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## Report A-047/2019

Accident involving a Cirrus SR22 aircraft, registration F-HAMP, in the municipality of Pedreguer (Alicante) on 15 September 2019



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DE ESPAÑA

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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° 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**

° ' "	Sexagesimal degrees, minutes and seconds
°C	Degrees centigrade
ACC	Area control center
AEMET	Spain's National Weather Agency
AESA	Spain's National Aviation Safety Agency
AGL	Above ground level
AMSL	Above mean sea level
ATC	Air traffic control
ATIS	Automated terminal information service
ATZ	Aerodrome traffic zone
CTR	Control zone
E	East Reporting point of the Sabadell ATZ (radio antennas)
FCL	Flight crew licensing
ft	Feet
GMC	Ground movement control
GPS	Global positioning system
h	Hours
ICAO	International Civil Aviation Organization
IFR	Instrument flight rules
km	Kilometers
km/h	Kilometers/hour
kt	Knots
LEAL	ICAO code of the Alicante-Elche airport
LEAM	ICAO code of the Almeria airport
LEAX	ICAO code of the La Axarquia-Leoni Benabu aerodrome (Malaga)
LECB	ICAO code of the Barcelona area control center
LECH	ICAO code of the Castellon airport
LECN	ICAO code of the Castellon aerodrome
LELL	ICAO code of the Sabadell airport
LEMU	ICAO code of the Mutxamel aerodrome (Alicante)
LERE	ICAO code of the Requena aerodrome
LETL	ICAO code of the Teruel airport
LEVC	ICAO code of the Valencia airport
LFBF	ICAO code of the Toulouse-Francazal airport
LFCH	ICAO code of the Arcachon – La Teste-de-Buch aerodrome
LFCY	ICAO code of the Royan – Médis aerodrome
LFMP	ICAO code of the Perpignan aerodrome
LFMZ	ICAO code of the Lézignan-Corbières aerodrome
m	Meters

METAR	Aviation routine weather report
MHz	Megahertz
N	North Reporting point of the Valencia CTR (Sagunto)
NM	Nautical miles
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
PLN	Flight plan
PPL	Private pilot license
S	South
SE	Southeast
SEP	Single-engine piston rating
SSR	Secondary surveillance radar
TACC	Terminal area control center
TAF	Aerodrome forecast
TMA	Terminal control area
TORA	Takeoff run available
TT	French private pilot license
TWR	Aerodrome control tower
ULM	Powered ultralight aircraft
UTC	Coordinated universal time
VFR	Visual flight rules
VMC	Visual meteorological conditions
W	West Reporting point of the Valencia CTR (Buñol) Reporting point of the Sabadell ATZ (Rubí)

## Synopsis

Owner:	Private
Operator:	Private
Aircraft:	Cirrus SR22, registration F-HAMP
Date and time of accident:	15 September 2019 at 15:46 h <sup>1</sup>
Site of accident:	Municipality of Pedreguer (Alicante)
Persons on board:	1 crew and 1 passenger, killed
Type of flight:	General Aviation – Private
Phase of flight:	En route
Type of operation:	VFR
Date of approval:	28 October 2020

### Summary of event

The aircraft with registration F-HAMP, along with 29 other aircraft, was taking part in the “Raid Latécoère Aéropostale” air rally, which had started on Saturday, 14 September, in Toulouse (France) and was scheduled to end on Saturday, 28 September, in Perpignan (France)<sup>2</sup>.

The second stage of the air rally took place on Sunday, 15 September. The planned route was to fly from the aerodrome of Pinar de Castellon (LECN) to the aerodrome of La Axarquia (LEAX), with a stopover at the Requena aerodrome (LERE) to refuel. However, the weather conditions at Requena were limiting to visual flight, so after waiting for several hours, it was decided to change the destination aerodrome to Mutxamel (LEMU).

The accident aircraft took off from the Pinar de Castellon aerodrome at 15:16 and flew over reporting points SOPET and COMPI, which are over the Mediterranean Sea. From COMPI, it continued flying on the same heading to reporting point MITOS, as a result flying inland instead of going around Cape Nao. As the aircraft headed inland, its radar track showed that it remained at the same altitude, 800 ft, when it should have climbed to 4500 for obstacle avoidance.

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<sup>1</sup> All times in this report are local. To obtain UTC, subtract 2 hours from local time.

<sup>2</sup> Annex I details the stages of the “Raid Latécoère Aéropostale” air rally.



As the aircraft was flying over the municipality of Pedreguer, in Alicante, it impacted the north face of Mont L'Ocaive, in Sierra Castell de la Solana. At the time, according to eyewitnesses, there was dense fog in the area and visibility was low. A fire broke out after the aircraft impacted the terrain.

The two occupants on board the aircraft perished in the accident.

The aircraft was completely destroyed by the impact and subsequent fire.

The investigation has determined that this accident was caused by the failure to adhere to visual flight procedures.

The following was a contributing factor:

- Ineffective communication of the new flight instructions. Before the aircraft took off en route to the Mutxamel aerodrome, the organizers held two meetings at the Pinar de Castellon aerodrome to provide the new flight instructions; however, no steps were taken to ensure that all the crews understood them.

## **1. FACTUAL INFORMATION**

### **1.1. History of the flight**

The aircraft with registration F-HAMP, along with 29 other aircraft, was taking part in the “Raid Latécoère Aériopostale” air rally, which had started on Saturday, 14 September, in Toulouse (France) and was scheduled to end on Saturday, 28 September, in Perpignan (France) <sup>3</sup>.

The first stage of the air rally was held on Saturday, 14 September, between the airport of Toulouse-Francazal (LFBF) and the aerodrome of Pinar de Castellon (LECN), which is in the municipality of Grao de Castellon.

One of the aircraft, with registration F-HAVG, landed at the aerodrome at 15:40. This aircraft did not continue the air rally, remaining at the aerodrome for four days and returning to the Perpignan aerodrome (LFMP) on 18 September.

The second stage of the rally took place on Sunday, 15 September. The planned route for this second stage was from the aerodrome of Pinar de Castellon to the aerodrome of La Axarquía (LEAX), in Malaga. Since the fuel service at the aerodrome of Pinar de Castellon was not available, the air rally organizers had planned a stopover at the aerodrome of Requena (LERE) to refuel.

That day, in the morning, the air rally organizers sent out a lead aircraft to check the weather situation at the Requena aerodrome, since the forecast was not favorable. The crew of this aircraft verified that the weather conditions in Requena were not suitable for visual flight, and the tour organizers, after studying several options, decided to change the destination aerodrome to Mutxamel (LEMU). The studied options were:

- Stay one more day at the Pinar de Castellón aerodrome, since it was possible to accommodate all the participants.
- Stay one more day at the Pinar de Castellón aerodrome and refuel at the Castellón airport (LECH). The Castellón airport authorities did not accept to supply fuel to the entire fleet so this option was ruled out.
- Fly to Valencia airport and stay that night there. This option was also ruled out because the Valencia airport authorities did not agree to accommodate the entire fleet.
- Fly to the Mutxamel aerodrome.

According to their statement, the organizers gathered all the crews at the counter at the aerodrome and informed them of the change in destination, specifying the route to follow along the coastline: reporting point N of the Valencia airport (LEVC) – Cullera –

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<sup>3</sup> Annex I details the stages of the “Raid Latécoère Aériopostale” air rally.

Cap Marti – Benidorm. According to the organizers, they emphasized the need to remain over the coast due to the unfavorable weather conditions inland.

Before the start of the air rally, the organizers had prepared and distributed to participants two routes, for both good and bad weather conditions, for the stage from the aerodrome of Pinar de Castellon to the aerodrome of La Axarquía. The bad weather route<sup>4</sup> specified flying over reporting points SOPET, COMPI and MITOS at an altitude of 4500 ft until reaching reporting point S (Estanque) at the Alicante airport (LEAL), after which the flight altitude decreased to 1000 ft.

The crews prepared their flight plans and filed them using the RocketRoute application. The flight plans included flying over reporting points SOPET, COMPI and MITOS.

At 15:14, the lead aircraft, which had taken off from the Requena aerodrome to the Mutxamel aerodrome, sent a message on WhatsApp to the other crews, stating that:

*«Vertical Culera c'est brumeux visi 5km  
Report météo de l'ouvreur à 1000ft Cullera  
Il faut rester sur le trait de côte»*

Which translates as:

*"Clouds over Cullera, visibility 5 km  
Weather report from the lead aircraft 1000 ft over Cullera  
You have to stay over the coastline"*

Later, at 15:16, the accident aircraft (registration F-HAMP) took off. It flew over reporting points SOPET and COMPI, and from COMPI it flew direct to reporting point MITOS; that is, without changing course. As a result, it flew inland and, according to its radar track, when it did so, it remained at the same altitude of 800 ft.

The aircraft behind the accident aircraft heard a panicked message from the pilot of the accident aircraft on the air rally frequency:

*"C'est bouché, c'est bouché, ATIS de Valence, C'est bouché ,svp!«*

Which translates as:

*"It's overcast, it's overcast, Valencia ATIS, it's overcast, please!"*

Seconds later, while flying over Pedreguer, in Alicante, it collided against the north face of Mont L'Ocaive, in Sierra Castell de la Solana. Mont L'Ocaive is the first mountainous

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<sup>4</sup> Annex IV contains the bad weather route for flying from the aerodrome of Pinar de Castellon to the aerodrome of La Axarquía.

geographic feature when flying south. At the time, there was a dense fog in the area and visibility was low. The aircraft caught fire after impacting the terrain.

The aircraft's two occupants were killed in the accident.

The aircraft was completely destroyed by the impact and subsequent fire.

## **1.2. Injuries to persons**

Injuries	Crew	Passengers	Total in the aircraft	Other
Fatal	1	1	2	
Serious				
Minor				
None				
TOTAL	1	1	2	

## **1.3. Damage to aircraft**

The aircraft was completely destroyed by the impact with the terrain and subsequent fire.

## **1.4. Other damage**

There was no other damage, with the exception of the crash site, which was affected by the fire that broke out after the accident.

## **1.5. Personnel information**

There were two persons in the aircraft, both with private pilot license. The statements provided by the other crews, as well as the flight plan of the accident aircraft, were used to determine which of the two persons was flying the aircraft at the time of the accident.

### **1.5.1. Pilot information**

The pilot, a 66-year-old French national, had a private pilot license (PPL(A)) issued on 14 August 2009 by the French Civil Aviation General Directorate (although before the FCL regulation, he had a French private pilot license, or TT, since 23 November 1981), and a SEP (land) rating that was valid until 31 July 2020.

According to information provided by BEA, the pilot had linguistic competence in English<sup>5</sup>.

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<sup>5</sup> In the manuals of the air rally organizers it is indicated that to fly over Spain you need a level 4 in English or Spanish in the FCL055 exam.

The pilot had a class-2 medical certificate that was valid until 31 July 2020, according to information provided by the organizers of the air rally.

The organizers of the air rally indicated that the pilot had contacted them several times to obtain information on the "Raid Latécoère-Aéropostale", expressing a great interest in taking part. He had been looking for a pilot who accompanies him, whom he found four weeks before the air rally began<sup>6</sup>.

According to the air rally organizers, the pilot had 950 flight hours of experience, of which 6 had been training on the accident aircraft. It was the pilot's first time taking part in the "Raid Latécoère-Aéropostale" air rally<sup>7</sup>.

The pilot's logbook, found at the accident site, indicated that the majority of the pilot's flight hours were concentrated in July, which was a considerable amount of activity. He usually flew Diamond DA40 and Robin DR400 aircraft. His most recent flights before starting the air rally had been as follows:

- On 12 June, he made a local flight from the French aerodrome of Arcachon – La Teste-de-Buch (LFCH) that lasted 50 minutes.
- On 13 June, he made two flights, one from the aerodrome of LFCH to the French aerodrome of Royan-Médis (LFCY), and another from LFCY to LFCH, lasting 45 and 50 minutes, respectively.
- On 23 July, he made three local flights from LFCH lasting 1 h, 50 minutes and 40 minutes. The first of these was to familiarize himself with the accident aircraft.
- On 12 September, he made one local flight from LFCH that lasted 55 minutes.
- On 13 September, he flew from LFCH to the aerodrome of Toulouse Francazal (LFBF) to take part in the air rally. The flight lasted 55 minutes.
- On 14 September, he flew from LFBF to the French aerodrome of Lézignan-Corbières (LFMZ). The flight lasted 45 minutes. He then flew from LFMZ to the aerodrome of Pinar de Castellon (LECN). That flight lasted 1 hour 50 minutes.

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6 The air rally organizers recommend having two pilots on board each airplane; however, depending on the skills and experience of the pilot and on the equipment on board (such as an autopilot), unaccompanied pilots are able to fly in the air rally.

7 Although air rally organizers do not have minimum experience requirements for participants, they do underscore that the pilot in command must feel comfortable in the aircraft. Moreover, since the air rally includes segments over the sea and desert (in which pilots may encounter fog and wind-blown sand, respectively), crews are requested to do a refresher flight with no visibility with an instructor prior to the start of the rally.

Organizers may require that one of its instructors be present in an aircraft if the pilot's proficiency is too low.

The organization should be reminded that the presence of an instructor on a non-training flight does not make him an instructor or crew member. See AMC1 FCL.060 (b) (1) in reference to the figure of the onboard instructor.

### 1.5.2. *Passenger information*

The passenger, a 73-year-old French national, had a private pilot license (PPL(A)) issued on 1 October 2008 by the French Civil Aviation General Directorate (although before the FCL regulation, he had a French private pilot license, or TT, since February 1973), and a SEP (land) rating that was valid until 31 March 2021.

According to information provided by BEA, the passenger had linguistic competence in English.

He also had a multi-axis ultralight pilot license, issued in 1993 by the French Civil Aviation General Directorate. It was valid until 28 February 2020. He was also an ultralight instructor (ULM).

He had a class-2 medical certificate that was valid until 3 October 2019 with the following limitations:

- OSL (operational safety pilot limitation),
- SSL (special restriction as specified): no aerial acrobatics. Monitoring by the AME (aviation medical examiner).

The pilot's logbook, found at the accident site, had entries from 5 October 1997 until 23 July 2019, meaning that, unlike the other pilot's logbook, it was not up to date. He also usually flew Diamond DA40 and Robin DR400 aircraft. The only flight logged on the accident aircraft was one made on 23 July.

According to the air rally organizers, the pilot had 1200 flight hours on airplanes and another 1200 hours on ultralights (ULM). He had also done 2 hours of training on the accident airplane. It was his first time taking part in the "Raid Latécoère-Aéropostale" air rally.

### 1.6. **Aircraft information**

The aircraft, a Cirrus SR22, registration F-HAMP and serial number 2286, was entered in the registry of the French Civil Aviation General Directorate on 4 July 2014.

It had a certificate of airworthiness, issued by the French Civil Aviation General Directorate, and an airworthiness review certificate that was valid until 8 April 2020.

The aircraft was equipped with two GPS: a Garmin 430 and a Garmin 650.

The accident aircraft had been rented from On Top Aviation, which owned it and reported that it had 2,257 flight hours. The most recent maintenance tasks had been as follows:

- On 11 September 2019, a 50-hour check, with 2,256 hours on the aircraft.
- On 11 March 2019, a 100-hour check, the annual inspection, and an overhaul of the propeller and magnetos.

The airplane was taking part in the “Raid Latécoère-Aéropostale” air rally for the second year in a row.

### **1.7. Meteorological information**

#### *1.7.1. General weather conditions*

At medium and high altitudes, there was a weakening and isolated cold-core low (-13° C) over the northeast third of the Spanish peninsula. Cyclonic circulation covered most of the mainland with less intensity than in previous days. An intense polar jet in the extreme north of Europe, with a ridge extending over the Mediterranean, caused flow from the southwest over the Balearic Islands. At low levels, there was a large and powerful blocking high-pressure area centered to the northeast of the Azores and extending toward inland Europe and the Canary Islands. There were high relative pressures in the northeast of Spain and the northern Mediterranean, low relative pressures in the southern half of Spain and a mesolow north of Algeria. Much of the Spanish mainland was affected by thermal and dynamic instability, especially inland, with low-intensity showers, while the Mediterranean region was stable, which favored the presence of stratiform clouds, and even mist and fog.

#### *1.7.2. Weather conditions in the area of the accident*

AEMET does not have a weather station in Pedreguer. The nearest stations are in Javea (13 km east), Pego (13 km northwest) and Oliva (19 km north-northwest). The data from these stations are as follows:

- Jávea:
  - Average wind speed ranging from 14 to 22 km/h from the north practically the entire time. Maximum gusts of 34 km/h, also from the north.
  - The temperature remained between 25° C and 27° C.
  - The relative humidity increased from 72% to 84% by the time of the accident.
- Pego:
  - Average wind speed ranging from 10 to 12 km/h from the north practically the entire time. Maximum gusts of 25 km/h, also from the north.
  - The temperature remained between 24° C and 25° C.
  - The relative humidity increased from 87% to 91% by the time of the accident.

- Oliva:
  - Average wind speed fell from 19 to 12 km/h, and was from the north practically the entire time. Maximum gusts fell from 34 to 24 km/h, also from the north.
  - The temperature dropped slowly from 25° C to 24° C.
  - The relative humidity increased slightly from 97% to 99% by the time of the accident.

Given these figures, it is very likely that the northerly wind gathered low, stratiform clouds and even mist and fog on the north side of mountains in the area of the accident. This would explain both the relatively constant temperatures during the period in question as well as the high values of relative humidity.

Remote sensing images do not show convective activity in the area of the accident or in the destination or departure aerodromes. It is highly likely, however, that there were low, stratiform clouds, which resulted in fog in mountainous areas. The mountain obscuration symbol shown in the low-level forecast for 12 UTC and 18 UTC warned of this possibility in the area of the accident, and that the visibility could fall to 5 km.



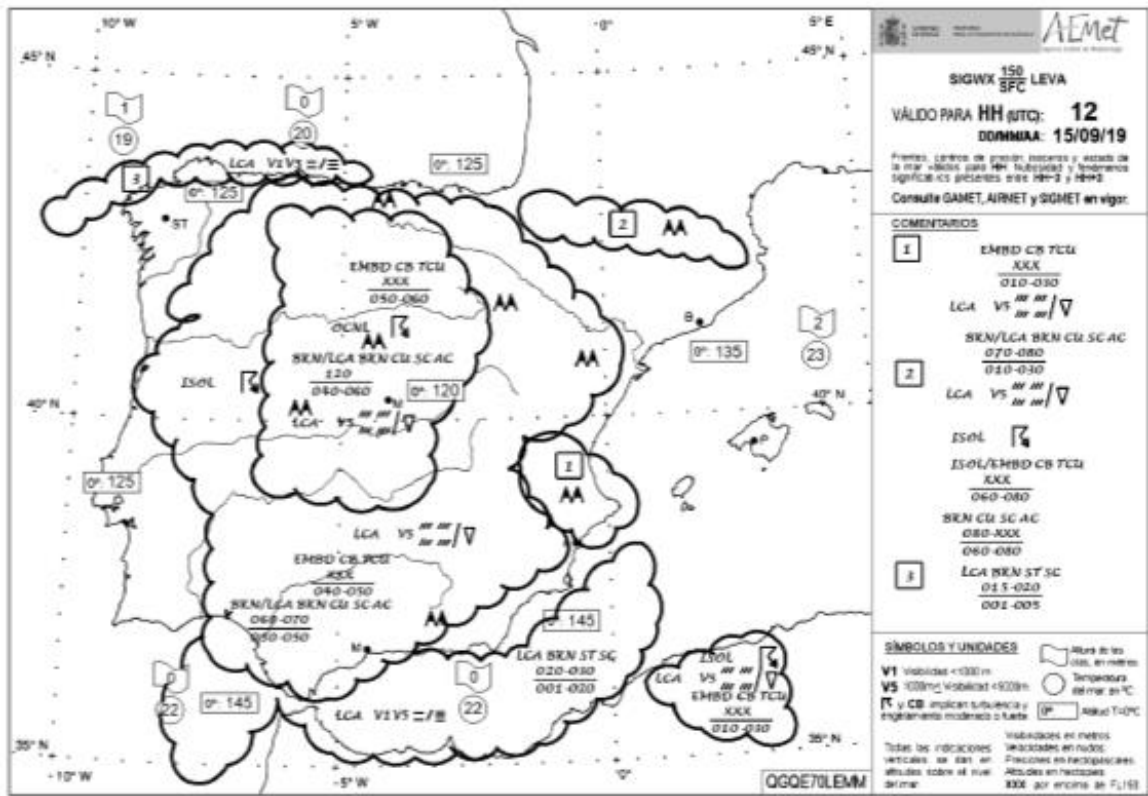


Illustration 1 Significant low level chart for 12:00 UTC

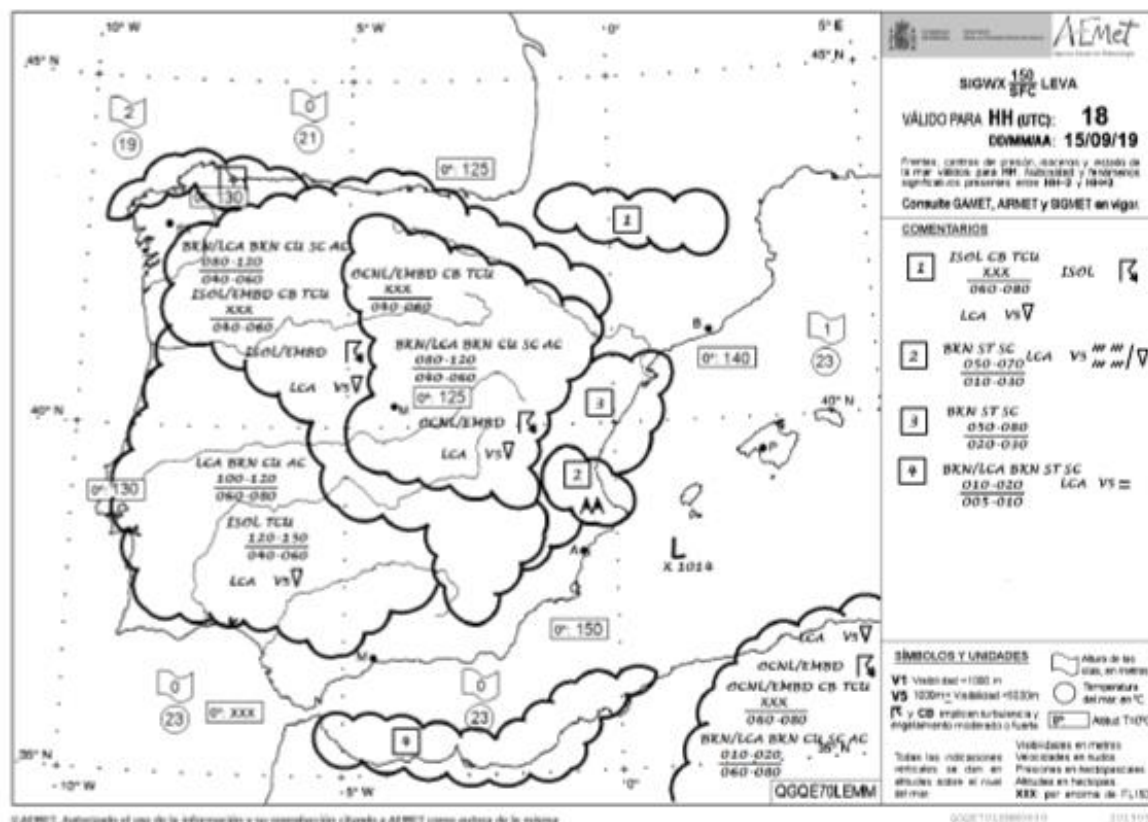


Illustration2 : Significant low level chart for 18:00 UTC

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In conclusion, according to AEMET, the situation was favorable to persistent low clouds in mountain summits and significantly reduced visibility caused by stratiform clouds touching the ground at high elevations, which very likely contributed to the accident.

The photo below, taken by an aircraft taking part in the air rally, shows the takeoff of aircraft N-578TD, which took off after the accident aircraft, and the wind that was present at the time.



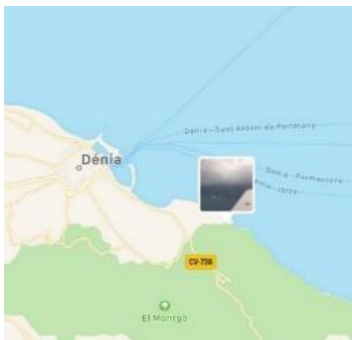
Illustration 3 : Wind at the Pinar de Castellón aerodrome as one of the aircraft takes off

Also included is another photograph, taken by the one flying behind the accident aircraft, of the weather conditions in Cape Nao, near the accident site.



Illustration 4: Photo of Cape Nao taken by one of the crews

These other photographs were taken by a passenger onboard HB-OQN aircraft. This aircraft took off 27 minutes later than the accident aircraft. The left figure shows the aircraft position when the right photograph was taken.





### 1.8. Aids to navigation

Below it is the radar track of the accident aircraft.

At 15:18 (13:18 UTC), the accident aircraft had just taken off from the aerodrome of Pinar de Castellon and was climbing. Aircraft F-GAAQ (which took off half an hour before the accident aircraft en route to Mutxamel) and F-BPIU (lead aircraft, which took off from the Requena aerodrome) were near Cape Nao.

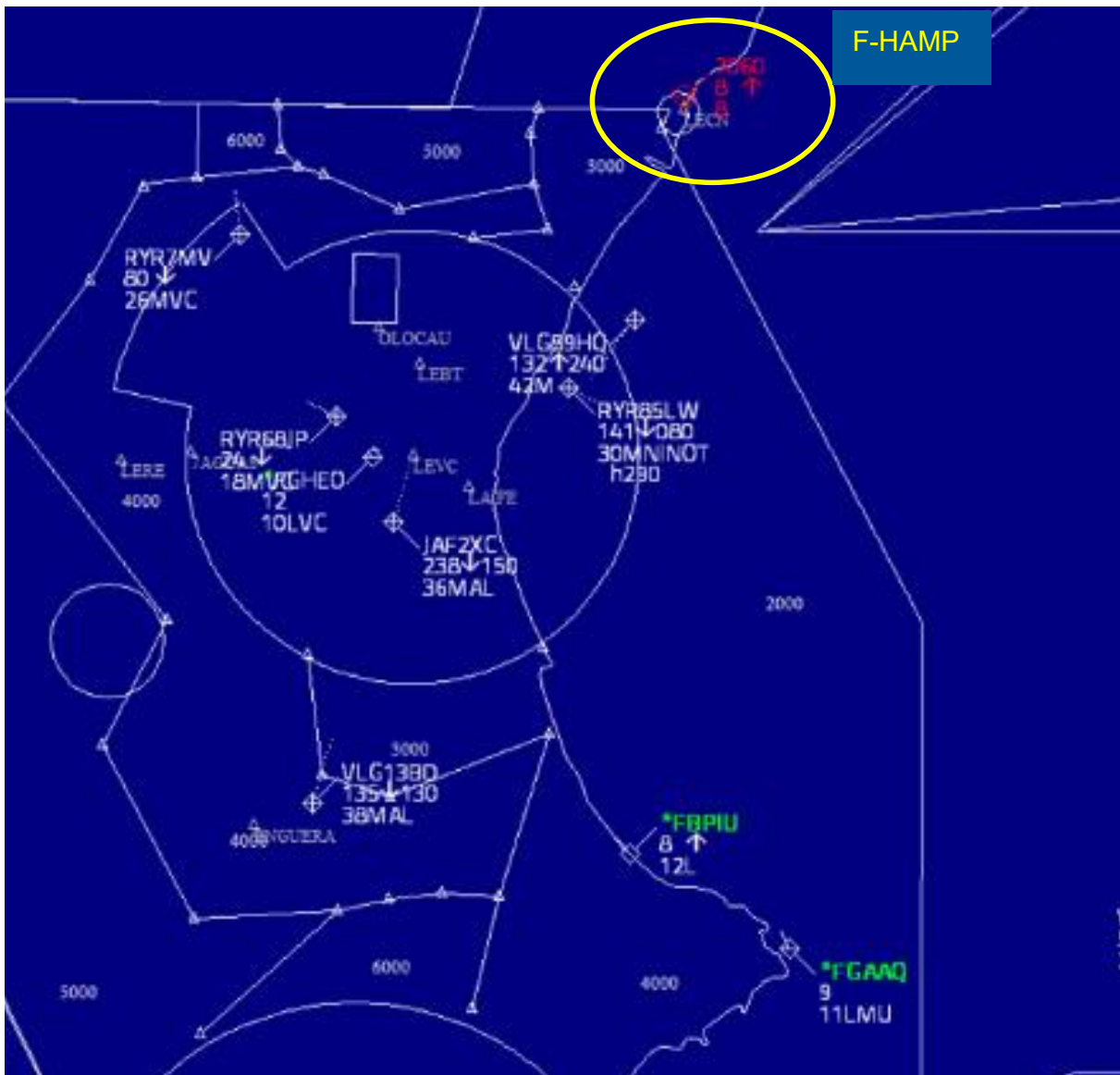


Illustration 5: Positions of F-HAMP, F-BPIU and F-GAAQ at 15:18

At 15:41:13 (13:41:13 UTC), the aircraft was at an altitude of 800 ft and flying at 180 knots. At that moment, the aircraft was flying in a straight path over the Mediterranean. The aircraft ahead of it, F-GAAQ and F-BPIU, were near the Mutxamel aerodrome.



Illustration 6: Positions of F-HAMP, F-BPHU and F-GAAQ at 15:41

By 15:42:49 (13:42:49 UTC), the aircraft was flying inland. It was still at an altitude of 800 ft, meaning it did not increase its altitude to clear potential obstacles, and on the same heading. The speed was also the same at 180 knots.

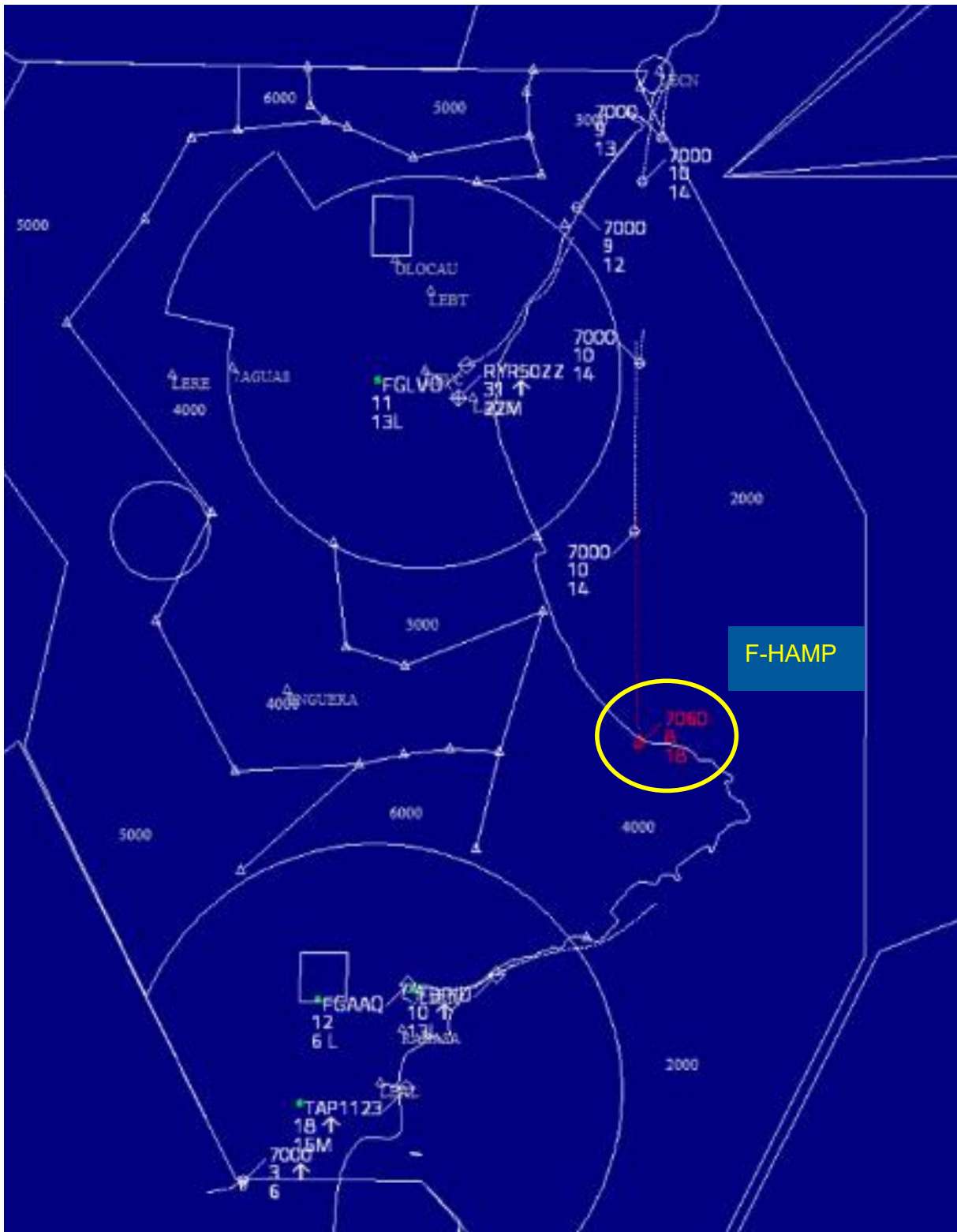


Illustration 7: Position of F-HAMP at 15:42:49

Seconds later, the aircraft made a left turn and changed its altitude slightly.

At 15:44:14 (13:44:14 UTC), the position of the accident aircraft and of the aircraft that had taken off after it (N-578TD) were:

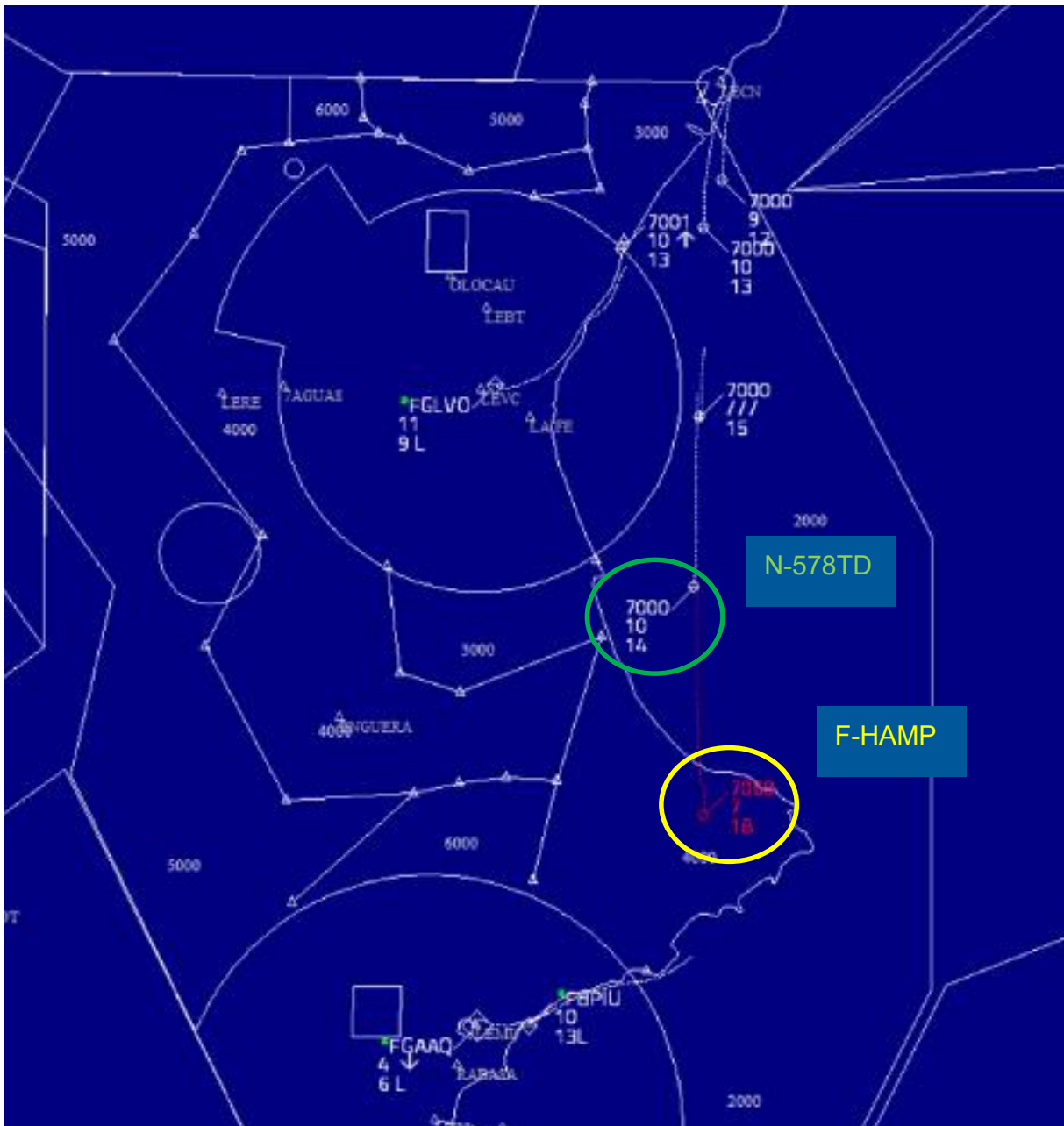


Illustration 8: Positions of F-HAMP and N-578TD at 15:44:14

Eight seconds later, while at coordinates 38° 47' 08" N and 00° 00' 04" E, the aircraft was lost from radar.



## **1.9. Communications**

The French and Spanish air navigation service providers requested to the organizers of the “Raid Latécoère Aéropostale” crews not to contact ATC except in extraordinary circumstances or if they were in immediate danger in order to avoid saturating air traffic control frequencies.

If necessary, the group leader would communicate with ATS and relay information to the rest of the aircraft on a dedicated frequency, which was used to communicate internally with the crews taking part in the air rally. This frequency was used to broadcast information on weather, traffic, hazards and other aspects. Organizers underscored the need not to use this frequency unnecessarily. Crews were also required to stay tuned to this frequency until engine shutdown.

It was through this dedicated frequency that the crew of the aircraft that took off after the accident aircraft, registration N-578TD, heard the pilot of the accident aircraft say:

*“C’est bouché, c’est bouché, ATIS de Valence, C’est bouché ,svp!”*

Which translates into:

*“It’s overcast, it’s overcast, Valencia ATIS, it’s overcast, please!”*

The crew of N-578TD radioed them the frequency of the Valencia ATIS, but they did not receive a reply from the pilot of the accident aircraft.

## **1.10. Aerodrome information**

The aircraft taking part in the air rally took off from the Pinar de Castellon aerodrome (ICAO code LECN) and landed at the Mutxamel aerodrome (ICAO code LEMU), except for the accident aircraft, which impacted the ground in Pedreguer, Alicante.

The aerodrome of Pinar de Castellon is in the town of Grao de Castellon. It is at an elevation of 17 ft and has one asphalt runway, 18/36, with a TORA of 576 m for runway 18 and 675 m for runway 36. It is an uncontrolled aerodrome.

It has one weather station that records data from a location near the runway. There are also two wind socks on either side of runway 36. When present, aerodrome staff inform traffic via radio of the wind speed and direction.

It has a refueling station, but it was not operational at that time.

The Mutxamel aerodrome is 6.4 NM north of Alicante. The nearest city is Mutxamel, 3.5 km SE. It is at an elevation of 475 ft and has one asphalt runway, 12/30, that is 1000 m long and 23 m wide.

### 1.11. Flight recorders

The aircraft with registration F-HAMP did not have a flight recorder, as it is not required for that aircraft type. It did, however, have an OWAKA beacon that broadcast the aircraft's position, calculated using GPS, every 5 minutes. The values transmitted between 15:11 and 15:41 were as follows:

Local time	Latitude	Longitude	Altitude
15:41	38.93575	-0.01096	272 m (892 ft)
15:36	39.19463	-0.01715	278 m (912 ft)
15:31	39.44032	-0.01217	
15:26	39.68449	-0.00287	272 m (892 ft)
15:21	39.93157	0.02938	320 m (1050 ft)
15:16	39.99511	0.02571	8 m (26 ft)
15:11	39.99614	0.02528	5 m (16 ft)

The positions transmitted until 15:41 are shown in the image below:



Illustration 9: Aircraft's position at various time during the flight

### 1.12. Wreckage and impact information

The aircraft impacted the mountain side, leaving an uphill trail of debris and fire, scattered within a radius of approximately 150 meters. The terrain impacted by the aircraft is rugged and stepped. It is very steep and contains various terraces that are surrounded by stone walls, resulting in plots where the land is farmed.

Two aerial photographs, taken from a helicopter, are included, showing the debris field after the accident.

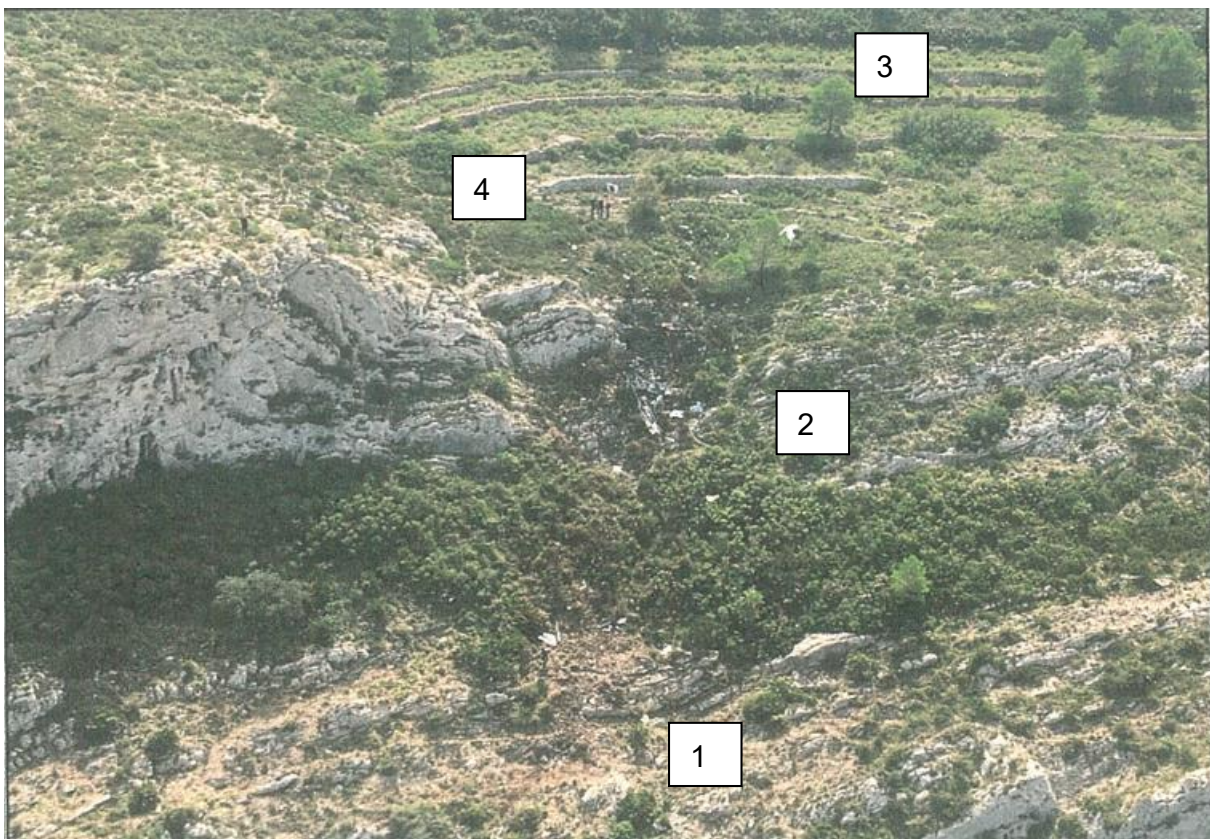


Illustration 10: Location of the main aircraft wreckage and the bodies of the crew members

**NOTE:**

- #1 – *impact site. Location of propeller.*
- #2 – *main aircraft wreckage.*
- #3 – *location of passenger's body.*
- #4 – *location of pilot's body.*

The bodies of the pilot and the passenger were separated by about 50 meters. The pilot's body was in the seat with the seat belt fastened. The passenger's body was found separated from the seat, at a higher elevation.

The following photograph was also taken from the helicopter.

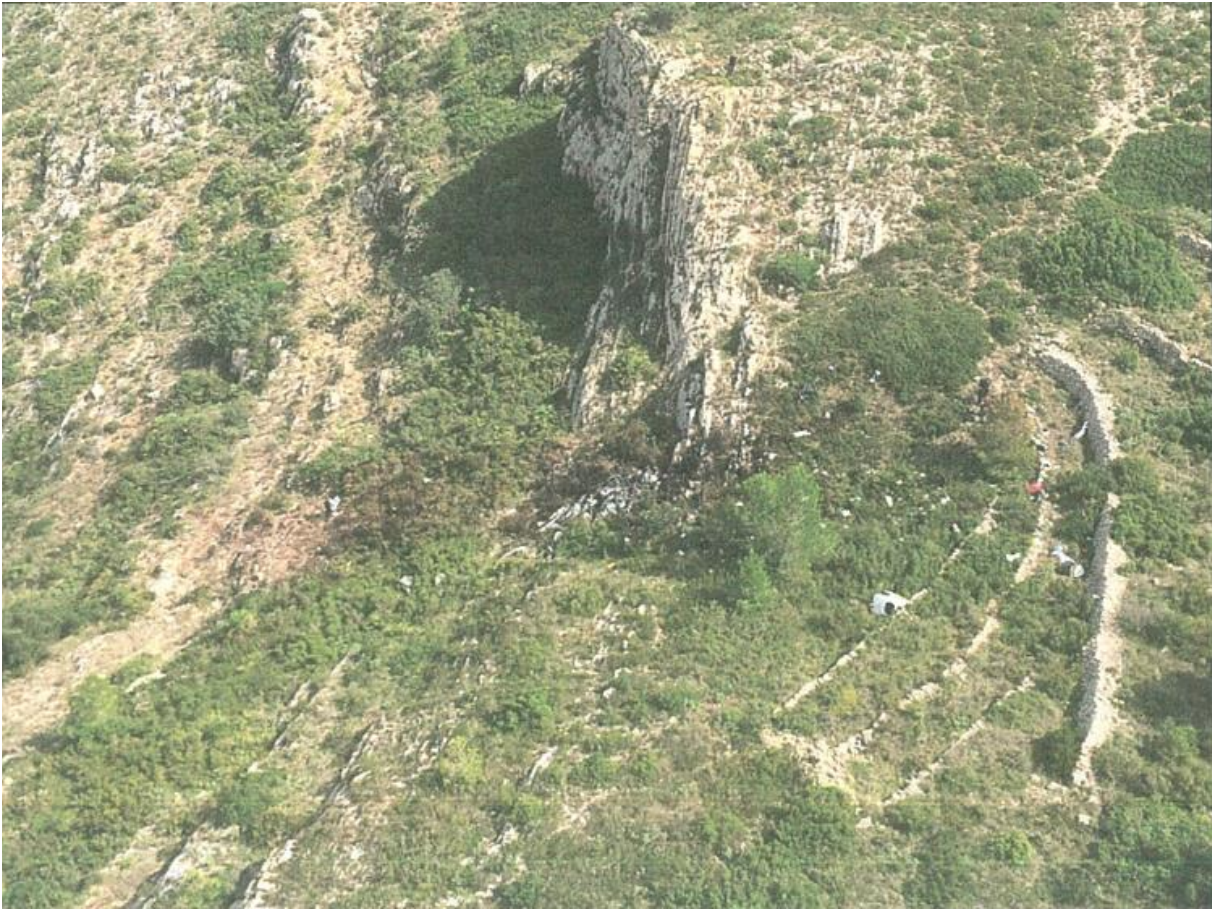


Illustration 11: Aerial view of crash site

The following photographs show the conditions in which the aircraft debris was found:

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The first debris found, lowest on the hillside, was the aircraft's propeller.

The photograph on the right shows the propeller (marked in red). The mark behind it was left by the aircraft as it moved up the hillside.



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Further up there were the tires from the main gear (one of them circled in red), and further up still there were the fuselage and the wings of the aircraft.

The debris from the fuselage and wings, as well as the surrounding area, had been affected by the fire that broke out after the impact.



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Continuing up the hillside, more debris from the aircraft was identified.

The top image shows the nose gear and parts of the fuselage, and the bottom image the same debris from the fuselage and debris from the wings.

The aircraft debris and the surrounding area had been affected by the fire that broke out after the impact, as the photographs show.



The photograph taken from the highest part of the hillside shows the main aircraft wreckage in the foreground, and the area where the aircraft impacted the slope in the background.



### **1.13. Medical and pathological information**

There are no indications that the pilot's actions were affected by physiological factors or that he was incapacitated.

### **1.14. Fire**

A fire broke out that affected the aircraft and the surrounding terrain.

### **1.15. Survival aspects**

The aircraft's two occupants perished from multiple trauma as a result of the characteristics of the accident, the impact with the terrain and the subsequent fire.

### **1.16. Tests and research**

#### **1.16.1. *Statement from the flight leader/director of flight operations of the air rally***

The flight leader/director of flight operations of the air rally gave a timeline of the events on the day of the accident:

08:00. Arrival at the aerodrome of Pinar de Castellon. Since the weather forecast did not allow landing at the Requena aerodrome following the planned route, he contacted the director of the Requena aerodrome and ATC Valencia to come up with an alternative route to Requena. The following route was agreed with Valencia ATC: coastal transit along the Valencia CTR at an altitude of 1000 ft, flying over reporting point N (Sagunto) of the Valencia CTR, Cullera and reporting point W (Buñol) of the Valencia CTR, continuing to Requena at a maximum altitude of 2000 ft.

09:30. Information meeting on that day's stage in front of the aerodrome information office. All the crews took part. They were informed that the destination aerodrome was the same (namely, Requena), but the route was changed (Cullera – Reporting point W of the Valencia-LERE CTR) due to unfavorable weather conditions, which impeded flying on the initially planned route.

10:00. He called the director of the Requena aerodrome. Weather conditions were deteriorating. It was decided to send the organization's lead aircraft (registration F-BPIU) to check the route and weather conditions.

10:30. The lead aircraft took off toward Requena along the route agreed with ATC.



10:40. He telephoned the coordinator of the Valencia ATC and received the transponder codes over the telephone, which were relayed to the crews. He sent the codes for confirmation via WhatsApp at 10:55<sup>8</sup>.

11:30. The lead aircraft landed in Requena. Its pilot confirmed that the weather conditions were worse than forecast and suggested that the remaining aircraft not fly to Requena.

11:50. The flight leader/director of flight operations, along with the assistant flight/operational safety director, and the head of operations of the organization, decided to halt the departure of the other aircraft to Requena, and sent a message via WhatsApp confirming this: *"Message to crews: departure not feasible due to weather. Eat here, wait for now. More information in 1 hour."*

They also agreed to forego La Axarquía as the destination aerodrome. After analyzing the weather, they concluded that a coastal route was possible in VFR conditions. They proposed three options, considering the main restriction – refueling – since the service station at the aerodrome of Castellón was not available:

- Fly Castellón – Valencia and stay in Valencia.
- Fly Castellón – Valencia to refuel and then leave for Murcia or La Axarquía along the coastline.
- Fly Castellón – Mutxamel, with a stopover in Valencia for those airplanes that do not have enough fuel to fly directly to Mutxamel.

They telephoned the coordinator in Valencia to study the viability of their options, and concluded after the call that:

- Operations at the Valencia airport rejected the possibility of spending the night there due to the insufficient parking capacity at the airport, which did not have enough stands to accommodate 23 light aircraft.
- Divide the aircraft involved into groups of 5 to refuel.
- They contacted the director of the Mutxamel aerodrome. The weather conditions there were good and they could stay overnight.

The flight leader/director of flight operations, along with the assistant flight/operational safety director, and the head of operations of the organization decided to go with the Castellón – Mutxamel route along the coastline, with a stopover in Valencia for those airplanes that did not have sufficient range. They sent a WhatsApp message to the crews at 13:21: *"Information briefing now in office C. Thanks"* and *"Bring information on your remaining range."*

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<sup>8</sup> Annex VII details the transponder codes assigned to aircraft

13:25. All the crews were informed<sup>9</sup> at the aerodrome's information desk of the decision to go to Mutxamel along the coastline (route: Castellon – reporting point N of the Valencia CTR – Cullera – Cap Marti – Benidorm). During this information session, the flight leader of the organization mentioned the need to stay over the coast, since the weather conditions inland were not favorable (this way they also avoided the mountains). Only five crews decided to stop in Valencia to refuel. They would take off in the initially planned order<sup>10</sup>, with an aircraft of the organization with registration F-GAAQ, being the first to do so at 14:40. The flight plans were filed using the RocketRoute app.

14:40. The lead aircraft, registration F-BPIU, took off from the Requena aerodrome to Mutxamel.

14:45. The aircraft with registration F-GAAQ took off from the aerodrome of Pinar de Castellon to Mutxamel.

14:46. The Valencia coordinator telephoned to request delaying the takeoffs until 15:15, since it was impossible to process all the flight plans.

Since the aircraft with registration F-GHEO, the lead aircraft of group A, was ready to take off at that time, and its destination was Valencia to refuel, it was cleared to take off by Valencia, which it did within one minute.

The remaining aircraft were stopped from taking off by radio (using the "Raid Latécoère Aéropostale" frequency, 130.00 MHz) and by voice.

14:49. Confirmation message via WhatsApp to all the crews: "*PLN blocked by Valencia, next departure at 13:15 UTC.*"

15:13. Report from lead aircraft, registration F-BPIU, on the weather conditions along the route, provided via WhatsApp to all the crews:

*"Clouds over Cullera, visibility 5 km  
Weather report from the lead aircraft 1000 ft over Cullera.  
You have to stay over the coastline"*

15:15. Takeoffs resumed in the following order: F-HAMP, N-578TD, F-PURU

15:16. F-HAMP took off.

15:43. The flight leader/director of flight operations took off on his aircraft, registration H-BOQN. After taking off, he reminded everyone on the organization's frequency to stay over the coastline along the Valencia CTR. The horizontal and vertical route to follow

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<sup>9</sup> Annex V details the information provided to the crews before the start of the flight.

<sup>10</sup> Section 1.18, Additional information, shows the takeoff sequence set up by the organizers for that day.

and the weather information were repeated several times throughout the flight. After refueling and parking his airplane at the Mutxamel aerodrome, he noticed that the beacon of aircraft F-HAMP was stationary, and he found out that the airplane had not reached the Mutxamel aerodrome (LEMU). He contacted the organization's assistant flight/operational safety director, and the Valencia ATC informed the latter of the alert due to an accident involving an airplane south of Valencia.

The flight leader/director of flight operations was asked why he had not provided updated GPS files to the crews with the new route (since the GPS files issued before the start of the air rally required flying at a minimum safety altitude of 4500 ft, which was not possible due to the cloud ceiling). The flight leader/director of flight operations stated that the crews are responsible for editing the GPS files provided by the organizers if necessary, and that the lead aircraft (registration F-BPIU), which always flies the route first, confirmed the need to follow the coastline due to the weather conditions.

***1.16.2. Statement from the crew of aircraft F-GAAQ, which took off first from the aerodrome of Castellon en route to Mutxamel***

Information briefing at around 09:30 at the aerodrome with all the participants in the air rally. Change in route, following the coastline between 500 and 1000 ft. At 10:00, after the director of the Requena aerodrome reported that the weather conditions were deteriorating, the decision was made to send only the lead aircraft, F-BPIU, to check the route and weather conditions.

At 10:30, F-BPIU took off en route to the Requena aerodrome. Upon arriving there, at 11:30, the pilot of the lead aircraft confirmed the deteriorating weather conditions and suggested not flying to that aerodrome. The departures of the other aircraft were canceled and the crews waited for more information. At 13:25, all the crews were gathered and told to go to Mutxamel along the coast via LECN - N LEVC - CULLERA - CAP MARTI - BENIDORM - LEMU. During this briefing, the lead pilot instructed them to stay on the coast, since the weather inland was not favorable (sharp reliefs). Five crews decided to refuel at the Valencia airport. The takeoffs would take place in the initially planned sequence, with F-GAAQ taking off first. The flight plans were filed using the Rocket Route app.

F-GAAQ, responsible for refueling, took off at 14:45 from Castellon to Mutxamel. After takeoff, the crew followed the coastline over the ocean, without going inland, at an altitude between 500 and 1000 ft toward the destination.

A minute later, at 14:46, the LEVC coordinator called to ask that the departure of the airplanes be delayed until 15:15 because it was impossible to process all the flight plans.

Reassuring messages about the weather conditions were broadcast en route on the air rally frequency (130.00 MHz), but they were not in radio contact with the remaining participants in the air rally, only with the lead aircraft, F-BPIU.

F-GAAQ landed at Mutxamel at 16:00, approximately 45 minutes before the remaining participants in the air rally (except for the lead aircraft, F-BPIU, which had taken off from the aerodrome of Requena).

***1.16.3. Statement from the crew of N-578TD, which took off after the accident aircraft***

They stated that before leaving, there was some tension due to not having been able to refuel at the aerodrome of Castellon (LECN).

It was decided to go to the Mutxamel aerodrome. The organizers of the air rally asked all the crews if they could fly directly to this aerodrome without refueling. There was a 20-kt wind at the Mutxamel aerodrome, gusting to 25 knots. The crew of an ULM was unsure whether to go, but after discussing it with the organizers of the air rally, they decided to fly.

The organizers of the air rally prepared the flight plan and instructed them to maintain 1000 ft AGL along the route.

It was parked next to F-HAMP and they heard that crew arguing while they waited for the Valencia control center to process the flight plans. One wanted to go to the Valencia airport to refuel, and the other did not.

After taking off, given the cloud ceiling, they decided to fly over the sea. At some points along the route, the cloud ceiling over the water was at 400 ft.

The accident crew called out on the air rally frequency:

*#C'est bouché, c'est bouché, ATIS de Valence, C'est bouché ,svp! #  
#It's overcast, it's overcast, Valencia ATIS, it's overcast, please! #*

He thought they wanted to go to Valencia to refuel and called them to give them the ATIS frequency, but did not receive a reply.

At that exact moment, he called out on the air rally frequency:

*#To all airplanes, stay over the coast, I'm at 400 ft, the route is good, do not go inland#*

They landed at LEMU at 15:25.

He added that he did not receive any information on his cell phone from the organizers of the air rally.

**1.16.4. Survey of air rally participants**

In addition to having the account of the flight leader/director of flight operations, the participants of the air rally were given a brief survey, the results of which are provided in Annex III.

**1.16.5. Statement from the control room supervisor in the Valencia TACC**

Emergency services contacted the Valencia terminal area control center at about 15:50 (13:50 UTC) to ask if they were missing an airplane (since they had received a call from a person who had seen an airplane crash).

At that point, they had on the screen the transponders of some aircraft that were taking part in the air rally and that were flying from the aerodrome of El Pinar de Castellon (LECN) to the aerodrome of Mutxamel (LEMU). Since this was visual traffic, the TACC was not in contact with them.

To see if it was one of these airplanes, they contacted the aerodromes of LECN, Valencia (LEVC), Alicante (LEAL) and LEMU to find out when they had taken off and in what airport the aircraft taking part in the air rally had landed.

At 17:35, they noticed that the aircraft with registration F-HAMP had taken off from the aerodrome of El Pinar de Castellon (LECN) and had not landed at Mutxamel (LEMU), its destination airport. This aircraft had been assigned transponder code 7060.

At 17:40, they received a call from the pilot of the rescue helicopter, who was on the ground, unable to fly over the possible crash site due to low visibility. He also reported that teams on the ground had found an airplane wreckage with one person on board, but they could not identify the aircraft's registration.

Later, while reviewing the radar data recording available at the TACC, they noticed that the aircraft was flying toward the Mutxamel aerodrome (LEMU) at an altitude of 800 ft and a speed of 170 knots. At 15:44:22 (13:44:22 UTC), the radar signal disappeared at coordinates 38° 47' 08" N 00° 00' 04" E.

**1.16.6. Eyewitness statements**

At approximately 15:45 on Sunday, 15 September, the eyewitnesses heard the engine of a small airplane, which sounded unusually close and low. The aircraft, which looked like a small Cessna, flew over the houses, located in the Monte Solana development. It was heading south, from Monte Solana to Mount L'Ocaive. The airplane disappeared from view after entering a thick, low cloud that covered much of the mountains.

Seconds later, the engine's aircraft suddenly stopped, and there was a noise that sounded like a crash. It was impossible to see what had happened due to the thick cloud.

They added that they did not hear any other aircraft fly over the area either before or after the accident aircraft.

### 1.17. Organizational and management information

The “Raid Latécoère-Aéropostale” air rally is an annual aviation event organized by the Pierre-Georges Latécoère air club association, which is headquartered at the aerodrome of Toulouse Franczal, in France.

During the investigation into this accident, the president of the association that organizes this event resigned, citing a lack of safety during the flights given the accidents and incidents<sup>11</sup> that occurred in Africa and South America in the Latécoère-Aéropostale air rallies in 2019. In fact, he opposed the staging of the air rally in South America in February 2020, which the Board of Directors did not accept.

Before the air rally started, the organizers had provided various documents to the participants, including some titled “Consignes d’Exploitation. Escales Africaines. 2019” and “Consignes de Securite. Escales Africaines. 2019”. For the investigation into this accident, the most relevant information terms of the organization of the event were extracted and included in Annex VI.

### 1.18. Additional information

#### 1.18.1. Planned departure sequence for 15 September

The departure sequence, along with the scheduled times, are given in the table below. The lead aircraft was scheduled to take off from the aerodrome of El Pinar de Castellon (LECN) at 09:00, and the last aircraft taking part in the Raid was scheduled to land at the aerodrome of La Axarquia (LEAX) at 14:46, such that:

- The time interval between two successive takeoffs by aircraft in the same group was 3 minutes.
- The time interval between takeoffs in two successive groups was 10 or 15 minutes.

Takeoff sequence	Aircraft type	Registration	Cruise speed	Departure from LECN	Arrival at LEAX
Lead	C182	F-BPIU	125	9:00	12:04
Group A				9:30	12:58
A1	C182	F-GHEO <sup>12</sup>	140	9:30	12:18
A2	SR22	F-HAMP	160	9:33	12:05
A3	C206	N-578TD	140	9:36	12:24
A4	MCR01	F-PURU	130	9:39	12:37

<sup>11</sup> The event that occurred in Spain during the staging of the air rally is detailed in the next section.

<sup>12</sup> The manager of flight operations was on this airplane.

Takeoff sequence	Aircraft type	Registration	Cruise speed	Departure from LECN	Arrival at LEAX
A5	DA40	F-HOBB	125	9:42	12:46
A6	C182T	F-HFBD	125	9:45	12:49
A7	VANS RV9	F-PARG	120	9:48	12:58
A8	C172	F-GAAQ <sup>13</sup>	120	9:51	12:58
<i>Group B</i>				10:00	13:50
B1	PA28	H-BOQN <sup>14</sup>	130	10:00	12:58
B2	DR400-180	F-GUXO	120	10:03	13:13
B3	DA40	F-GSDE	120	10:06	13:16
B4	DA40	F-GUVC	120	10:09	13:19
B5	DR400-180	F-GLVO	120	10:12	13:22
B6	TC160	F-PJRG	115	10:15	13:31
B7	TB10	H-BEYX	115	10:18	13:34
B8	DR400-160	F-HEAA	110	10:21	13:44
B9	PA28	G-ERNI	110	10:24	13:47
B10	TB10	F-HSBT	110	10:27	13:50
<i>Group C</i>				10:42	14:46
C1	DR400-180	F-GSRT	120	10:42	13:52
C2	DR400-160	F-GTPJ	115	10:45	14:01
C3	Polaris	F-JXRL	110	10:48	14:11
C4	A32	F-JDUU	110	10:51	14:14
C5	SKYLANE	F-JVAL	105	10:54	14:25
C6	DR400-160	F-GNPJ	100	10:57	14:37
C7	PS28	F-HSAF	100	11:00	14:40
C8	DR400	F-GKQK	100	11:03	14:43
C9	C172	F-GTDE <sup>15</sup>	100	11:06	14:46
C10	PA28	F-GGLL	115	11:09	14:25

On the day of the accident, the destination aerodrome was replaced by Mutxamel and the departure times were delayed due to the weather conditions:

- The designated lead aircraft, registration F-BPIU, took off from the aerodrome of Requena en route to Mutxamel.
- At 14:45, the first aircraft, registration F-GAAQ, took off from the aerodrome of Pinar de Castellon en route to Mutxamel.
- At 14:47, the second aircraft, registration F-GHEO and leader of group A, took off from the aerodrome of Pinar de Castellon en route to Valencia to refuel.
- At 15:15, the remaining aircraft resumed taking off, the first one to depart being the accident aircraft.

<sup>13</sup> The crew of this aircraft were tasked with arranging the refueling operations at the destination.

<sup>14</sup> The flight leader/director of flight operations of the air rally was on this airplane.


<sup>15</sup> The assistant flight/safety director was on this airplane.

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- Annex III, the survey taken of the participants in the air rally, includes the departure times from the aerodrome of Pinar de Castellon and the arrival times at Mutxamel.

### 1.18.2. Flight plan prepared by the pilot of the accident aircraft

The flight plan prepared by the pilot of the accident aircraft is provided below.

**ENAIRe** GPV/Consultas/Consultas de Plan de Vuelo/Historias de PV 

ARCID:  EOB:  EOBT:  :  ADEP:  ADES:  ALTN:

REG:

Día/Hora Salida  ARCID  Estado

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(FPL-FHAMP-VG  
-SR22/L-SDFGRY/S  
-LERE0830  
-N0160VFR  
-LEAX0126 LEMG  
-EET/LECM0013 RMK/CREW CONTACT  
[REDACTED] REG/FHAMP DOF/190915  
PBN/B2C2D2O2S1)

(SPL-FHAMP  
-LERE0830  
-LEAX0126 LEMG-EET/LECM0013 RMK/CREW CONTACT  
[REDACTED] REG/FHAMP DOF/190915  
PBN/B2C2D2O2S1-E/0303 P/002 R/E J/L A/WHITE N/CREW CONTACT NUMBER  
[REDACTED]  
[REDACTED]

(FPL-FHAMP-VG  
-SR22/L-SDFGRY/S  
-LECN0910  
-N0160VFR  
-LERE0030 LEVC  
-RMK/CREW CONTACT [REDACTED]  
[REDACTED] REG/FHAMP DOF/190915 PBN/B2C2D2O2S1)

(SPL-FHAMP  
-LECN0910  
-LERE0030 LEVC-RMK/CREW CONTACT [REDACTED]  
[REDACTED] REG/FHAMP DOF/190915 PBN/B2C2D2O2S1-E/0208  
P/002 R/E J/L A/WHITE N/CREW CONTACT NUMBER [REDACTED]  
[REDACTED]

(FPL-FHAMP-VG  
-SR22/L-SDFGRY/S  
-LECN1315  
-N0160VFR DCT SOPET DCT COMPI DCT MITOS DCT  
-LEMU0043 LEAL  
-RMK/CREW CONTACT [REDACTED]  
[REDACTED] REG/FHAMP DOF/190915 PBN/B2C2D2O2S1)

(SPL-FHAMP  
-LECN1315  
-LEMU0043 LEAL-RMK/CREW CONTACT [REDACTED]  
[REDACTED] REG/FHAMP DOF/190915 PBN/B2C2D2O2S1-E/0214  
P/002 R/E J/L A/WHITE N/CREW CONTACT NUMBER [REDACTED]  
[REDACTED]

Of note is the fact that the fuel range is different in the three flight plans filed by the pilot that day. At 08:30 UTC, he specified 3:03 h, at 09:10 UTC, 2:08 h and at 13:15 UTC, 2:14 h.



According to the final flight plan, the aircraft left from the aerodrome of Pinar de Castellon at 15:15 (13:15 UTC) and would fly over reporting points SOPET, COMPI and MITOS en route to the aerodrome of Mutxamel.

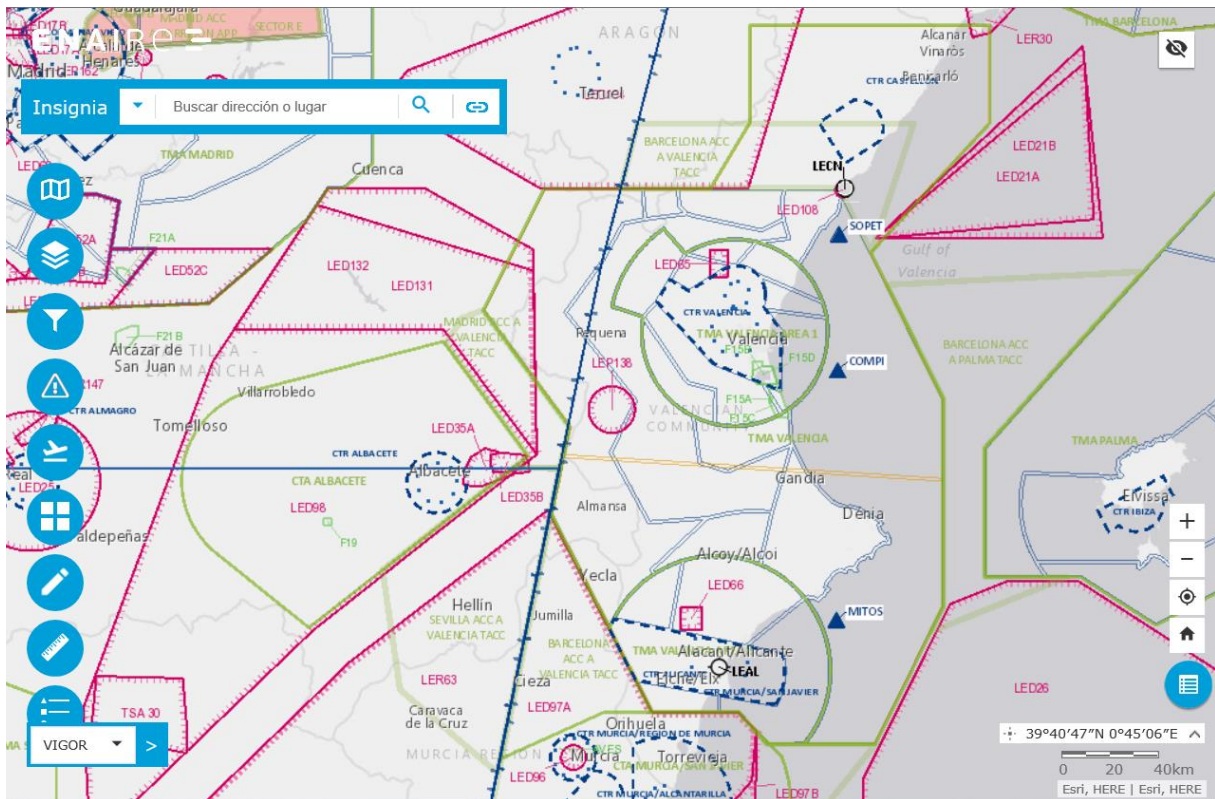


Illustration 12: Location of reporting points flown over by the accident aircraft

### 1.18.3. AESA authorization to stage the air rally

There is currently no published regulation in Spain that requires authorization from AESA to hold an air rally. Only in the event of formation flights does requirement SERA 3135<sup>16</sup> in Regulation (EU) 923/2012 of 26 September lay out the conditions in which to hold these flights.

However, for the ultralight aircraft taking part in the air rally, on 13 September 2019, AESA issued a "Resolution of the National Aviation Safety Agency which holds in abeyance the operational limitations contained in Article 3 of Royal Decree 2876/1982

<sup>16</sup> SERA.3135 Formation flights

Aircraft shall not be flown in formation except by pre-arrangement among the pilots-in-command of the aircraft taking part in the flight and, for formation flight in controlled airspace, in accordance with the conditions prescribed by the competent authority. These conditions shall include the following:

- (a) one of the pilots-in-command shall be designated as the flight leader;
- (b) the formation operates as a single aircraft with regard to navigation and position reporting;
- (c) separation between aircraft in the flight shall be the responsibility of the flight leader and the pilots-in-command of the other aircraft in the flight and shall include periods of transition when aircraft are manoeuvring to attain their own separation within the formation and during join-up and breakaway

of 15 October for the staging of the 16th edition of the 2019 Raid Latécoère-Aéropostale”, at the request of the manager of the L’Aeroclub de Sabadell, on behalf of the representative of the Raid Latécoère-Aéropostale.

Said resolution, applicable to ultralight aircraft, resolves to, among other aspects:

1. *“Suspend, on an exceptional basis, the operational limitations laid out in Article 3 of Royal Decree 2876/1982 of 15 October, according to which aircraft with a light structure cannot perform flights in controlled airspaces and over active hazardous areas, and allow the participants in the 2019 Raid Latécoère-Aéropostale to enter the aerodrome traffic zone (ATZ) and the control zone (CTR) of the aerodromes of LELL (Sabadell), LETL (Teruel), LECN (Castellon), LEAM (Almeria) and Granada, as well as the controlled airspaces through which the route, coordinated with ENAIRE, the air navigation service provider, will pass.”*
2. *“The air traffic service provider, FERRONATS, states that the Sabadell Tower has no objection provided that the ULM aircraft operate under VFR and in VMC, in constant compliance with the requirements to operate in class-D airspace.”*

#### **1.18.4. Authorization from ENAIRE to stage the air rally**

With regard to ENAIRE, the conditions and limitations are those specified in its report dated 14 August and provided to the organizers of the air rally, and include:

- *All aircraft must file a flight plan with the fields filled out correctly. IFR points must be included.*
- *They must be in constant radio contact on the assigned frequency and with the appropriate ACC/TWR.*
- *They must be equipped with a Mode C SSR transponder.*

#### **1.18.5. Events of 14 September**

On 14 September, the first stage of the air rally was held between the aerodromes of Perpignan and Pinar de Castellon. The planned route was to go through the ATZ of the Sabadell airport, entering it via reporting point E and exiting it via W at an altitude of 3000 ft. The documentation from the organizers specified that after crossing the border, crews were to tune into the Barcelona frequency (INFO 127.70 MHz) until reporting point VLA (Villafranca VOR).

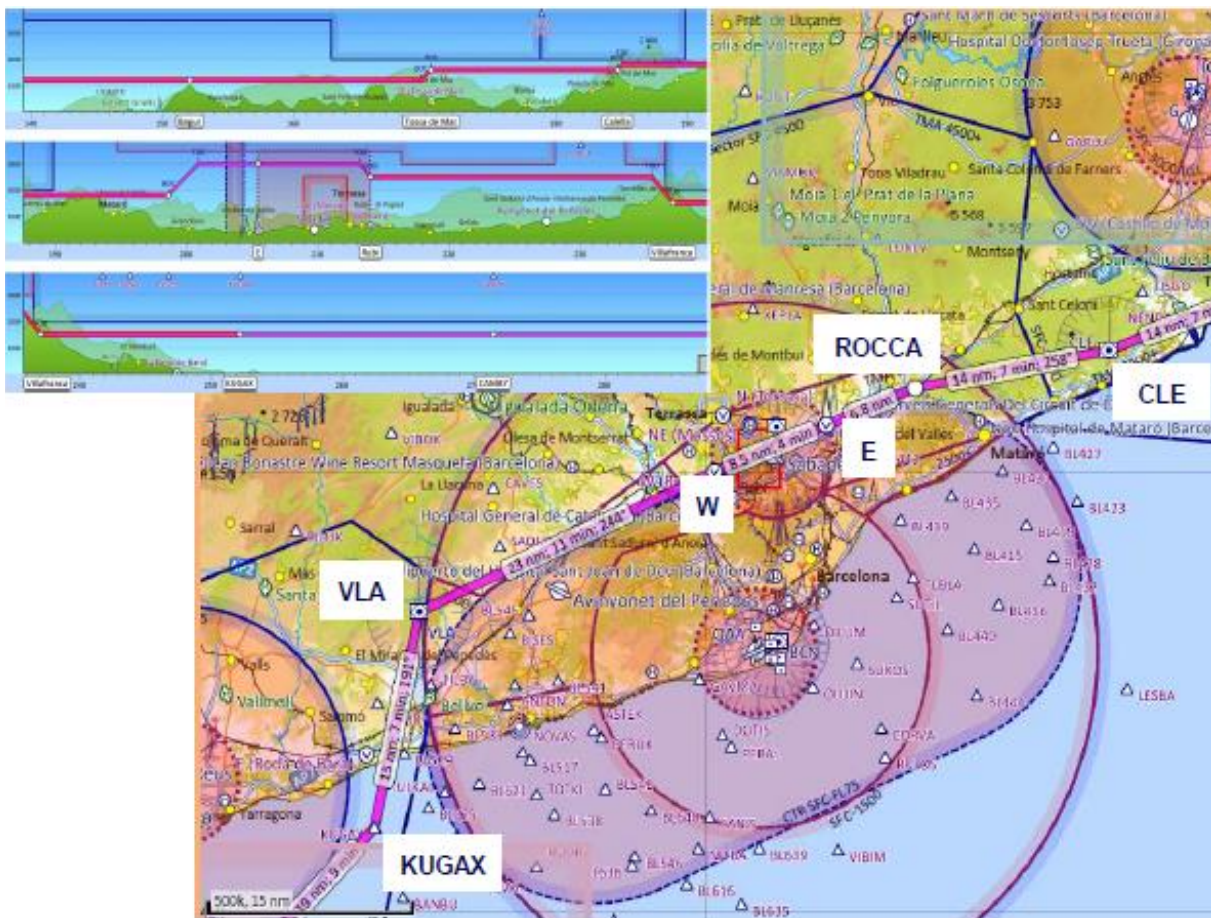


Illustration 13: Close up of the route proposed for 14 September

At 12:37 UTC, several aircraft taking part in the air rally (specifically, N-578TD, F-HAMP, F-HAVG, F-PURU, F-GUVC and F-GNPJ) crossed the ATZ of the Sabadell airport (LELL)<sup>17</sup> from east to west at different altitudes (from 1700 to 3000 ft) without establishing radio contact with the controller in the control tower at said airport.

The controller in the control tower at the Sabadell airport tried several times to contact the pilots of the aircraft and, when he was unable to do so, he called the Barcelona control center (LECB). He also provided traffic information to aircraft in the pattern that were affected, which confirmed having visual contact with the aircraft taking part in the air rally. There were no conflicts with any traffic.

The CIAIAC did not deem this to be a serious incident and thus did not open an official investigation.

Moreover, near the Sabadell airport is hazardous area LED46, whose vertical limits go from the ground to an altitude of 2500 ft. This area is the location of daily acrobatic maneuvers by an aviation club, and was flown over, though no incidents were reported.

<sup>17</sup> Its vertical limits extend from the ground to 3500 ft AMSL.

In addition, on that day, the aircraft with registration F-HAVG dropped out of the air rally after landing at the aerodrome of Pinar de Castellon due to a technical problem with a pitot tube. The aircraft remained at the aerodrome for four days. On 18 September, the crew returned and took off en route to the aerodrome of Perpignan.

**1.18.6. Previous accident in the air rally**

On Tuesday, 12 October 2010, a Robin DR400-180, registration F-GJLM, impacted the slopes of Mount Alkurruntz. It had taken off from the airport of Lezignan-Corbieres, in the south of France, with three persons on board.

It was taking part alongside 11 aircraft in a charity air rally lasting 18 days, the Raid Latécoère, whose final destination was the Saint-Louis airport in Senegal.

In its report A-034-2010, the CIAIAC concluded that the accident had been caused by the appearance of fog and the subsequent change in the flying conditions, which transitioned from instrument to visual flight. At the time of the accident, the aircraft was flying in an unexpected area due to having selected the wrong heading 17 minutes before the accident.

No safety recommendations were issued.

**1.18.7. Visibility conditions and distance from clouds in VFR flights**

Table SERA S5-1 Visibility conditions and distance from clouds in VFR flights				
Altitude	Airspace class	Flight visibility	Distance from cloud	
			Horizontal	Vertical
At and above 3050 m (10000 ft) AMSL (*)	A(**) B C D E F G	8 Km	1500 m	300 m (1000 ft)
Below 3050 m (10000 ft) AMSL and above 900 m (3000 ft) AMSL, or above 300 m (1000 ft) above terrain, whichever is higher		5 km		
At and below 900 m (3000 ft) AMSL, or 300 m (1000 ft) above terrain, whichever is higher	A(**) B C D E	5 km (***)	Clear of cloud and with the surface in sight.	
	F G			

(\*) When the height of the transition altitude is lower than 3050 m (10000 ft) AMSL, FL 100 shall be used instead of 10000 ft.

(\*\*) The VMC minima in Class A airspace are included for guidance to pilots and do not imply acceptance of VFR flights in Class A airspace.

(\*\*\*) When so prescribed by the competent authority:

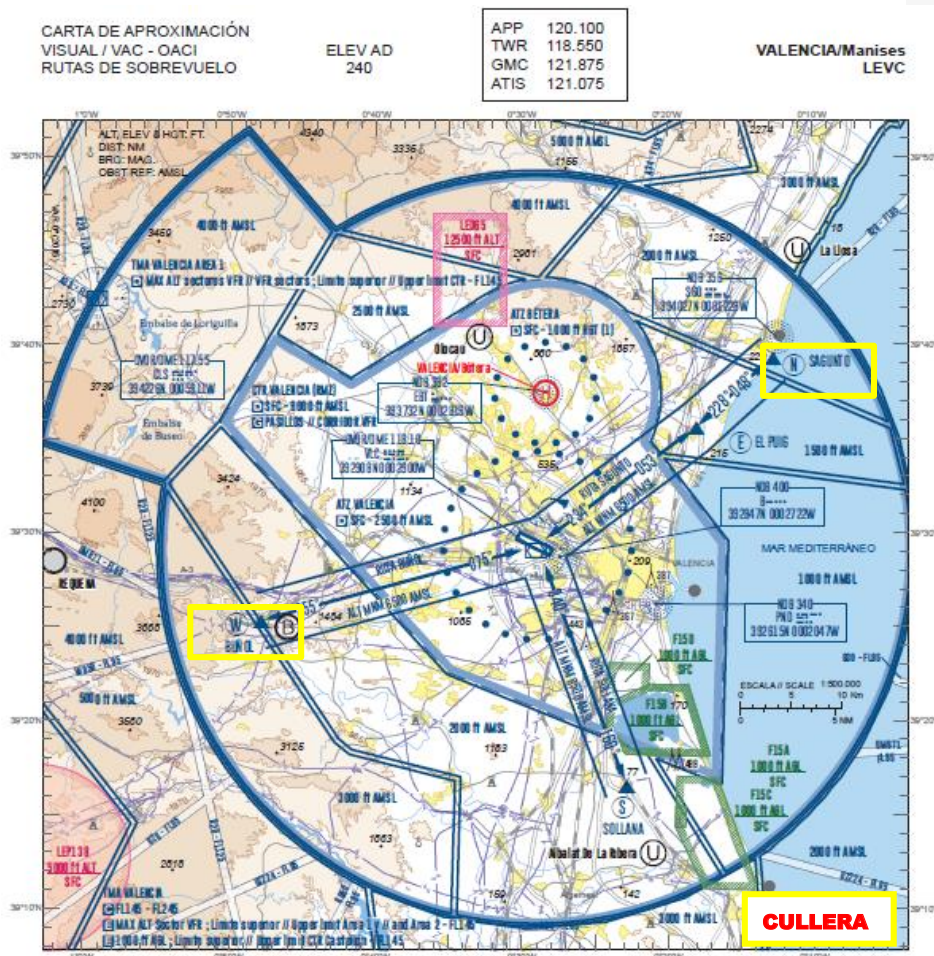
(a) flight visibilities reduced to not less than 1500 m may be permitted for flights operating:

- (1) at speeds of 140 kts IAS or less to give adequate opportunity to observe other traffic or any obstacles in time to avoid collision; or
- (2) in circumstances in which the probability of encounters with other traffic would normally be low, e.g. in areas of low volume traffic and for aerial work at low levels;

1.18.8. Visual approach chart for routes flying through the Valencia CTR

Attached is the visual approach chart for routes flying through the Valencia CTR, which includes the uncontrolled visual sectors, defined as class-G airspace, through which the participants in the air rally traveled on the day of the accident.

Indicated on the chart are reporting points N (Sagunto), W (Buñol) and the town of Cullera.



**1.19. Useful or effective investigation techniques**

No special investigation techniques were used.

## **2. ANALYSIS**

Various aspects are considered, such as:

- With respect to the pilot and the passenger of the accident aircraft, we analyze their relationship, flight skills and proficiency.
- We also analyze if the fuel on board the aircraft or the use of advanced navigation technology during the flight could have contributed to this accident.
- We further analyze if the weather conditions along the route were conducive to visual flight.
- With regard to the organization of the air rally, we analyze if there was any outside pressure and the communication channels set up to provide flight instructions.
- How information and alerts were conveyed to the aircraft taking part in the air rally.
- Lastly, we analyze how the flight plans were filed and activated.

### **2.1. Relationship between the pilot and the passenger of the accident aircraft**

The organizers of the air rally stated that the pilot had contacted them on several occasions to obtain information on the "Raid Latécoère-Aéropostale", expressing great interest in taking part. He had been looking for a pilot who accompanies him, whom he found a few weeks before the air rally began. According to the flight logs of the pilot and the passenger, on 23 July 2019, both had performed a flight to familiarize themselves with aircraft F-HAMP. There are no logs of the pilots flying together after that date.

As a result, participating in the air rally was a challenge to both, since they hardly knew each other and they had to work as a team to make the right decisions during the flights.

Working as a team requires communication, task sharing, cooperation, stress control, leadership, assertiveness and management of automation. It is by doing all this that they share the same situational awareness.

In this case, just before the flight began, the pilot and the passenger argued in public about the need to refuel at the Valencia airport. This disagreement underscores that communications between them were lacking, since they did not share the same situational awareness regarding the amount of fuel available; moreover, the pilot's leadership was being questioned by the pilot who accompanies him, who did not accept the pilot's decision not to refuel at the Valencia airport and fly directly to the aerodrome of Mutxamel.

It is not known what happened in the cockpit between the two; however, according to statements from other crews, the route required proper teamwork due to the difficult weather conditions during the flight. As a result, a lack of teamwork cannot be ruled out as a potential contributing factor in this accident.

Since the organizers of the air rally recommend having two pilots on board each airplane<sup>18</sup>, this Commission deems it necessary to recommend to the organizers that they include in their manuals the criteria and requirements for crews; specifically, the need for the participating pilots to work on the following aspects before taking part in the rally in order to enhance their teamwork during the stages of the air rally: communication, task sharing, cooperation, stress control, leadership, assertiveness and management of automation.

### **2.2. Flight proficiency and skills of the pilot and the pilot who accompanies him**

In their documents, which were distributed prior to the air rally, the organizers warned of the difficulties involved in the stages and acknowledged that *“flying between clouds, with few or no external visual references due to low visibility, could lead to dangerous situations”*. They also requested that *“pilots with little or no experience flying in zero visibility inform the organization so that all the appropriate measures can be taken”*.

Although no specific records are available on the flight experience, whether with no visibility or reduced visibility, of the pilot and the pilot who accompanies him, both are regarded as having no experience in this type of flight, since:

- Based on the content of the pilot’s logbook, most of his flights took place primarily in July, when he flew a considerable amount of time, mostly on local flights from French aerodromes.
- Based on the content of the logbook of the pilot who accompanies him, he flew year-round, but not very much. He mostly flew out of French aerodromes. What is more, although his license was valid, he had a limitation in his medical certificate that required him to fly with a safety pilot.

It may thus be concluded that the lack of the pilots’ experience flying in reduced or zero visibility could have been a contributing factor in this accident.

Moreover, after finishing this stage, some crews stated that they had been overwhelmed by the situation, and three of them even dropped out of the air rally the next day because they did not feel safe.

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<sup>18</sup> Annex II shows the number of persons on board each aircraft. Most of them had two pilots on board, as recommended by the air rally organizers.



It is thus necessary to issue a safety recommendation to the organizers of the air rally to have them include in their manuals the criteria and requirements applicable to the crews; specifically, the flight skills and proficiency of the crews that are required to take part in an air rally of these characteristics.

### 2.3. The fuel on board the aircraft

On 13 September, the pilot added 130 liters of fuel at the Toulouse Franczal aerodrome (LFBF). Then, without further refueling, he made the following flights:

- On 14 September, he flew from the aerodrome of LFBF to the French aerodrome of Lézignan-Corbières (LFMZ). The flight lasted 45 minutes. He then flew from LFMZ to the aerodrome of Pinar de Castellon (LECN) on a flight that lasted 1 hour 50 minutes.
- On 15 September, when the accident occurred, the aircraft had flown 33 minutes since taking off from LECN.

In total, it had flown 3 h 8 minutes without refueling when the accident occurred.

Moreover, although it is unusual for the ranges specified in the three flight plans filed by the pilot that day <sup>19</sup> to be so different, the one entered in the 15:15 plan (13:15 UTC) was 2:14 h, meaning that at the time of the accident, the aircraft had a range of 1:41 h remaining, and when it left from the aerodrome of Toulouse Franczal, it would have been 4:49 h.

It is also important to keep in mind that when the organizers of the air rally gathered the crews to ask them if they needed to refuel, the pilot of the accident aircraft ruled out refueling at the Valencia airport and decided to fly directly to the aerodrome of Mutxamel. Records from this meeting show that the accident aircraft had the following performance:

Cruise speed of 160 knots  
Fuel consumption of 58 l/h<sup>20</sup>  
Fuel amount of 343 l<sup>21</sup>

The organization's records do not include the amount of fuel present in the aircraft before taking off from the aerodrome of Pinar de Castellón.

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<sup>19</sup> Section 1.18.2 includes the various flight plans filed by the pilot on the day of the accident.

<sup>20</sup> If the fuel consumption was 58 l/h (15,3 gallons/hour) then the flights would take place at 65% power

<sup>21</sup> According to Pilot's Operating Handbook and FAA Approved Airplane Flight Manual for the Cirrus Design SR22 the usable fuel is 306.6 liters, and not 343 liters as declared the pilot. The fuel capacity is 318 liters according to the Airplane Flight Manual.

However, the pilot who accompanies him did not agree with the pilot's decision since, before taking off for Mutxamel, they publicly argued about the need to refuel at the Valencia airport.

Lastly, according to the Aircraft Flight Manual, the aircraft's range depends on the flight altitude and the power applied during the flight.

<b>Altitude (ft)</b>	<b>75% power</b>	<b>65% power</b>	<b>55% power, mix for best power</b>	<b>55% power, mix for longer range</b>
SL	4,0	4,6	5,4	6,2
2000	3,9	4,5	5,4	6,2
4000	3,9	4,5	5,3	6,1
6000	3,9	4,5	5,3	6,1
8000	3,8	4,4	5,2	6,0
10000		4,4	5,1	5,9
12000		4,3	5,1	5,9
14000			5,0	5,8

As a result, if the flights took place at 65% power (according to the fuel consumption declared by the pilot), the range would be of 4.5 hours. If this assumption is correct, the aircraft left Toulouse Francazal aerodrome with full fuel tanks.

Despite the various inconsistencies found, in light of the range specified by the pilot in the last flight plan, the likelihood that the pilot turned inland to fly directly to the Mutxamel aerodrome and thereby save fuel is ruled out.

#### **2.4. Use of advanced navigation technology during the flight**

The use of advanced navigation technology is widespread among general aviation pilots, and has been identified as a hazard by both EASA<sup>22</sup> and AESA, since it gives rise to:

- Distractions. It can distract the pilot of the aircraft and reduce the amount of time spent looking outside.
- Over-reliance and dependence. Greater technical capabilities can tempt pilots to operate beyond their personal limits and fly overly complicated routes.

The survey conducted among the crews that took part in the air rally showed that all except one were equipped with some sort of advanced navigation technology device, and that most crews used these devices while flying.

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<sup>22</sup> To warn of the hazards of this type of technology, EASA published "Using Advanced Navigation Technology Safely", which AESA translated and published as "Uso seguro de la tecnología de navegación avanzada".

As a result, it is very likely that the pilot of aircraft F-HAMP was also using an advanced navigation device at the time of the accident. Moreover, the aircraft's radar track also seems to indicate that the aircraft was flying directly from one reporting point to the next.

Before the start of the air rally, the organizers had sent out some electronic files that allowed the crews to see the planned routes of the air rally on advanced navigation devices. Annex IV shows the planned bad-weather route for the stage of 15 September. This route was to be flown over the sea at an altitude of 4500 ft until reaching reporting point S (Estanque) of the Alicante airport (LEAL), after which the flight altitude was reduced to 1000 ft. This route required a range of 6 h 10 min. Due to the weather conditions and to the low-fuel situation, the organizers of the rally shortened the route and decided to land in Mutxamel instead of continuing on to the La Axarquía aerodrome. As a result, the route that was finally decided upon passed through reporting points SOPET, COMPI and MITOS.

After taking off from the Pinar de Castellon aerodrome, the accident aircraft did not fly along the coastline; rather, it flew directly from one reporting point to the next. As a result, the pilot who relied on an advanced navigation device went inland, and once over land, the pilot did not modify their heading or increase their altitude.

Navigational information is normally not associated with information on the terrain, obstacles or the weather, and if it is, the databases may not contain all the information. So it is not known if before impacting the terrain, the pilot received any type of alarm warning them of their proximity to the ground.

It is important to include here the warning contained in the document published by EASA and AESA:

*"Be aware that those equipments are not certified nor qualified as aeronautical product and therefore no guaranty could be given on the safety and reliability. GPS based systems must not be relied upon as a sole navigation reference. Keep ready at any time to resume your own navigation with terrain maps that remains your primary mode of navigation."*

### **2.5. The weather conditions along the route**

The organizers of the air rally had the AEMET's low-level charts to know the forecasted meteorological conditions along the route. In particular, the low-level chart issued at 12:00 UTC, warned for the area in which the accident occurred of:

- Darkening of the mountains
- Mixed cloud layers: *cumulonimbus* (CB) and *cumulus congestus* of great vertical extent (TCU), from 1000 ft or 3000 ft

- Locally, large areas where surface visibility is greater than 1 km and less than 5 km with showers

The information provided in the low level charts is a valid prediction for a period of 6 hours; with which, it is affected by certain uncertainty. In fact, the actual weather conditions encountered by the participants in the air rally were more unfavorable than forecasted.

The photograph taken by the aircraft that took off after the accident aircraft shows that visibility had gone down significantly in the area near the crash site. The surveys of the crews also confirm the low visibility in the area of Cape Nao (around 5 kilometers). The crews had to reduce their altitude to stay in visual contact with the coastline. Some crews stated that they had to descend below 500 ft, which is the limit altitude over water specified in requirement SERA.5005 Visual flight rules.

Therefore, when the accident aircraft headed inland, the mountains were darkened and obscured by the clouds. Based on the radar track, the pilot slightly altered their flight altitude. This may have been because:

- Either the pilot, trapped in the clouds, did not increase their altitude so as not to lose their few visual ground references.
- Or since they had not previously flown over the area and had not planned the route in detail, they were unaware of the hazard of flying so low.

The pilot issued a call for help on the air rally frequency and collided with the mountain a few seconds later.

The organizers of the air rally were unaware, based on the forecasted meteorological information, that along the route the actual meteorological conditions that the participants in the air rally would encounter would be worse than forecasted, with the cloud ceiling lower than 500 ft and the visibility less than 5 km. However, given the complexity of the meteorological situation on that day, the precursor aircraft should have flown in advance the proposed route, from the Pinar de Castellón aerodrome to the Mutxamel aerodrome, to analyze its viability as he did it in the morning flying to the Requena aerodrome.

Therefore, the organizers of the air rally should have analyzed the proposed route in more detail since requirement SERA.5005 Visual flight rules, which specifies that the flight level must be over 150 m (500 ft) over the sea, was violated at times. Moreover, visibility was marginal, around 5 kilometers (limit value for a VFR flight in VMC)<sup>23</sup>. No safety recommendation is issued in this regard since compliance with the contents of the regulation is mandatory.

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<sup>23</sup> Section 1.18.7 contains the requirements of the SERA regulation in terms of visibility and distance to clouds conditions in VFR flights.

The pilot should also have planned the proposed route better. While it is true that it was modified at the last second, the route that was eventually selected was the first part of the planned bad-weather route for the stage of 15 September. As Annex IV shows, this route was being flown at an altitude of 4500 ft. Therefore, the pilot should not have flown inland at an altitude of 1000 ft. Furthermore, the pilot is responsible for making a decision to deviate from the proposed route if weather conditions do not allow visual flight.

The lack of adherence to visual flight procedures by the pilot of the accident aircraft was also evident the day before<sup>24</sup>.

## **2.6. Peer pressure from the group**

The accounts of the crews indicate that there was certain pressure to adhere to the plan, or at least as much as possible, despite the weather conditions in the area.

Moreover, the crew of an ultralight felt pressure to take off, since the rally organizers required all the aircraft to fly as a group.

It is also significant that after the accident of F-HAMP, the rally continued as planned, except for three crews (N-579TD, F-JDUU and F-JVAL), which did not continue since they did not feel safe.

As indicated earlier, it is necessary to issue a safety recommendation to the organizers of the air rally to have them include in their manuals the criteria and requirements for the crews, in particular the flight skills and proficiency that crews need to have to take part in an air rally of these characteristics.

## **2.7. The communications channels set up by the organizers to provide the flight instructions**

### **2.7.1. *The information briefings***

That day, due to the weather, changes were made to the route planned and distributed before the air rally started. There were two meetings with the crews to give them the new flight instructions:

- At 09:30, they were told that the destination aerodrome was the same (Requena) but with a change in the route (Cullera-Reporting point W of the Valencia CTR-LERE), given the weather conditions.

Then, at 11:50, via a WhatsApp message, the route to Requena was canceled, and later, at 13:21, also via WhatsApp, a second meeting was called.

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<sup>24</sup> See section 1.18.5, which details the events that occurred in the Sabadell ATZ.

- At 13:25, the crews were told they would fly to Mutxamel along the coastline (route: Castellon – reporting point N of the Valencia CTR – Cullera – Cap Marti – Benidorm)<sup>25</sup>. During the investigation into this accident, the flight leader of the organization stated that during this information briefing, he underscored the need to stay over the coast, since the weather conditions inland were not favorable (and they also avoided the mountainous terrain this way). He did not give specific instructions on what altitude to maintain.

Both meetings were held in front of the information office at the Pinar de Castellon aerodrome and were attended by all the crews.

Some crews stated, through the surveys, that the information sessions were brief, that they did not have sufficient information regarding the weather conditions forecast along the route and at the destination aerodrome, and that the instructions were not accurate. The various route changes had also created some fatigue, which, as another crew said, caused them not to pay enough attention during the last briefing. The radar tracks also show that a fair number of crews were not flying “along the coastline”, but rather resorting to advanced navigation devices to fly from one reporting point direct to the next, although they did not fly inland, like the accident aircraft did upon reaching Cape Nao.

The tour organizers are aware, as specified in their Manuals, that the pilots should not have to interpret the flight instructions in order to understand them. Specifically, the phases of a flight affected by specific or exceptional instructions should not be subject to any possible interpretation.

The fact that the message to be relayed (the new instructions) was not received by all the crews satisfactorily may be explained by the medium (the air), the setting (the location, the large number of participants in the information briefing) or the noise (fatigue, stress).

As a result, it is appropriate to recommend to the organizers of the air rally that when a route is changed, steps are taken to ensure that all the crews receive the new flight instructions with no room for interpretation.

### ***2.7.2. The frequency of the organization***

The organizers of the air rally had set up a frequency to communicate with the crews in the air.

Section 1.18.1 shows the “Planned departure sequence for 15 September”, according to which, the lead aircraft F-BPIU was to take off from the aerodrome of Pinar de

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<sup>25</sup> Section 1.18.8 shows the visual approach chart to the Valencia airport, and on it are marked reporting point N of the Valencia CTR and the town of Cullera.

Castellon (LECN) at 09:00 en route to the La Axarquía aerodrome (LEAX), followed, half an hour later, by F-GHEO, the leader of the A group, and then, 3 minutes apart, the remaining aircraft in the A group, including F-HAMP. Given this departure sequence, the lead aircraft F-BPIU and the leader of group A would have informed the others of the conditions.

However, on that day, the lead aircraft took off from the aerodrome of Requena. As the leader of group A proceeded to Valencia to refuel, the air rally organizers designated another aircraft from the organization (F-GAAQ aircraft) as leader of group A. Due to the stop of the take-offs, requested by LECL supervisor, F-HAMP, which belonged to group A, was the second aircraft to take off from Pinar de Castellon en route to Mutxamel, and it did so half an hour later than F-GAAQ. The crew of F-GAAQ stated that reassuring messages were broadcast about the weather conditions en route through the air rally frequency. However, they did not have radio contact with the remaining participants, except with the lead aircraft, F-BPIU. Consequently, the accident aircraft was unable to receive instructions from either the lead aircraft or the aircraft preceding it.

According to the Manual of the air rally organizers, aircraft are required to fly in a group behind that group's leader. Since the departure of the aircraft had to be interrupted for 30 minutes at the request of the LECL supervisor, the organization of the air rally should have requested the aircraft F-GAAQ to return to the Pinar de Castellón aerodrome until all aircraft belonging to group A could have taken off together. This way, the accident aircraft would have received assistance and instructions along a route that was complicated by the weather. Because of this, it is recommended that the organization not deviate from the procedures contained in its manuals.

In fact, the crew of the aircraft that took off after the accident aircraft ensured that it was they, not an organization aircraft, that first broadcast on the organization frequency the weather conditions upon reaching Cape Nao and recommended staying over the coast and not turning inland.

### **2.7.3. *The WhatsApp messages***

The organizers of the air rally also used the WhatsApp application to send messages to the participants' mobile phones while on the ground.

According to the organizers, two minutes before the accident aircraft took off, they sent a message via WhatsApp to all the crews, reminding them to stay along the coastline. It is not known if this message was read by the pilot or the passenger of the accident aircraft before they took off.

In any event, as noted earlier, an analysis of the radar tracks shows that a considerable number of crews were not flying along the coastline, meaning that not all the crews successfully received the message.

Since the documentation that the organizers distributed prior to the air rally did not indicate that this method would be used to send instructions to the crews while on the ground, it is recommended that the organizers include in their manuals the criteria and requirements as these pertain to communicating with the crews.

## **2.8. Flight information and alert services provided to the crews taking part in the air rally**

The accident occurred below the airspace of the Valencia TMA, which has a lower limit of 4000 ft AMSL in the area of the accident. The airspace below the Valencia TMA is defined as a class-G VFR sector. This means, according to the requirements in SERA.6001 *Classification of airspaces*, that “IFR and VFR flights are permitted and receive flight information service if requested”.

According to Commission Implementing Regulation (EU) No. 923/2012 of 26 September 2012, laying down the common rules of the air and operational provisions regarding services and procedures in air navigation, the purpose of the flight information service is to give advice and information useful for the safe and efficient conduct of flights. Requirement SERA.9005 defines the scope of the flight information service and states that information must be provided on:

- Section b) 2) “collision hazards to aircraft operating in airspace classes C, D, E, F and G”;
- Section c), for VFR flights, “traffic and weather conditions along the route of flight that are likely to make operation under the visual flight rules impracticable”.

Seconds before the accident, the accident pilot asked, on the frequency of the air rally organizers, for the ATIS frequency. It is likely that what the aircraft’s pilot actually wanted was the frequency of the Valencia TMA, and not the ATIS frequency, in order to request flight information. This means that the pilot was not in constant radio contact with the area control center, as required by ENAIRE in its authorization. The pilot was unable to contact the Valencia TMA and the accident occurred seconds later.

About one and a half minutes elapsed between the time the accident aircraft turned inland and the impact with the terrain. This would have been enough time to inform the crew of the collision hazards present in the area if the crew had been in radio contact with the Valencia TMA control center.

The controllers in the Valencia TMA found out about the accident after receiving a call from a 112 emergency center, which indicates that they were not monitoring the route being flown by this aircraft. They should have been more mindful of these flights, given the difficult weather conditions in the area. ENAIRE required the filing of a flight plan that contained IFR points to indicate the route the aircraft taking part in the air rally would follow. The aircraft filed a flight plan with IFR points SOPET, COMPI and MITOS.



Because of the weather conditions along the route, it could not be followed by flying directly from one reporting point to the next in visual conditions. This means that controllers in the Valencia TMA should have been observing if the aircraft flew directly from one reporting point to the next. Had they paid close enough attention, the controllers could have provided the crews with information to improve the safety of the flights.

### 2.9. Filing and activation of the flight plans

As ENAIRE explained, the flight plan in the SACTA system presents, among others, the states: Coordinated, Pre-active, Active and Finished. When aircraft take off from uncontrolled aerodromes (normally with the transponder code 7000) they have to contact the control units so that the air controller can pre-activate the flight plan in SACTA and assign them a transponder code. Once it responds in coherence, after being automatically detected by SACTA, it would go to the active state and correlate the radar tag.

That morning, at 10:40 the flight director and chief pilot contacted the Valencia ATC by telephone to prepare the flight plans and activate them after takeoff.

The LECL supervisor pre-activated the flight plans and provided the participants' transponder codes, so that once in the air, SACTA will activate the flight plans automatically if the aircraft made use of the assigned transponder code.

Although the aircraft did not take off until several hours later and with a different destination aerodrome, apparently the codes assigned in the morning were still valid, since that afternoon when the flight director and chief pilot contacted the LECL supervisor by telephone again he did not receive new transponder codes.

When the participants of the air rally were about to take off, the flight director and chief pilot indicated that the Valencia coordinator called him to request the delay of takeoffs "*due to the impossibility of processing all the flight plans*". It's more, during the investigation, ENAIRE only provided the strips<sup>26</sup> for 19 of the 29 aircraft taking part in the air rally, meaning that the flight plans of all aircraft were not activated<sup>27</sup>.

Specifically, the strip for the accident aircraft was missing, even though it had filed a flight plan and it used the transponder code assigned in the morning.

This possible restriction or limitation had not been foreseen and therefore transmitted by ENAIRE to the organization of the air rally. The organization of the air tour, as has

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<sup>26</sup> According to ENAIRE, the flight strips can be of coordination, pre-activation or progress. That day, 23 flight plans from LECN to LEMU were created and coordinated. And only 14 flight plans were activated. In order to generate a progress flight strip for an aircraft, it is essential that its flight plan be activated first.

<sup>27</sup> From the radar track, it is noted that the aircraft took off with the transponder code 7000 instead of the one assigned. So, SACTA could not activate the flight plan.

been analyzed in a previous section, did not adapt to this situation and deviated from the procedures set out in its Manuals since the aircraft belonging to group A took off without a leading aircraft of group A preceding them 3 minutes.

For this reason, the organization has been recommended not to deviate from the procedures contained in its Manuals.

### **3. CONCLUSIONS**

#### **3.1. Findings**

- The pilot and the passenger had valid licenses and medical certificates.
- The aircraft was airworthy and its documentation was valid.
- Weather conditions were degraded. Visibility was very low, around 5 kilometers (limit value for a VFR flight in VMC). The cloud ceiling was so low that the flight altitude was occasionally below 150 m (500 ft), which is the limit value specified in the regulation.
- The pilot and the pilot who accompanies him had limited experience on the aircraft and with reduced visibility flights.
- The pilot and the pilot who accompanies him had met a few days before the air rally started and had almost no flights together.
- Before the flight, the pilot and the pilot who accompanies him argued in public about the need to refuel at the Valencia airport.
- The pilot relied on advanced navigation technology to pilot the aircraft.
- Before the start of the stage, the organizers of the air rally held two information briefings.
- The new flight instructions were not communicated effectively.
- The departure sequence planned by the organizers was not followed and the aircraft in the group A took off without a leader preceding them 3 minutes. The leader of the group A took off 30 minutes earlier than the aircraft in the group A.
- The controllers in the Valencia TMA did not provide flight information services.
- Only 14 aircraft had an activated flight plans.
- The day before, several aircraft had crossed the Sabadell ATZ without first contacting the controller in the control tower.
- Some crews stated feeling overwhelmed by the situation and even dropped out of the air rally the next day.

#### **3.2. Causes/Contributing factors**

The investigation has determined that this accident was caused by the failure to adhere to procedures for visual flight.

The following was a contributing factor:

- Ineffective communication of the new flight instructions. Before taking off en route to Mutxamel, the organizers held two meetings at the Pinar de Castellon

aerodrome to relay new flight instructions, but they did not ensure that all the crews had understood them.

#### **4. SAFETY RECOMMENDATIONS**

**REC 20/20.** It is recommended that the organizers of the air rally, when changing routes, ensure that all the crews receive the new flight instructions with no room for interpretation.

**REC 26/20.** It is recommended that the organizers of the air rally revise and modify their manuals to include criteria and requirements for: crews, communications and weather.

**ANNEX 1: STAGES OF THE 2019 RAID LATÉCOÈRE-AÉROPOSTALE**

The table below shows the stages of the 2019 Raid Latécoère-Aéropostale:

ETAPAS	Escalas Técnicas Facultativas	Fecha
Toulouse - CASTELLÓN DE LA PLANA	Perpiñán (LFMP)	14 septiembre
CASTELLÓN DE LA PLANA- MÁLAGA La Axarquía	Requeña (LERE)	15 septiembre
MÁLAGA La Axarquía - RABAT	Táger (GMTT)	16 septiembre
RABAT - CASABLANCA	-	17 septiembre
CASABLANCA - TAN TAN - TARFAYA	AGadir (GMAD)	18 septiembre
TARFAYA - La AOUNE- DAKAR	Dakhla (GMMH)	19 septiembre
NOUADHIBOU - DAKAR	Nouakchott (GQNN)	20 septiembre
DAKAR		21 septiembre
DAKAR - SAINT-LOUIS		22 septiembre
SAINT-LOUIS		23 septiembre
SAINT-LOUIS - DAKHLA	Nouakchott (GQNN) - Nouadhibou (GQPP)	24 septiembre
DAKHLA -ESSAOURA	La Ayouné (GMML) - Tan-Tan (GMAT)	25 septiembre
ESSAOUIRA - MÁLAGA La Axarquía	Benslimane (GMMB) - TÁNGER (GMTT)	26 septiembre
MÁLAGA La Axarquía - BARCELONA	Requeña (LERE) - TERUEL (LETL)	27 septiembre
BARCELONA - PERPIÑÁN		28 septiembre

**ANNEX 2: MAKE-UP OF THE CREWS**

The table below provides details on the number of pilots on board each aircraft, highlighting those aircraft where members of the organization were traveling:

Aircraft		# of pilots/passengers	Was a member of the organization among the crew?	Responsibilities
Type	Registration			
C182	F-BPIU	2/0	YES	Director of ground operations
				Mechanic – Responsible for parking
PA28	H-BOQN	2/1	YES	Flight Director – Flight leader
				Director of Projects - Accounting
				Mechanic
C172	F-GAAQ	2/0	YES	Supplies
				Supplies
PA28	F-GGLL	2/0	YES	Mechanic
				Lead Mechanic
C182	F-GHEO	3/1	YES	Flight Operations
				Director of Logistics
PA28	G-ERNI	3/0	YES	Administrative Director
SKYLANE	F-JVAL	1/1	NO	
MCR01	F-PURU	2/0	NO	
TB10	F-HSBT	1/2	NO	
TC160	F-PJRG	2/1(Pilot in training	NO	

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Aircraft		# of pilots/passengers	Was a member of the organization among the crew?	Responsibilities
Type	Registration			
VANS RV9	F-PARG	2/0	NO	
TB10	H-BEYX	1/2	NO	
Polaris	F-JXRL	1/ 1	NO	
A32	F-JDUU	2/0	NO	
DR400	F-GKQK	2/0	NO	
DR400-160	F-GTPJ	2/1	NO	
DA40	F-HOBB	3/0	NO	
C206	N-578TD	1/1	NO	
DR400-180	F-GUXO	3/0	NO	
DA40	F-GSDE	3/0	NO	
DA40	F-GUVC	2/1	NO	
PA28-200	F-BRUE	1/2 (Both pilots in training)	NO	
DR400-180	F-GLVO	3/0	NO	
DR400-180	F-GSRT	2/2 (1 pilot in training)	NO	
SR22	F-HAVG	2/1	NO	
C182T	F-HFBD	3/0	NO	
C172	F-GTDE	3/0	YES	Assistant flight/operational safety director
DR400-160	F-HEAA	2/0	NO	
PS28	F-HSAF	2/0	NO	
SR22	F-HAMP	2/0	NO	



### **ANNEX 3: SURVEY OF AIR RALLY PARTICIPANTS**

A survey was taken of the participants in the air rally. The crews of 23 of the 28 aircraft that flew between the aerodromes of Pinar de Castellon and Muxtamel that day responded to the survey. In all, 29 replies were received, since several individuals on board the same aircraft took part in the survey. They were asked:

#### **1 – Is this your first time taking part in an air rally. If not, how many have you participated in?**

62% (18 out of 29) of the participants stated it was their first time in an air rally, and 21% (6 of 29) stated it was their second. The remaining 17% (5 of 29) included:

- The flight leader/director of flight operations, who had taken part in four Raid Latécoère-Aéropostale. This was his third time as flight leader.
- The director of ground operations and one of the pilots in the lead aircraft, F-BPIU, who had been with the organization since 2011 and had taken part in over 25 air rallies (Latécoère-Aéropostale and Toulouse-Saint Louis in Senegal).
- One of the pilots in aircraft F-GAAQ, which took off half an hour before the accident aircraft, had taken part in more than 10 air rallies, and specifically, had flown in the Raid Latécoère-Aéropostale on four occasions.

#### **2 – Is this your first time flying in Spain? If not, how often have you flown in Spain?**

52% (15 out of 29) of the participants replied that it was their first time flying in Spain (in VFR) and 24% (7 out of 29) said it was their second time in Spain (in VFR). The rest had flown more than twice in Spain in VFR.

#### **3 – Have you ever flown from the aerodrome of Castellon to Muxtamel?**

79% (23 out of 29) had never flown from the aerodrome of Castellon to Muxtamel. As for the rest:

- Both the flight leader/director of flight operations and the director of ground operations (one of the pilots in the lead aircraft, F-BPIU) had flown from the aerodrome of Castellon to Muxtamel.
- One of the pilots in the lead aircraft of group A, registration F-GAAQ, replied that though he had not taken this route, he had flown from Castellon to other aerodromes along the coastline (Valencia, Almeria, Málaga, Sevilla, Cordoba, Granada).

#### **4 – What do you remember from the day of the accident?**

A summary of the crews' recollections from the day of the accident is provided below:

1. There was an information briefing in the morning with all the participants. All possible options were analyzed, considering the weather situation and the fuel restrictions (the aircraft could not be refueled at the Castellon aerodrome before departing). A suggestion was made that we fly to the aerodrome of Requena.
2. An aircraft was sent to scout the aerodrome of Requena. This aircraft reported that the weather at Requena was degraded, so flying there was ruled out. The crews were immediately informed in person and by WhatsApp.
3. After lunch, another information briefing was held with the crews before the flight. The option chosen was to go to Mutxamel (given the weather conditions and the ability to refuel and park). The crews disagreed on the information provided during this final meeting before the flight. Some crews stated that they were told about the weather situation, the characteristics of the Mutxamel aerodrome, the need to follow the coastline and not to fly over land, and to descend, sometimes to around 600 ft, during the route (since a direct route was not possible south of Valencia due to the high terrain in the Gulf of Valencia and the low cloud ceiling). Other crews stated that the information briefings were short and did not provide enough information on the weather conditions they could expect along the route or at the destination aerodrome.
4. In addition, some crews stated that before taking off, there was a lot of stress due to the difficult weather conditions and the various changes in plan. Moreover, the different plan changes had created a certain amount of fatigue, which resulted in some crews not paying too much attention during the last information briefing. Others added that they felt the air rally organizers were overwhelmed and disconcerted by the situation. Yet another crew said they had doubts about the viability of the route, given the weather forecast. What is more, the previous day they had been forced to land with a 17 to 20 kt crosswind, which exceeded the limits allowed in the flight manual.
5. Five aircraft had to refuel in Valencia, since they did not have enough fuel to reach Mutxamel. The first airplane to take off was F-GAAQ, followed by F-GHEO, after which the coordinator in Valencia requested (by telephone) delaying further takeoffs because they had not processed all the flight plans.
6. Half an hour later, the takeoffs were resumed. Before taking off, it had received an instruction via WhatsApp to "Remain over the coast at all times at 1000 ft. It's better in the direction of Benidorm". The faster airplanes took off first. Some crews stated that during the takeoff, which was to the north, there was a strong crosswind.

7. The reconnaissance aircraft (F-GAAQ and F-BPIU) provided weather information to the crews gradually. The lead aircraft of the various groups, and those ahead in the route, also reported on the weather. However, there were crews that complained about the low amount of weather information from the preceding aircraft.
8. In addition to weather information, the lead aircraft in the group repeatedly broadcast the instruction to follow the coastline over the sea at an altitude of 1000 ft.
9. The crews all stated that they had to descend (most between 500 and 600 ft) to stay in visual contact with the coast due to the low cloud ceiling when flying over Cape Nao and Benidorm. None of them flew over the land.
10. The weather conditions improved after this.
11. The marginal weather conditions made the flight highly stressful for some crews. In fact, three crews decided not to continue in the air rally.

**5 – What time did you take off from Castellon? When did you land in Mutxamel?**

The lead aircraft, registration F-BPIU, took off from the aerodrome of LERE at 14:40. The remaining aircraft took off from the aerodrome of Pilar de Castellon. Most of them flew directly to the aerodrome of Mutxamel, but some had to refuel at the Valencia airport.

Planned takeoff sequence	Aircraft type	Registration	Departure from LECN	Arrival at / Departure from LEVC	Arrival at LEMU
<b>Group A</b>					
A1	C182	F-GHEO <sup>28</sup>	14:47	15:45	16:45
A2	SR22	F-HAMP	15:15		-
A3	C206	N-578TD	15:20		16:20
A4	MCR01	F-PURU	-	-	-
A5	DA40	F-HOBB	15:00		16:00
A6	C182T	F-HFBD	15:35		16:35
A7	VANS RV9	F-PARG	16:00		17:06
A8	C172	F-GAAQ <sup>29</sup>	14:45		16:00
<b>Group B</b>					
B1	PA28	H-BOQN <sup>30</sup>	15:43		16:45
B2	DR400-180	F-GUXO	15:48		16:46
B3	DA40	F-GSDE	15:52		17:02
B4	DA40	F-GUVC	-	-	-

<sup>28</sup> The manager of flight operations was on this airplane.

<sup>29</sup> The crew of this aircraft were tasked with making refueling arrangements at the destination.

<sup>30</sup> The flight leader/flight director was on this airplane.

Planned takeoff sequence	Aircraft type	Registration	Departure from LECN	Arrival at / Departure from LEVC	Arrival at LEMU
B5	DR400-180	F-GLVO	-	-	-
B6	TC160	F-PJRG	16:01		17:33
B7	TB10	H-BEYX	15:59		17:12
B8	DR400-160	F-HEAA	16:02		17:09
B9	PA28	G-ERNI	16:00		17:15
B10	TB10	F-HSBT	-	-	-
<b>Group C</b>					
C1	DR400-180	F-GSRT	16:38		18:00
C2	DR400-160	F-GTPJ	15:33	15:57 / 17:50	18:55
C3	Polaris	F-JXRL	16:17		17:36
C4	A32	F-JDUU	16:30		17:30
C5	SKYLANE	F-JVAL	16:22		17:34
C6	DR400-160	F-GNPJ	16:20		17:35
C7	PS28	F-HSAF	16:30		17:50
C8	DR400	F-GKQK	-	-	-
C9	C172	F-GTDE <sup>31</sup>	16:12	16:55 / 19:00	20:11
C10	PA28	F-GGLL	16:30	17:20 / 18:40	20:00

## 6 – What was the weather like in Castellon?

The statements from the crews differ considerably in their descriptions of the weather conditions at the aerodrome of Castellon.

- Most of the crews described visibility as being good, in excess of 10 km.
- As for the cloud ceiling, although some of the crews (around 30%) described the sky as overcast or broken, most stated that it was acceptable for visual flight.
- As for the wind, some of the crews (around 25%) stated that it was strong (some of the crews specified values of 25 to 30 knots), from the north and that they had to take off with a crosswind.

## What was the weather like in Mutxamel?

Most of the crews replied that the visibility, cloud ceiling and wind were suitable for VFR flight near the Mutxamel aerodrome, describing weather conditions there as CAVOK.

## What was the weather like along the route?

Most of the crews stated that after taking off from Castellon, the weather conditions worsened rapidly. According to the various accounts, the weather ceiling ranged from

<sup>31</sup> The assistant flight/safety director was on this airplane.

800 to 350 ft once past Valencia. After Cape Nao, the weather conditions improved, with longer visibility and a higher cloud ceiling.

Navigating became so difficult that it resulted in the following situations:

- One crew stated that they argued about the possibility of turning around because of the weather conditions, especially near Cape Nao, and they shared the work in the cockpit.
- Another pilot reported that he had to take control of the aircraft after his companion (the pilot flying at the time) asked him to, saying he did not feel proficient enough to continue flying due to the degrading conditions, which were borderline even for a professional pilot.

Although some crews emphasized the fact that they received instructions from the organizers of the air rally – both on the organization’s frequency and during the information briefing prior to the flight – on the route to take as well as on the weather conditions along the route, the crew of the aircraft that took off after the accident aircraft assured that there had been no specific instructions before takeoff and that they were the first to report, on the organization’s frequency, the weather conditions they encountered upon reaching Cape Nao.

One of the pilots in the lead aircraft, F-BPIU, stated that he reported to the flight operations managers via WhatsApp that:

*A 15h18 gandia idem mto max 1000ft brume et visi 5 kms .*

*A 15h20 a denia la visi s ameliore*

*A 15h36 toujours resté sur trait de cote a 1000ft, en direction de Benidorm c'est mieux*

*A 15h43 toujours trait de cote visi sup a 10 plafond 3000ft*

*A 16h00 LEMU est CAVOK. toujours suivre trait de cote coté mer a 1000ft*

Which translates as:

*At 15:18, Gandia same weather, max 1000 ft, mist and 5 km visibility.*

*At 15:20, improved visibility in Denia.*

*At 15:36, stay over the coastline at 1000 ft at all times, it gets better en route to Benidorm.*

*At 15:43, over coastline at all times, visibility over 10, ceiling 3000 ft.*

*At 16:00, LEMU CAVOK. Follow coastline at all times at 1000 ft.*

7 – How did you prepare for the flight? Where did you check the weather information for the destination and alternate airports? How did you check the weather forecast during the route?

The crews stated that they prepared the flight by using the information provided by the organizers of the air rally, as well as by using various flight planning tools.

During the flight, some stated that they received weather information on 130.00 MHz from the organizers in the preceding aircraft.

**8 – Do you fly with any type of GPS navigation device? Did you use it on the day of the accident?**

All the aircraft, except one, were equipped with some sort of advanced navigation device. Most of the crews used these devices, except for some crews, which did not use them:

- One of the pilots of aircraft F-BPIU stated that he preferred to fly visually.
- The pilot of aircraft F-GAAQ stated that he did not use any kind of navigation device. Conditions were VMC along the coastline over the sea.
- Another pilot stated that despite having a GPS device, it was not used during the flight.
- Another crew replied that they did not use the GPS much. Given the conditions, they flew visually along the coast, out of the clouds.

One pilot added that despite using GPS, he did not follow the route proposed by it and stayed over the sea near the coastline.

**9 – Regarding the accident pilots, do you know which one was flying the airplane the day of the accident? Did you hear them report anything relevant on the radio during the flight? Do you know if they were using a GPS device to navigate?**

Some crews identified the pilot who was seated in the left seat.

Although the aircraft was equipped with an advanced navigation device, they did not know if the pilot was using it during the accident flight.

**ANNEX 4: PLANNED BAD-WEATHER ROUTE FOR 15 SEPTEMBER**

Two routes were planned for the stage of 15 September, one for good weather and another for bad. The good-weather route was flown at a higher altitude over the Iberian Peninsula, and the bad-weather route was over the sea at an altitude of 4500 ft up to reporting point S (Estanque) of the Alicante airport (LEAL), after which the altitude was lowered to 1000 ft.

This annex includes the information given to the participants of the air rally by the organizers before the start of the rally.

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RAID LATÉCOÈRE AÉROPOSTALE AFRIQUE 2019 Castellón - La Axarquía - Leoni Benabu											PLOG	
AIRCRAFT: RAID LATÉCOÈRE AÉROPOSTALE AFRIQUE 2019											Startup	Brakes Off
PILOT: Hervé Berardi											Takeoff	Landing
FUEL REQUIRED 177.0 ltr PLANNED FUEL 260.0 ltr ENDURANCE: 6 hr 10 m											Brakes On	Shutdown
TIME: 15 sept. 2019 07:30 Z												
LANDING AT: 15 sept. 2019 10:29 Z												
Elevation 17 ft (1 hPa) SR 05:40 Z, MCT 05:13 Z												
	Position	MSA	Level	IAS	TrkT	TrkM	Wind	HdgM	GS	Dist	Time	
LECN Castellón △ SOPET	N395002 W0000017	900	4500	120	188	187				10 (10)		
SOPET △ COMPI	N392103 W0000028	500	4500	120	180	180				29 (39)		
COMPI △ MITOS	N382658 W0000049	4000	4500	120	180	180				54 (93)		
MITOS 🌿 LEMU Muchamiel	N382624 W0002826	2900	4500	120	268	268				22 (115)		
LEMU Muchamiel 📍 NE (Cabo Huertas) (LEAL)	N382143 W0002428	1700	4500	120	146	146				5.6 (121)		
NE (Cabo Huertas) (LEAL) 📍 N (Camp de Golf) (LEAL)	N381840 W0003242	1800	4500	120	245	244				7.2 (128)		
N (Camp de Golf) (LEAL) 📍 S (Estanque) (LEAL)	N381430 W0003413	1300	4500	120	196	196				4.3 (132)		
S (Estanque) (LEAL) 📍 N (Torrevieja) (LELC)	N375916 W0003847	2000	4500	120	193	193				16 (148)		
N (Torrevieja) (LELC) 📍 N1 (Cabo Roig) (LELC)	N375435 W0004301	1000	1000	120	215	215				5.8 (154)		
N1 (Cabo Roig) (LELC) 📍 E (Isla Grosa) (LELC)	N374404 W0004302	900	1000	120	180	180				11 (164)		
E (Isla Grosa) (LELC) 📍 S1 (Cabo de Palos) (LELC)	N373653 W0004031	1000	1000	120	165	164				7.5 (172)		
S1 (Cabo de Palos) (LELC) 📍 S (Escombreras) (LELC)	N373233 W0005548	1800	1000	120	250	250				13 (184)		
S (Escombreras) (LELC) △ NERKU	N372629 W0012740	2300	1000	120	257	256				26 (210)		
NERKU 📍 Villaricos	N371459 W0014614	2100	1000	120	232	232				19 (229)		

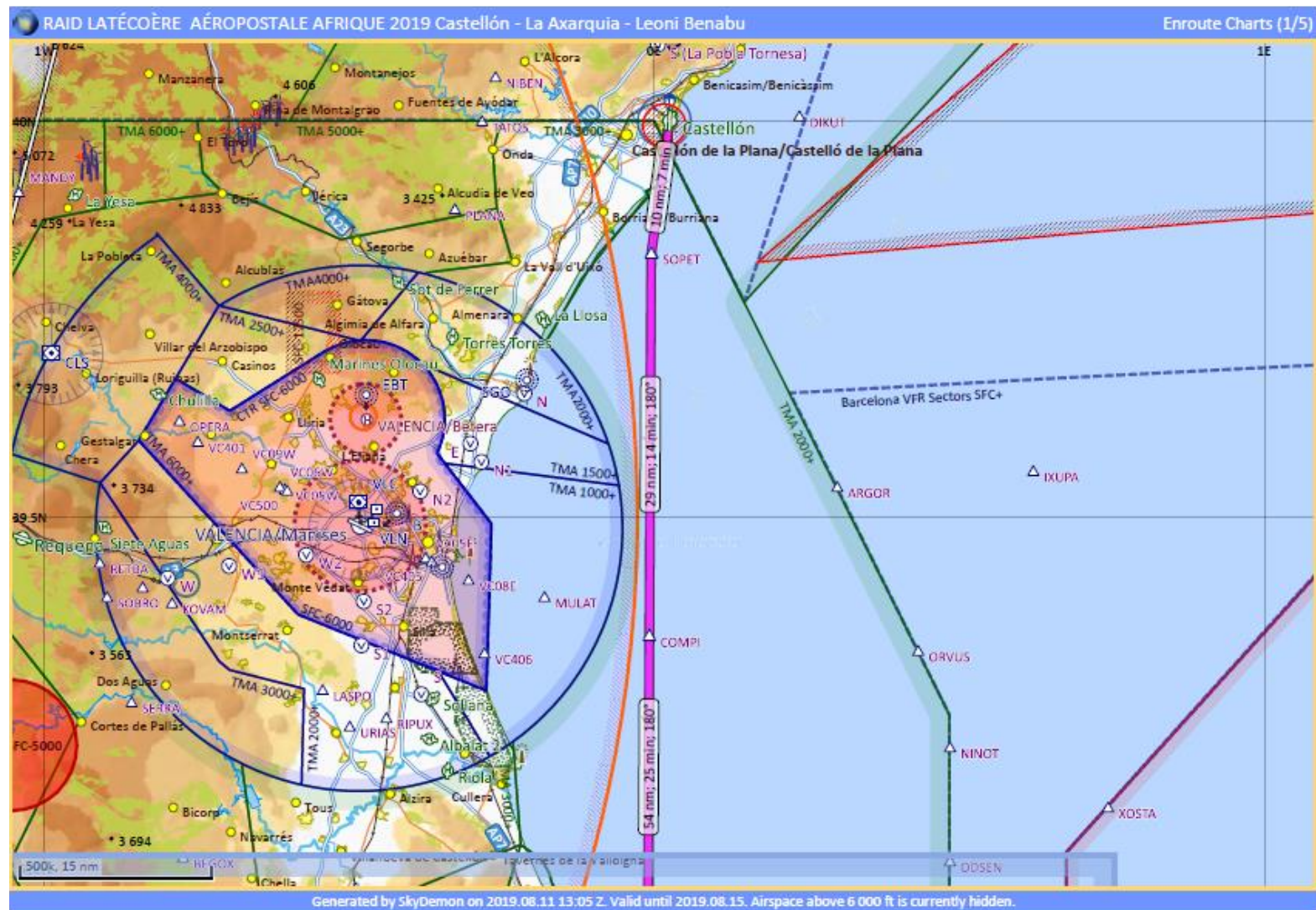
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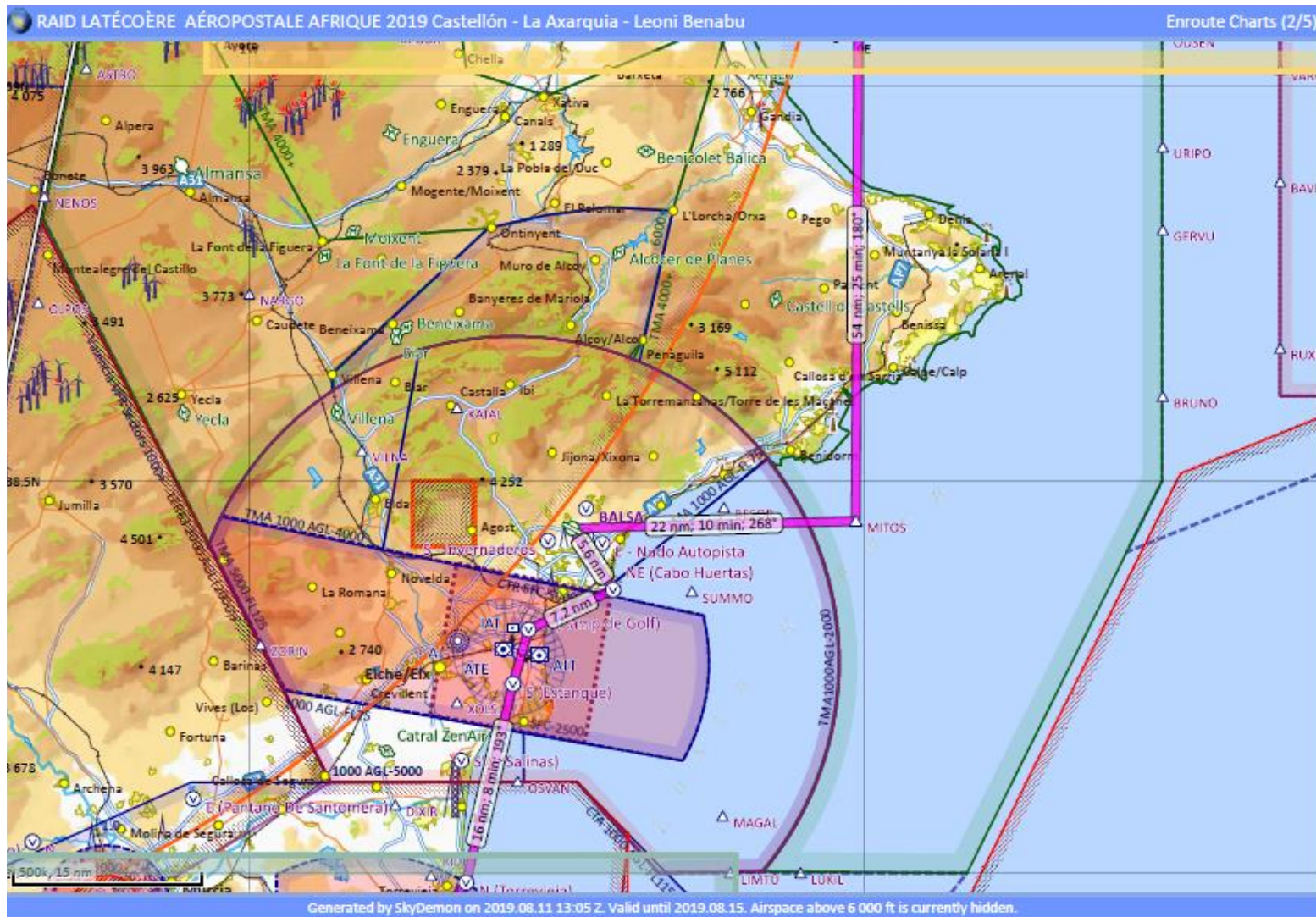


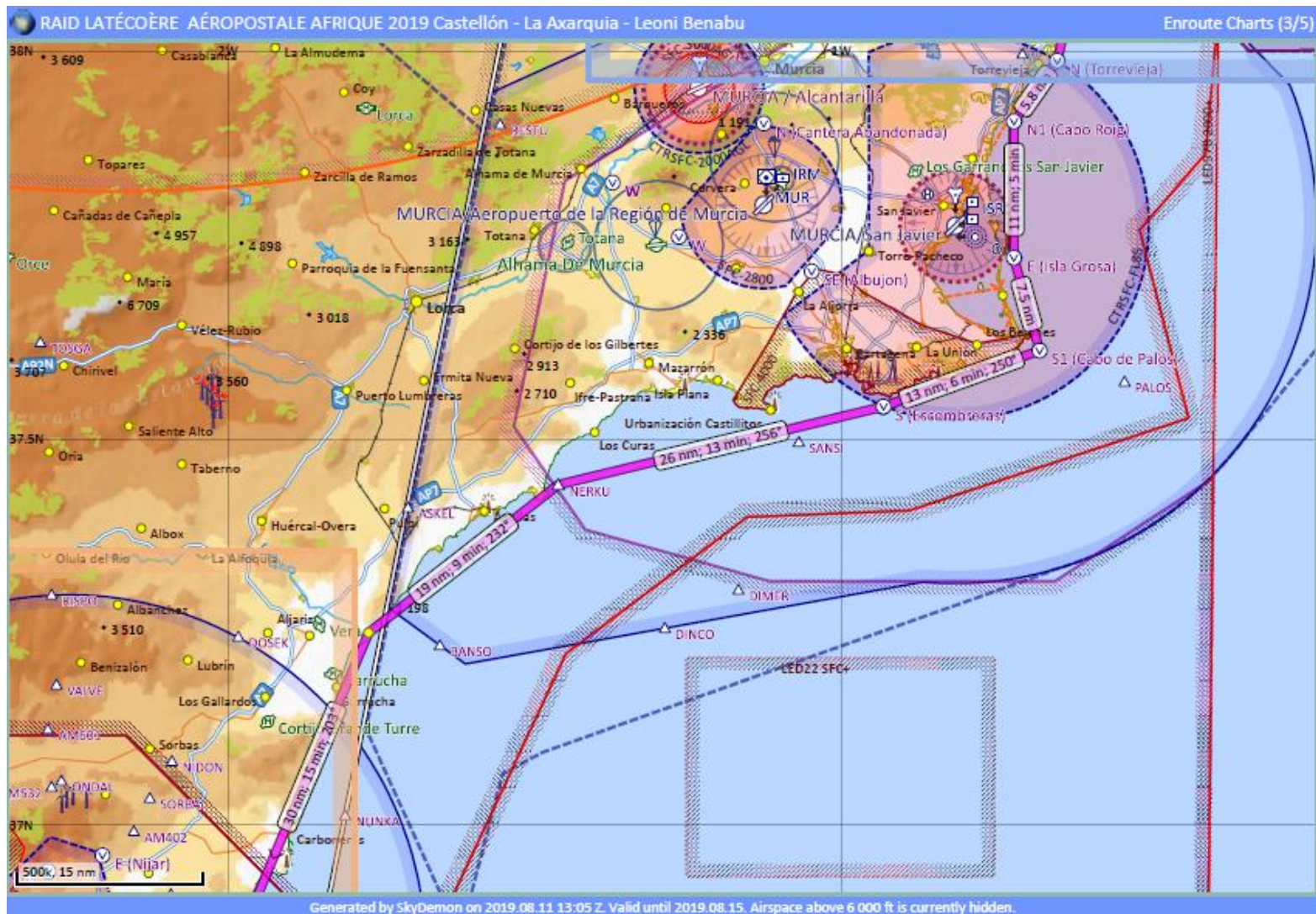
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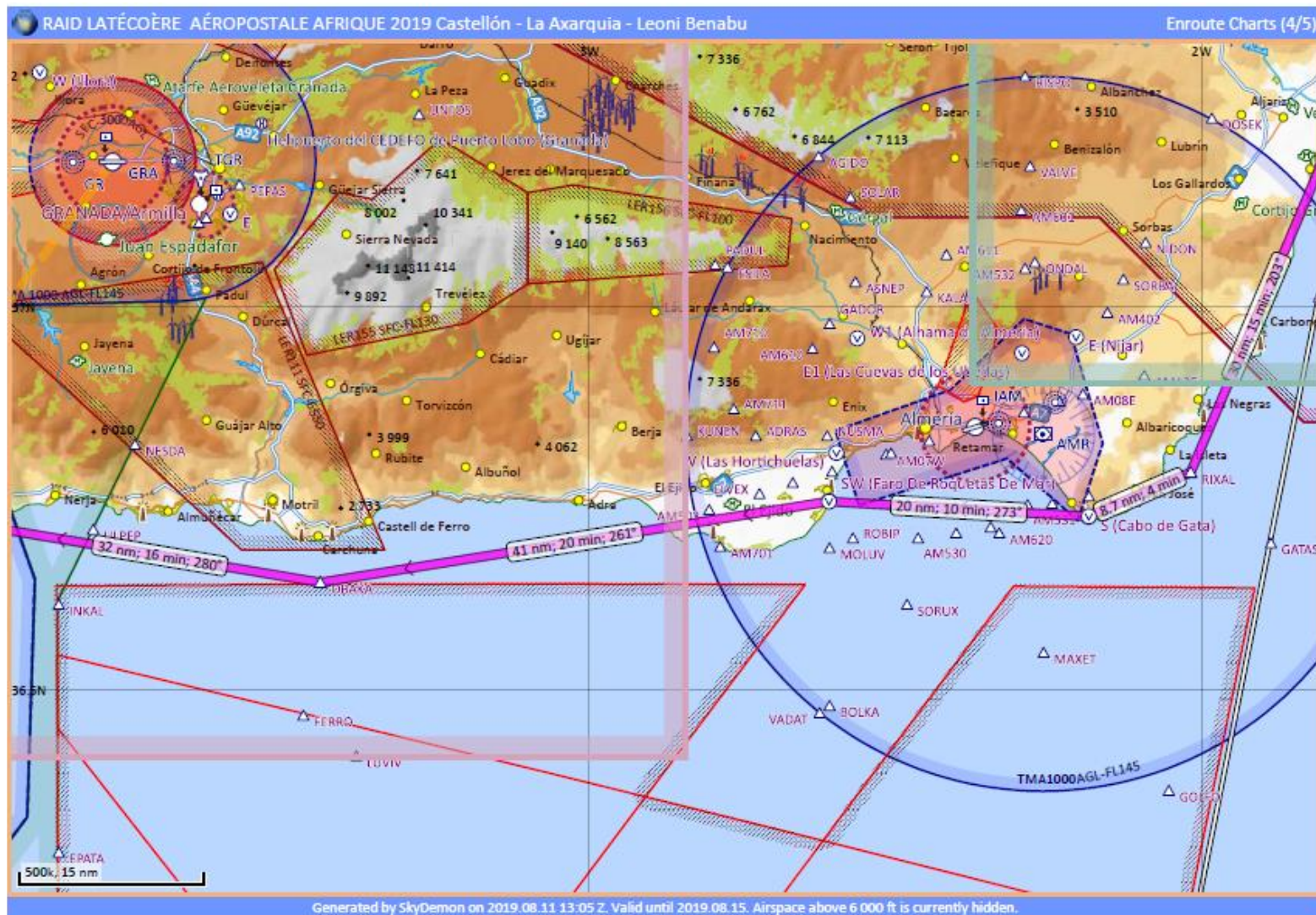
RAID LATÉCOÈRE AÉROPOSTALE AFRIQUE 2019 Castellón - La Axarquía - Leoni Benabu										PLOG
Villericos										
△ RIXAL	N364704 W0020104	3600	1000	120	203	203				30 (260)
RIXAL										
⊙ S (Cabo de Gata) (LEAM)	N364337 W0021103	2100	1000	120	247	247				8.7 (268)
S (Cabo de Gata) (LEAM)										
⊙ SW (Faro De Roquetas De Mar) (LEAM)	N364447 W0023629	1700	1000	120	273	273				20 (289)
SW (Faro De Roquetas De Mar) (LEAM)										
△ OBAKA	N363826 W0032618	2200	1000	120	261	261				41 (329)
OBAKA										
⊙ PTM Torre del Mar	N364346 W0040606	2300	1000	120	279	280				32 (362)
PTM Torre del Mar										
LEAX La Axarquía - Leoni Benabu	N364806 W0040808	2800	1000	120	339	340				4.6 (366)
LEAX La Axarquía - Leoni Benabu										
LEGR Granada Federico García Lorca. Granada-Jaén	N371119 W0034638	7300	4500	120	036	037				29 (395)
Elevation 128 ft (3 hPa)										366
SS 18:24 Z, ECT 18:30 Z										
LECN Castellón	Alicante CTR			Vera	130.125		La Axarquía - Leoni Benabu	123.500		
Castellón Radio	123.500	Valencia Approach	119.075	Cortijo Grande Turre			Sevilla TMA			
Valencia TMA		LEAL ALICANTE-Elche		Cortijo Grande Turre	123.500		Sevilla Approach	120.800		
Valencia approach	120.100	ATIS	120.080	LEAM Almería			LEGR Granada Federico García Lorca. Granada-Jaén			
La Llosa		Alicante Tower	118.155	Almería Approach	118.350		Granada Tower	118.850		
La Llosa	130.100	Murcia/San Javier CTR		Almería CTR			Atarfe Aeroveleta Granada			
Valencia TMA		San Javier Approach	130.300	Almería Tower	118.350					
Valencia approach	120.400	LELC MURCIA/San Javier		Malaga VFR Sectors						
LEMU Muchamiel		San Javier Approach	130.300	Málaga Approach	118.455					
Mutxamel Radio	123.500	Vera		LEAX La Axarquía - Leoni Benabu						
ATE (Alicante)	114.650	ALT (Altet)	113.800	AMR (Almería)	114.100		GRD (Granada)	109.300		
IAT (Alicante)	110.300	VSJ (Murcia San Javier)	113.000	GDA (Granada)	113.400		GR (Granada Oeste)	285.0		

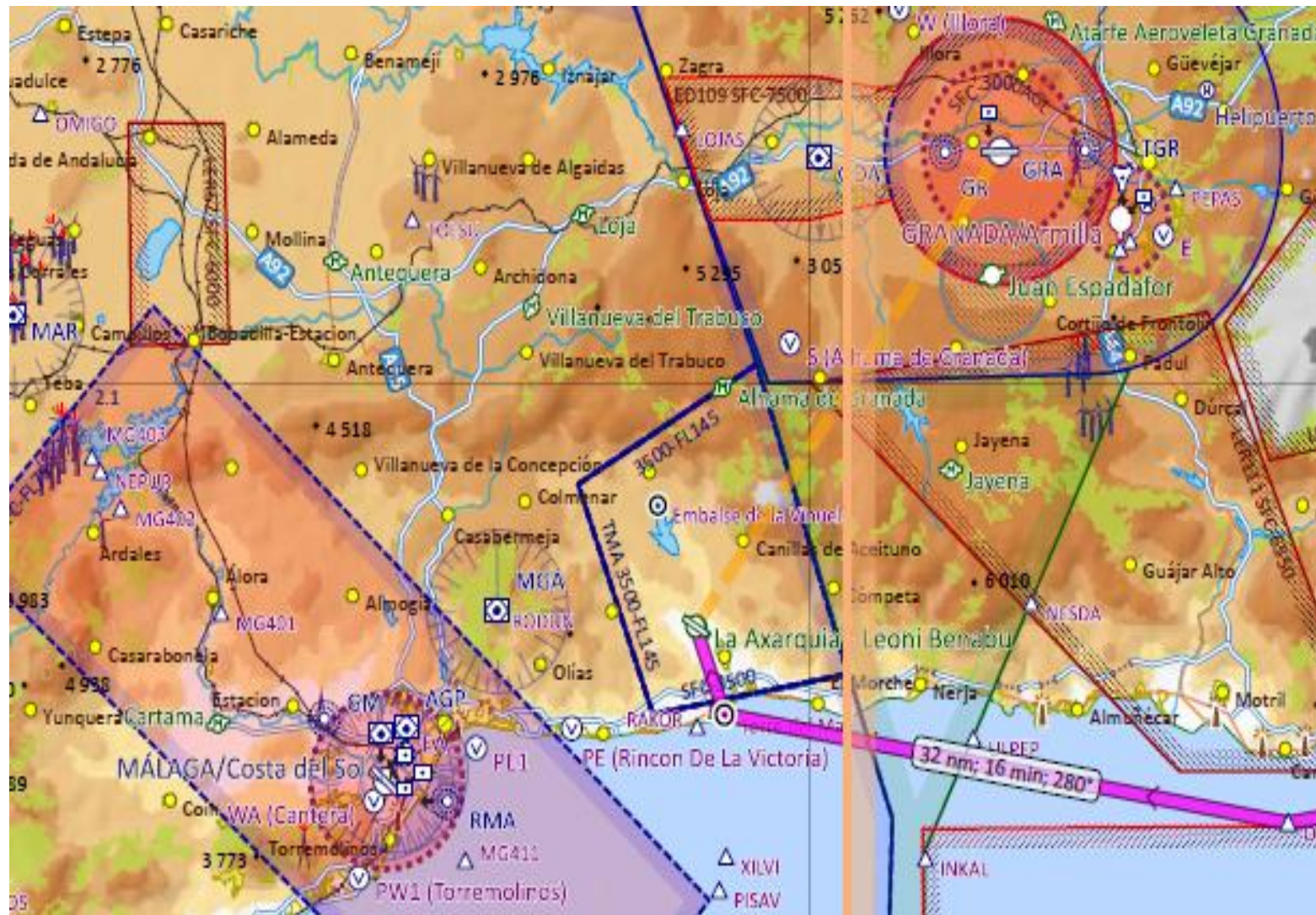
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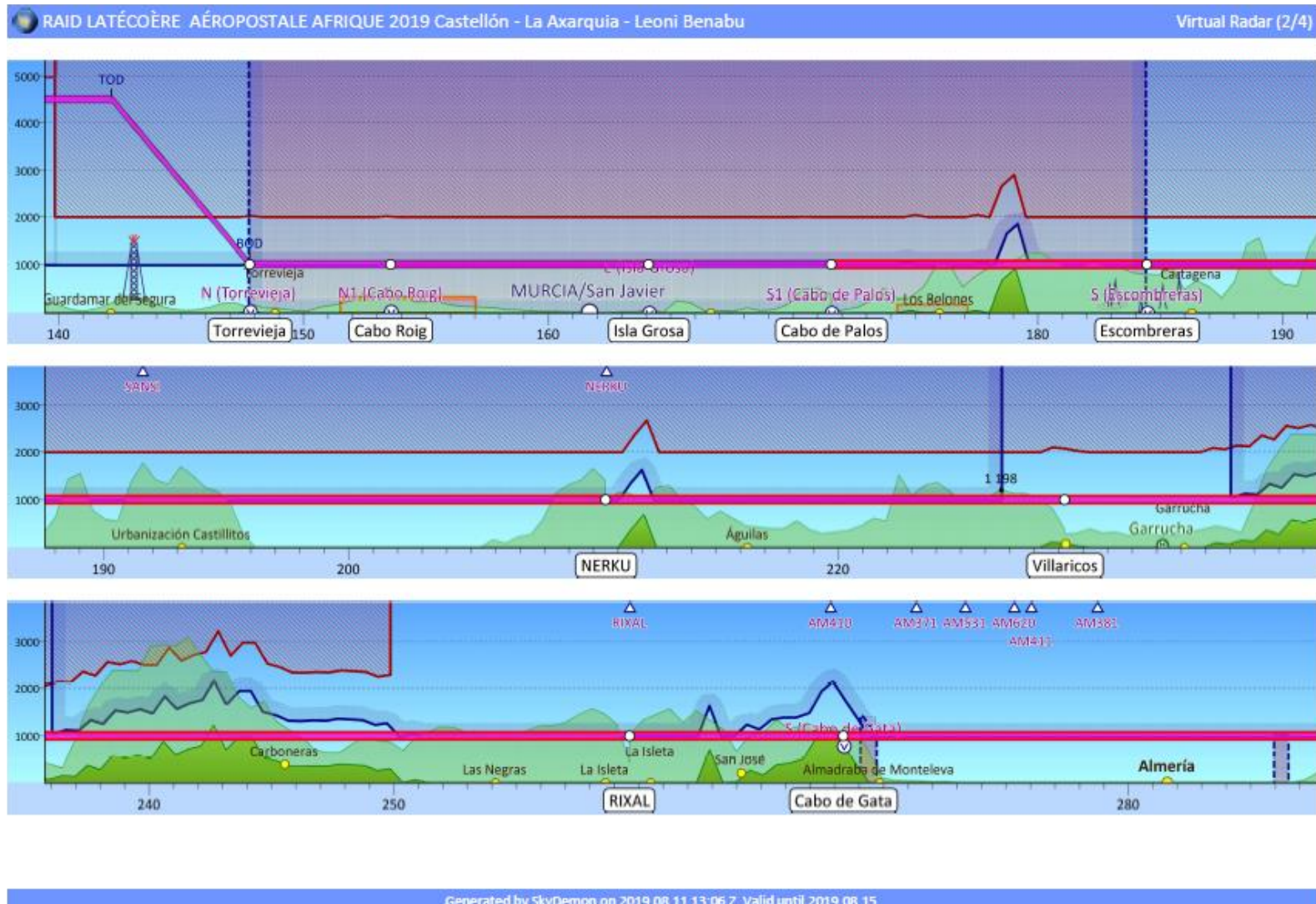




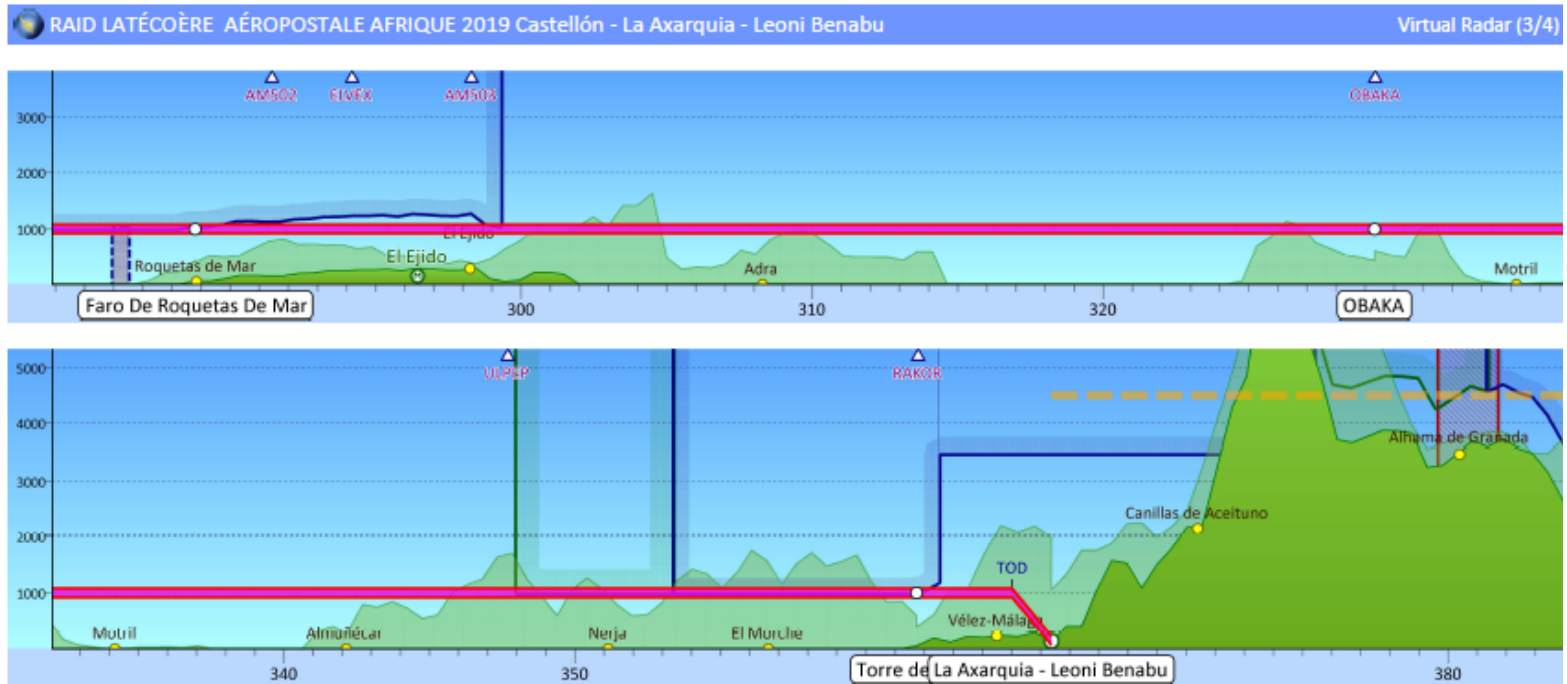












## ANNEX 5: INFORMATION PROVIDED BY THE ORGANIZERS FOR THE STAGE

According to the organizers, the following information was provided orally during the information briefing that began at 13:25:

### 1 – Weather information:

- Overall weather situation. Confirmation of unfavorable weather inland, and therefore of change in final destination for that day: Mutxamel aerodrome instead of La Axarquia aerodrome.
- Weather situation at the aerodrome of El Pinar de Castellon. Since no official weather information was available, they used the information (METAR and TAF<sup>32</sup>) for the nearby Castellon airport (LECH). Both METARs described practically the same weather conditions, including:
  - Wind from 020° at 12 knots, varying in direction from 340° to 060°.
  - Visibility over 10 km, no clouds below the reference altitude, CAVOK and no towering cumulonimbus or cumulus clouds.
- Weather conditions at the Valencia airport (LEVC)<sup>33</sup> according to the 11:30 UTC (13:30 local) METAR:
  - Wind from 040° at 10 knots, varying in direction from 010° to 090°.
  - Visibility over 10 km. Few clouds at 2000 ft. Broken skies at 3300 ft.
- Weather conditions at the Mutxamel aerodrome. No official weather information available, but the operations office at the aerodrome was called, which confirmed that the weather was the same as at the Alicante airport (LEAL)<sup>34</sup>. According to the 11:30 UTC (13:30 local) METAR:
  - Wind from 070° at 14 knots.
  - Visibility over 10 km. Few clouds at 3000 ft.

The TAFOR for 12:00 UTC to 15:00 UTC forecast wind from 070° at 15 kt, gusting to 25 kt.

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<sup>32</sup> METAR LECH 151130Z AUTO 02012KT 340V060 CAVOK 24/17 Q1022=  
METAR LECH 151100Z AUTO 02011KT 340V060 9999 NCD 24/16 Q1022=  
TAF LECH 151100Z 1512/1612 04010KT 9999 BKN028 TX24/1513Z TN18/1606Z TEMPO 1521/1608 BKN014 PROB30 TEMPO 1521/1608 4000 BR=

<sup>33</sup> METAR LEVC 151130Z 04010KT 010V090 9999 FEW020 BKN033 27/19 Q1020 NOSIG=  
METAR LEVC 151100Z 04014KT 020V080 9999 FEW020 BKN035 26/18 Q1021 NOSIG=  
TAF LEVC 151100Z 1512/1612 05012KT 9999 SCT025 SCT040 TX25/1512Z TN20/1606Z BECMG 1521/1524 VRB04KT=

<sup>34</sup> METAR LEAL 151130Z 07014KT 9999 FEW030 27/21 Q1018 NOSIG=  
METAR LEAL 151100Z 07012KT 050V110 9999 SCT030 28/21 Q1018 NOSIG=  
TAF LEAL 151100Z 1512/1612 06012KT 9999 FEW030 TX29/1512Z TN20/1606Z TEMPO 1512/1515 07015G25KT BECMG 1517/1520 30005KT BECMG 1609/1611 11010KT=

### 2 – NOTAM information (Rocketroute):

There were no active NOTAMs for departures from the Castellon aerodrome (LECN) or for arrivals at the Mutxamel aerodrome (LEMU).

For the alternate airport of Alicante (LEAL), there was one NOTAM<sup>35</sup>, informing of cards AD2-LEAL VAC 1.1 (effective date of 28 March 2019) and AD2-LEAL VAC 2.1 (effective date 20 June 2019) and of the GMC frequency.

For the routes in the Barcelona FIR<sup>36</sup>, it advised of a skydiving exercise from 1 to 30 September from sunrise to sunset within a 2 NM radius of point 400000 N 0000100 E of El Pinar, Castellon.

It also advised of an area that was temporarily restricted for unmanned vehicles (whose lateral limits coincided with LED66 in Agost, Alicante) from 5 August until 26 September at specific times.

Lastly, it also informed of skydiving exercises from 1 July until 30 September from 08:00 UTC until sunset in the area of Santa Pola, in Alicante.

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<sup>35</sup> ALTERNATE AIRPORT 1 LEAL/ALC (ALICANTE, SPAIN) UTC +01:00  
B) 05 JUL 2019 11:06 C) PERM  
E) REF AD 2-LEAL VAC 1.1 (WEF 28-MAR-19) AND AD 2-LEAL VAC 2.1 (WEF 20-JUN- 19) FREQ GMC:  
WHERE IT SAYS: 120.080 IT MUST SAY: 130.655 C  
A3972/19 NOTAMN

<sup>36</sup> Q) LECB/QWPLW/IV/M/W/000/140/4000N00001E  
B) 01 SEP 2019 05:26 C) 30 SEP 2019 17:44 D) SR-SS  
E) PJE WI 02NM RADIUS OF 400000N 0000100E CASTELLON/EL PINAR  
D2932/19 NOTAMN

Q) LECB/QRTCA/IV/BO/W/000/014/3828N00041W  
B) 05 AUG 2019 07:00 C) 26 SEP 2019 22:00 D) AUG 05-08 0700-1100, AUG 12-13 0700-1100 1400-1700, SEP 03 05 2000-2359, SEP 04 06 13 0000-0300, SEP 11 0700-1100 2000-2359, SEP 12 0000-0300 2000-2359, SEP 23-26 0800-1100 1900-2200  
E) TEMPORARY SEGREGATED AREA FOR UNMANNED AIRCRAFT VEHICLE FLYING ACTIVATED WI 383000N 0004400W, 383000N 0003800W, 382500N 0003800W, 382500N 0004400W (LATERAL LIMITS COINCIDENTAL WITH LED66) ALICANTE/AGOST  
D2439/19 NOTAMN

Q) LECB/QWELW/IV/BO/W/000/006/3813N00031W  
B) 01 JUL 2019 08:00 C) 30 SEP 2019 17:47 D) 0800-SS  
E) AIR EXERCISES OF PARAGLIDERS WI 381335N 0003057W, 381313N 0003054W, 381311N 0003058W, 381259N 0003052W, 381232N 0003048W, 381201N 0003053W, 381201N 0003042W, 381254N 0003028W, 381337N 0003040W ALICANTE/SANTA POLA  
D2160/19 NOTAMN

**3 – Recommended route:**

In light of the weather conditions, the crews were advised to follow the coastline. No specific instructions were given on the altitude to maintain.

**4 – Radiocommunications:**

They were given instructions on the use of radiocommunications, specifying the frequencies and codes for the various control and information centers:

- Frequency of the aerodrome of Pinar de Castellon (LECN): 123.500 MHz
- Frequency of the organization 130.000 MHz
- Frequency of the Valencia TMA 122.100 MHz
- Frequency of the Valencia airport (LEVC)
- Frequency of the Mutxamel aerodrome (LEMU)

**5 – The following hazards were identified for this stage:**

- Change in the flight path of the route.
- Weather situation inland.

## **ANNEX 6: DOCUMENTATION PROVIDED BY THE ORGANIZERS OF THE AIR RALLY**

### **Excerpt from the document "*Consignes d'Exploitation. Escales Africaines. 2019*"**

This document considers aspects such as:

- The organization reserves the right to change the route depending on the weather and operating conditions at the time. The itinerary is obligatory for all participants<sup>37</sup>. The pilot must inform the organization if he deviates from the route.
- The aircraft will fly together in groups of 10 to 15 airplanes behind a group leader. Section 1.18 details the sequence in which the airplanes took off on the day of the accident.
- Every day, once that day's flight is over, an information briefing is held for the next day's stage, where crews are informed of the weather forecast and the departure sequence of the aircraft. All pilots in command must be present at every information briefing, as verified by signing an attendance sheet. After these meetings, the crews must individually prepare for the next day's stage.
- Before takeoff, at the time specified in the previous day's information briefing, each group leader conducts a readjustment session (schedule, weather, departure instructions) with the pilots in his group. This information briefing complements the one from the previous day.
- The flights will take place under VFR or special VFR rules.
- The pilot is responsible for the operation of his aircraft and for complying with regulations at all times. Specifically, crews must be very vigilant to avoid collisions, considering the large number of airplanes in a limited airspace, and apply strict radio discipline (brief and precise messages that limited to essential communications). Any pilot diverting from the route shall, after ensuring the safe operation of his airplane, use any method to inform the organizers (air rally frequency preferred), which shall take the measures necessary to help.
- The aircraft taking part in the "Raid Latécoère – Aéropostale" air rally must observe all applicable regulations in the airspace they cross. Consequently, pilots in command must set up the regulatory radio links with air traffic control services, especially when entering an airspace is subject to authorization. However, protocols have been set up with certain organizations that replace the applicable regulations only in the context of "Raid Latécoère – Aéropostale" flights to limit radio contact and not saturate the frequencies.

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<sup>37</sup> A few weeks before the air rally began, the organization gave the participants the "GPX" files of the proposed routes.

Radio contact with flight information services must be avoided so as not to saturate these frequencies. The group leader will communicate with the service in question and, if necessary, relay the information on the air rally frequency.

- Not every aerodrome in the air rally has aviation fuel for light aircraft, especially in Western Africa. Therefore, the organization's ground operations staff will place an order with a supplier before the stage to have 200-liter AVGAS barrels available, based on the consumption forecasts reported by the crews on the sheet provided for this purpose.

### **Excerpt from the document "*Consignes de Securite. Escales Africaines. 2019*"**

The following points were taken from this other document:

- Sensory illusions. Physiological disruptions when flying in clouds, with few or no external visual references due to low visibility, can lead to dangerous situations. Pilots must be cognizant of the fact that these are natural phenomena. To avoid their consequences, pilots with little or no experience in zero-visibility flying must inform the organizers of this so that the necessary measures can be taken.
- General rules for writing flight instructions. Flight instructions must not require pilots to interpret them in order to understand them. In particular, the phases of flight affected by specific or exceptional instructions should not be subject to any possible interpretation.
- Distribution of flight instructions:
  - The documentation is distributed the month before the air rally starts.
  - General information briefing the day before the air rally starts to give crews general instructions and remind them of the rules.
  - Every evening, an information briefing is held by the flight leader with specific instructions for the next day's stage.
  - In the morning, before the start of each stage, each group leader goes over these instructions with the pilots in his group.
- Air traffic. The airplanes in the "Raid Latécoère-Aéropostale" do not enjoy specific waivers involving regulatory compliance (SERA, Part NCO, etc.), specifically with regard to entering controlled airspaces, where they are required to comply with regulations except for the special cases duly specified during the information briefings.
- Fuel management. At each information briefing, the organizers may specify the minimum fuel amount before takeoff, in consideration of the various hazards along the route. Therefore, pilots will administer their fuel to comply with this instruction and inform their group leader as soon as possible if unable to comply so it can be factored into the landing sequence. This amount does not replace the regulatory final reserve fuel.

- The voluntary interruption of a flight must be considered when the destination or alternate aerodromes are no longer accessible (degraded weather, shortage of fuel, mechanical problem, sunset, etc.). Pilots will inform the organization of their decision on the air rally frequency.

- Use of the radio:

Radio communication media are work and safety tools. Therefore, all participants are requested to follow the instructions given in the briefings on its use during flights, especially at departure and arrival, either for air traffic control frequencies or frequency of the organization.

The messages will be concise, precise and operative.

As far as possible, routes will be through uncontrolled airspaces. In order not to saturate the flight information frequencies, the crews are requested not to contact these frequencies except in cases of force majeure or immediate danger.

The frequency of the organization of the air rally will be used for communication between aircraft and meteorological, traffic, danger or other information will be transmitted. It is important not to occupy this frequency unnecessarily.

- Weather assistance:

The information sessions will include information on the "weather forecast". The weather conditions that the participants are likely to encounter during the next day's flight will be detailed: current weather conditions, visibility, wind, dangerous phenomena.

The organization uses the data provided by the national agencies of the countries flown over (METEOFRACTANCE, AEMET, MOROCCO METEO, ANACIM) and transmitted by the various public or private aeronautical flight preparation services.

- The organization of the air rally will transmit the meteorological records to the crews in a computerized manner. The pilots must verify the content of these records and report any anomaly to the organization to inform all participants.

**ANNEX 7: TRANSPONDER CODES ASIGNED BY ENAIRE**

According to the organizers of the air rally, ENAIRE assigned the next transponder codes to aircraft. In particular, the accident aircraft was assigned the transponder code 7060.

Raid Latécoère-Aéropostale -Afrique 2018

Codes transponder

Ouvreur 1	Type	Immatricu	VP	l/h	Fuel (l)	Essence	MTOW (kg)
	C182	FBPIU	120	50	234	AVGAS	1400

Vague Laté Alpha

A1	C182	FGHEO	140	60	330	AVGAS	7363
A2	SR22	FHAVG	160	60	343	AVGAS	7060
A3	SR22	FHAMP	160	58	343	AVGAS	
A4	C206	N578TD	140	60	330	AVGAS	7042
A5	MCRD1	FPURU	130	15	80	AVGAS	7034
A6	DA40	FHOBB	125	25	106	JETA1	7056
A7	C182T	FHFBD	125	50	330	AVGAS	7035
A8	VAN5 RV9	FPARG	120	23	136	AVGAS	7075
A9	C172	FGAAD	120	38	240	AVGAS	7024

Vague Laté Bravo

B1	PA28	HBOQN	130	41	182	AVGAS	7077
B2	DR400-180	FGUXO	120	38	190	AVGAS	7377
B3	DA40	FGSDE	120	21	113	JETA1	7087
B4	DA40	FGUVC	120	21	113	JETA1	7063
B5	DR400-180	FGLVO	120	40	190	AVGAS	7357
B6	TC160	FPJRG	115	36	201	AVGAS	7372
B7	TB10	HBEYX	115	40	204	AVGAS	7073
B8	DR400-160	FHEAA	110	35	190	AVGAS	7376
B9	PA28	GERNI	110	38	190	AVGAS	7022
B10	TB10	FHSBT	110	40	204	AVGAS	7039

Vague Laté Charlie

C1	DR400-180	FGSRT	120	38	190	AVGAS	7015
C2	DR400-160	FGTPJ	115	30	165	AVGAS	7065
C3	Polaris	FJXRL	110	15	72	AVGAS	7047
C4	A32	FJDUU	110	17	93	AVGAS	7365
C5	SKYLANE	FJVAL	105	12	84	AVGAS	7031
C6	DR400-160	FGNPJ	100	32	160	AVGAS	7011
C7	PS28	FHSAF	100	20	114	AVGAS	7069
C8	DR400	FGKQK	100	28	110	AVGAS	
C9	C172	FGTDE	100	35	182	AVGAS	7023
C10	PA28	FGGLL	115	21	106	JETA1	7021

RC SAF

7060 / 3500 ft