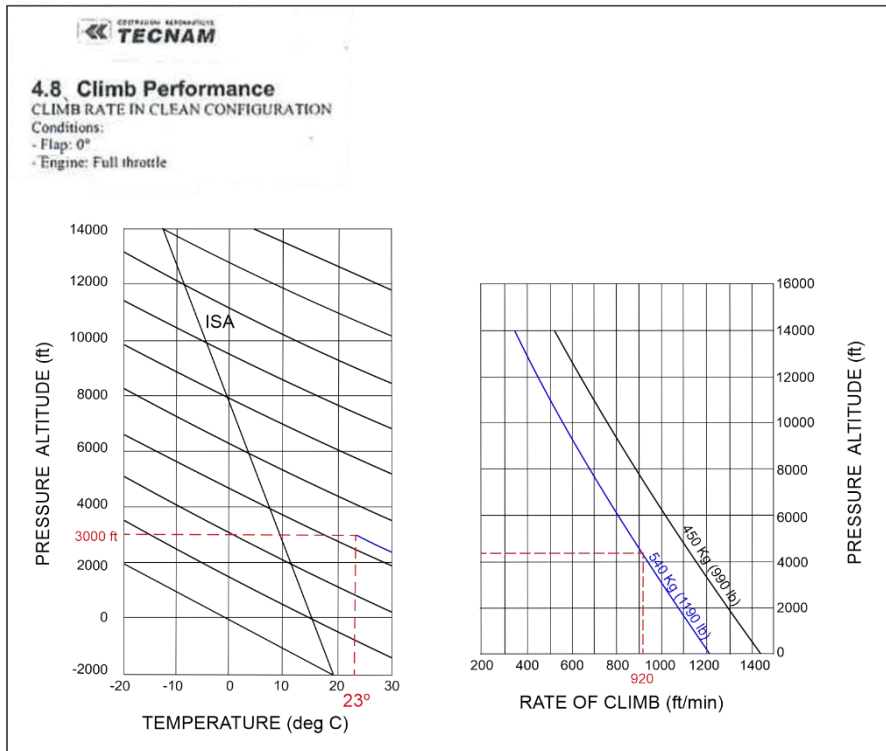


Fig. 2 - Rate of climb calculation tables

1.19. Useful or effective investigation techniques

N/A

2. ANALYSIS

2.1 General aspects

The pilot held the required licence and relevant medical certificates for the flight.

The aircraft had the correct documentation for the flight.

2.2 Regarding weather conditions

The data recorded at the different meteorological stations in the area confirms non-limiting meteorological conditions for the flight.

2.3 Regarding the wreckage

The position of the wreckage indicates that the aircraft impacted with the ground in an inverted position. The extensive deformation suffered by the left wing is consistent with a tree strike. This would also have caused the aircraft to become inverted.

The relatively little deformation suffered by the cabin and fuselage, and the fact that the occupants were able to get out of the aircraft by themselves, indicates a major dissipation of energy during the moments prior to impact. This may have been caused by the wings coming into contact with the surrounding vegetation, creating a cushioning effect, and the likely application of a flare manoeuvre on the part of the pilot.

2.4 Regarding the operation

In view of the altitude at which the wreckage was found (4,445 ft), it is clear that the pilot did not follow the instructions given by the flight manager beforehand, with regard to climbing to a sufficient height within the aerodrome in order to be able to exit the valley safely.

According to the information provided by a witness who is familiar with the movements of aircraft in the area, the plane was flying at an unusually low altitude and with a very slow rate of climb, which did not allow it to gain sufficient height.

There is no reason to believe that the engine malfunctioned, as no communications were received to that effect. Moreover, the breakage and detachment of the propeller blades are consistent with an impact under power.

An exact calculation of the rate of climb would require knowledge of the QNH. As we do not have this information in this instance, we can make an estimate based on a pressure altitude that coincides with the elevation of the aerodrome; however, in view of the low pressure conditions that characterise the area, the resultant calculation will always be on the more conservative side.

In the case in question, the total weight of the aircraft was estimated at 540 kg: 300 kg for the unladen weight, 180 kg for the occupants and 59 kg for the fuel (after subtracting the fuel consumed on the previous flight, and assuming the aircraft departed with its tanks full).

According to the tables in Figure 2, for a weight of 540 kg and flap conditions of 0°, flying under full power and at the speed providing best rate of climb, at sea level the aircraft's rate of climb would be in excess of 1,200 ft/min. After accounting for the altitude and weather conditions at the time of the accident, the rate of climb would be around 920 ft/min, in the best-case scenario.

Clearly, although it is sufficient to reach the most suitable altitude for exiting the valley, this rate is significantly lower than that to which the pilot would have been accustomed in his more habitual flights.

This may have caused him to believe that the rate of climb was insufficient, and so he may have erroneously attempted to improve it by increasing the angle of attack. However, rather than improving the situation, this action would have worsened it, as it reduces both speed and the rate of climb. This would have led to the aircraft adopting a slightly nose-up position and a virtually horizontal (or even downwards) trajectory, which is consistent with the way in which the aircraft impacted with the mountain.

3. CONCLUSIONS

3.1 Confirmed findings

The flight plan was incorrect or non-existent.
There were no limiting meteorological conditions for the flight.
The aircraft was unable to overcome the slope of the mountain.

3.2 Causes/contributing factors

The accident was caused by incorrect or non-existent flight planning, which led to the impact with the mountainside, without taking into account the aircraft's diminished performance.

4. OPERATIONAL SAFETY RECOMMENDATIONS

None