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SAFETY INVESTIGATION REPORT

Accident to the class 3 JMB AIRCRAFT VL-3-A identified **59DUJ** on 19 June 2020 at Mortemer

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Égalité
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SAFETY INVESTIGATIONS

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SPECIAL FOREWORD TO ENGLISH EDITION

This is a courtesy translation by the BEA of the Final Report on the Safety Investigation. As accurate as the translation may be, the original text in French is the work of reference.

CONTENTS

GLOSSARY

Abbreviations	English version
ACC	Area Control Centre
ADAHRS	Air Data/Attitude/Heading Reference System
AMC	Acceptable Means of Compliance
ANS	Air Navigation Service provider
BKN	BroKeN (clouds)
BTIV	Telecommunications and flight information unit
BULMF	Belgian microlight federation
CAVOK	Ceiling And Visibility OK
CVR	Cockpit Voice Recorder
DGTA	French air transport directorate
DSNA	French air navigation service provider
EASA	European Aviation Safety Agency
EFIS	Electronic Flight Instrument System
EMS	Engine Monitoring System
FDR	Flight Data Recorder
FEW	FEW (clouds)
FFPLUM	French powered microlight glider federation
FIC	Flight Information Centre
FIR	Flight Information Region
FIS	Flight Information Sector
FL	Flight Level
ft	Feet
GM	Guidance Material
ICAO	International Civil Aviation Organization
ICNA	Air traffic control engineer
IFR	Instrument Flight Rules
kt	Knots
LoA	Letter of Agreement
METAR	Aerodrome routine meteorological report
NM	Nautical Mile
NOTAM	NOtice To AirMen
OLIVIA	Flight planning and filing, accessing aeronautical data tool
PFD	Primary Flight Display
QNH	Atmospheric pressure at sea level
RCA	Air traffic regulation
RPM	Revolution Per Minute
SB	Service Bulletin
SERA	Standardised European Rules of the Air

Abbreviations	English version
SIGMA	Surface movement guidance and control system
SIGWX	Significant weather chart
TAF	Terminal Area Forecast
TCU	Tower Cumulus
TMA	Terminal Manoeuvring Area
TSEEAC	Senior civil aviation technician
UTC	Universal Time Coordinated
VFR	Visual Flight Rules
VOR	VHF Omnidirectional Range

SYNOPSIS

Time	At 11:22[1]
Operator	Private
Type of flight	Cross country
Persons on board	Pilot and passenger
Consequences and damage	Pilot and passenger fatally injured, microlight destroyed

Loss of control en route, collision with ground

The pilot and passenger had planned to fly to Figeac-Livernon aerodrome to visit the passenger's parents and prepare the organisation of future group cross-country flights in the region. The day preceding the day of the accident, the crew had postponed the flight due to adverse meteorological conditions.

The day of the accident, a flight plan was filed for a cruise altitude of 3,000 ft with the route passing via the Abbeville and Rouen VORs. Just before departing, the pilot told a witness that he was going to try and fly on top of the clouds that were straight ahead in the distance.

On crossing the border and on first radio contact with the Lille Air Navigation Service (ANS) which manages the Lille Flight Information Sector (FIS), 59DUJ was at an altitude of 3,500 ft. At this point, the pilot asked the controller several times for clearance to climb to avoid clouds on his route. The highest level reached was FL 080 which is usually reserved for IFR flights.

Shortly after flying over the Abbeville VOR, the pilot progressively turned left, changing direction by around 20°. He probably wanted to avoid the cloud front that was on his right. Once established on this new route, he was around 15 NM from the Paris Terminal Manoeuvring Area 7 (TMA), class A airspace prohibited to VFR flights above FL 065.

Soon after, the Lille controller asked the pilot of 59DUJ to contact the Paris Info Flight Information Centre (FIC) without having first coordinated with the latter. The radar blip for 59DUJ was only displayed on the screen of the Paris FIC agent three minutes after first contact with the FIC due to the pilot having initially made an error when squawking the transponder code. This error could be explained by the heavy workload from having to skirt around cloud masses. When the radar blip appeared on the screen of the FIC agent, 59DUJ was in class G airspace at FL 080, around one flight minute from entering TMA 7.

The FIC agent repeatedly ordered the pilot to turn right in order to join the area where the TMA lower limit was FL 085 (TMA 9) and asked him not to descend.

The pilot did not mention that he could not turn right because of the cloud front. He initially turned left and entered the class A area by around 500 m inside the limit. The FIC agent was focused on the pilot avoiding TMA 7 by the west. The pilot for his part then reduced his speed, descended and started piloting manually in order to then continue his route below FL 065 and TMA 7, announcing this over the radio. The tight turns in descent suggest that the pilot might

[1] Except where otherwise indicated, the times in this report are given in local time.

have wanted to spiral in an opening in the cloud layer while trying not to continue manoeuvring inside the class A area. He performed two right-hand turns in a globally descending trajectory which resulted in him exiting TMA 7 and then entering it again.

Then during a left turn with a bank angle of 49° and an indicated airspeed of 73 kt, the microlight reached the stall angle and the pilot lost control of the aircraft. The pilot, aware they were falling, was unable to regain control of the microlight. The airframe parachute was not activated before the collision with the ground.

It was not possible to determine if, during the descent to avoid the TMA, the microlight entered the cloud layer.

The BEA has issued one safety recommendation with respect to the organisation of the flight information service and assistance for VFR flights in difficulty in France.

1. FACTUAL INFORMATION

1.1. History of the flight

Note: the following information is principally based on the data recorded by the onboard equipment, statements and radio communication recordings. All of the radio exchanges between the pilot and the Lille and Paris Air Navigation Services (ANS) were in English.

At 10:29, the pilot in the left seat, accompanied by a passenger in the right seat, took off from Kortrijk-Wevelgem airport (Belgium) bound for Blois-Le Breuil aerodrome (Loir-et-Cher) on a VFR flight plan with the radio call sign F-JDMB (see **Figure 1**, point 1). The crew planned to stop at Blois-Le Breuil before continuing to their destination, Figeac-Livernon aerodrome, where the family of the passenger was waiting for them.

At 10:32:18, the pilot contacted the Lille unit on the FIS2/Approach frequency[2] 120,275 MHz indicating that he was at 3,500 ft and was entering the Flight Information Region (FIR)[3]. The controller assigned him the squawk code 6100 and approved the transit at 3,500 ft.

At 10:34:39, the pilot requested clearance to climb to flight level FL 065[4] due to clouds (point 2). The controller asked him to call back when he was steady. 59DUJ entered part 1 of the Lille FIS (FIS 1) in class G airspace.

At 10:40:10, 59DUJ entered class D controlled airspace, geographically included in FIS 1.

At 10:40:40, when he had been flying at an altitude of between 6,500 ft and 6,700 ft for three minutes, the pilotasked for clearance to climb to FL 075 (point 3), which was approved by the Lille controller.

At 10:42:02, the pilot indicated that he had reached FL 075 and the controller acknowledged this (point 4). He entered FIS 2. For around four minutes, the altitude fluctuated between 7,400 and 7,900 ft before stabilising at 7,500 ft QNH. Then at 10:46:24, the autopilot was engaged.

At 10:54:23, when 59DUJ was exiting the class D airspace, the pilot asked for clearance to climb to FL 080 due to clouds (point 5). The controller asked him to confirm FL 080 and then approved[5] the climb which was carried out with the autopilot disengaged.

One minute later, the microlight was at an altitude of 8,000 ft. In the following four minutes, the altitude fluctuated between 7,800 ft and 8,200 ft with the autopilot engaged and then disengaged several times.

At 10:59:17, the autopilot was engaged again.

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[2] At Lille, for each FIS, the FIS contact frequency mentioned on the aeronautical charts corresponds to an approach frequency.

[3] The entry into the PARIS FIR corresponds to the crossing of the French frontier.

[4] The altimeter setting displayed by the pilot on his altimeter was 1016 hPa from the beginning of the flight until 11:10, at which point he displayed 1013 hPa.

[5] As at this point 59DUJ was flying in class G airspace, there is no regulatory requirement for the controller to approve a change in altitude.

At 11:06, while the aircraft was flying over VOR ABB (Abbeville) at an altitude of 8,000 ft and an average indicated airspeed of 125 kt, the pilot progressively turned left using the autopilot HDG mode (point 6). In total, after five minutes, he altered his course by around 20° to the left. This put him on a route towards Paris TMA 7, class A airspace prohibited to VFR flights and whose lower limit is FL 065.

At the same time, at 11:10:48, the pilot selected the standard setting of 1013 hPa, he was at FL 080, in radio contact with Lille FIS 2 and 16 NM from Paris TMA 7.

At 11:11:42, when 59DUJ was at 8.8 NM before exiting the Lille FIS, the Lille controller asked the pilot to display squawk code 7000 and to contact the Paris Information FIC[6] (point 7). She did not inform the FIC of the arrival of 59DUJ. The passenger of 59DUJ read back the message. At 11:12:22, the passenger contacted Paris Information. The FIC agent asked her to give him the departure and destination aerodromes. The pilot took back the radio and gave this information along with the flight altitude of 8,000 ft at QNH 1013. At 11:13:19, the FIC agent assigned him the squawk code 7012.

Twenty one seconds later, the pilot disengaged the autopilot, altered his route by 14° to the right and then turned left to return to his initial route (205°). During the left turn, the autopilot was re-engaged and the pilot entered code 7102 by mistake on his transponder which meant that it was not displayed on the FIC agent's screen[7].

At 11:15:50, the pilot turned right again by 8° and held a route 213°. 59DUJ exited Lille FIS and entered the Paris FIS, still in class G uncontrolled airspace.

At 11:16:30, the autopilot was disengaged and remained so until the end of the flight.

The pilot then climbed to FL 083 and carried out several left and right turns with heading changes of up to 30°.

At 11:16:39, the FIC agent asked the pilot to confirm that he had indeed displayed code 7012. The pilot replied that the code was coming now.
At 11:17:03, the FIC agent told the pilot that he had him "*in sight*"[8] and that due to his altitude, it was difficult to have a "*radar identify*". The pilot replied that he was now at 8,100 ft QNH 1013.

At 11:17:22, the DSNA secondary radars acquired code 7012 of 59DUJ and the associated label was then displayed on the FIC agent's screen.

[6] The Paris FIC is also a flight information service centred over the Paris region.
[7] Only the squawk codes between 7010 and 7020 are displayed on the Paris FIC agent's screen.
[8] The term "*in sight*" used by the FIC agent was inappropriate, especially as code 7012 had not yet been transmitted by the transponder of 59DUJ and the FIC agent probably could not see 59DUJ on his radar screen at this time.

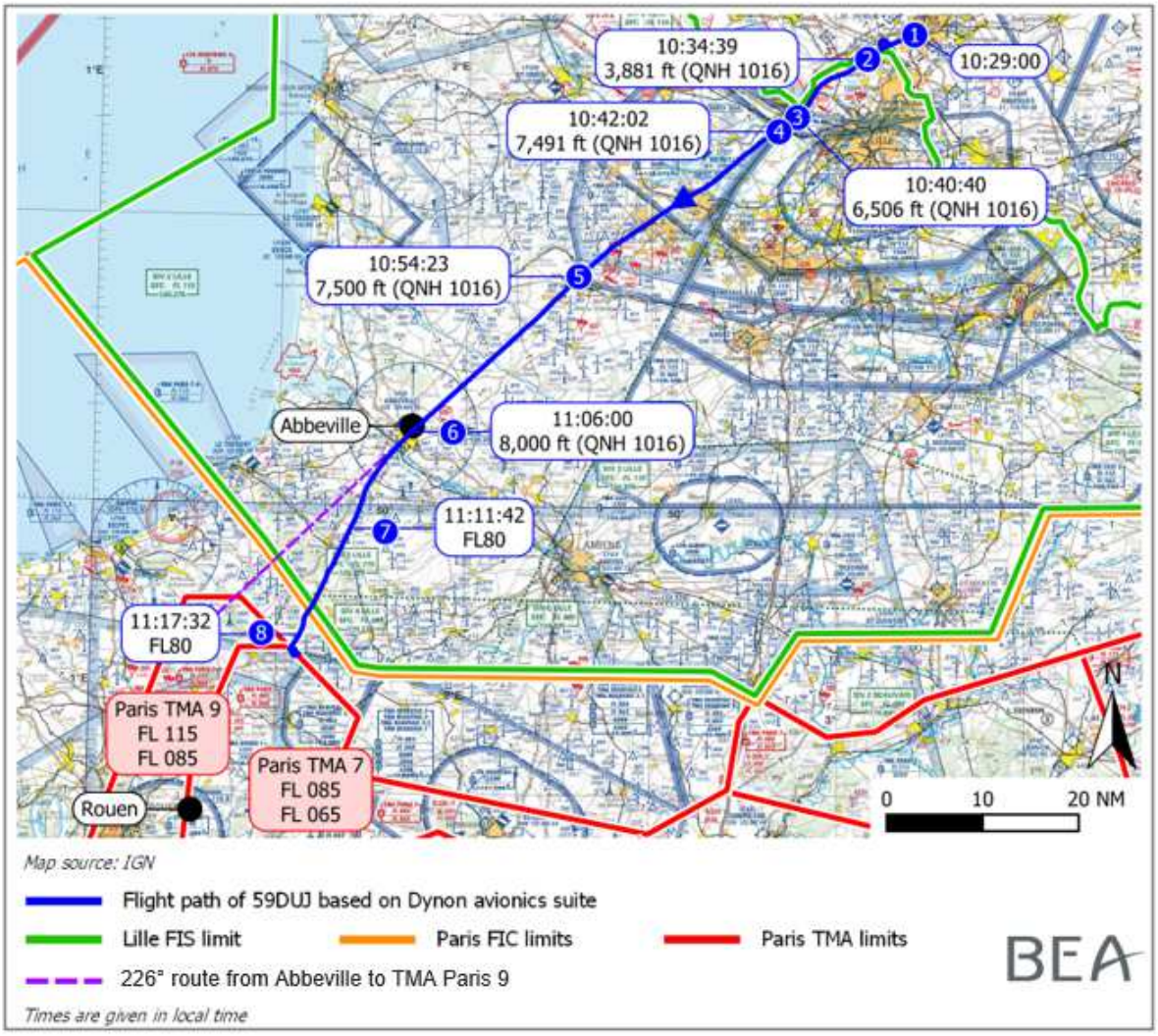


Figure 1: overall flight path of 59DUJ

At 11:17:32, although 59DUJ had redescended to FL 080, the FIC agent told the pilot he had him in sight[9] and that ahead of him there was a flight level area maximum FL 065[10]. He asked him to turn right now (point 8). The pilot replied that he would descend.

The FIC agent asked him not to descend but to turn right now as he had entered the "*class area*"[11]. The pilot replied that he would do that.

At 11:17:59, the FIC agent repeated for the third time that the pilot was to turn right now.

59DUJ held its heading. At 18:18:10, the engine speed progressively decreased from 5,100 RPM to 3,860 RPM.

[9] The FIC agent probably used the term "*in sight*" to indicate to the pilot that he had now identified him on his radar screen. The DSNA specified that the correct term in this case is *identified.*

[10] What the FIC agent really wanted to indicate was that the lower limit of Paris TMA 7 is FL 065.

[11]The FIC agent probably wanted to indicate that Paris TMA 7 was a class A area.

226° route from Abbeville to TMA Paris 9

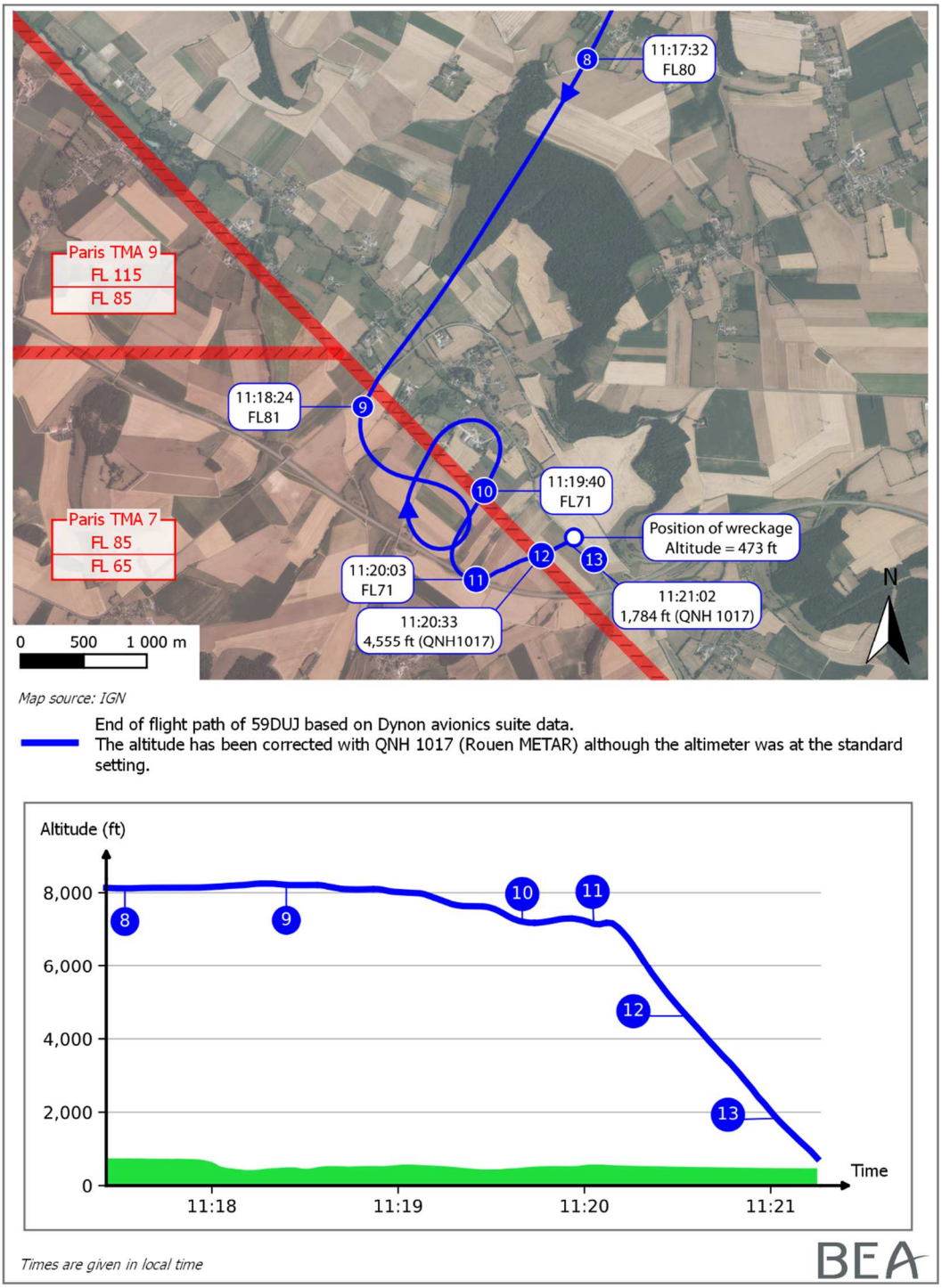


Figure 2: zoom on flight path with vertical profile for end of flight

At 11:18:19, when 59DUJ was at an altitude of around 8,200 ft, the pilot started to descend and turned left. The indicated airspeed which had decreased was 103 kt.

At 11:18:24, the FIC agent called 59DUJ and informed him that he was in an area prohibited for him, that the maximum flight level was FL 065 and repeated that he was to turn right now (see **Figure 2**, point 9). The aircraft continued its left turn onto heading 113° with a bank angle of 35°.

The pilot replied that he was descending. The FIC agent ordered him not to descend and to turn right now.

The pilot replied that he was turning right and carried out two consecutive right-hand turns with bank angles of 40° and 60° respectively. The indicated airspeed had decreased and was oscillating between 85 kt and 100 kt.

At 11:19:40, after the FIC agent had called again, the pilot replied that he was passing through 7,000 ft in descent to FL 065 maximum (point ⑩). The FIC agent suggested that he take magnetic route 280°. 59DUJ continued to fly in a straight line.

The engine speed then decreased to 2,100 RPM before increasing again to 3,400 RPM when the pilot turned left. The aircraft had a bank angle of 35°, a nose-up attitude of 10° and an indicated airspeed of 65 kt. At 11:20, an amber high pitch warning was displayed on the PFD.

At 11:20:03 (point ⑪), when the aircraft had a left bank angle of 49°, a nose-up attitude of 13° and an indicated airspeed of 73 kt, the pitch indicator activated a red stall warning[12], which stayed displayed on the PFD until the end of the flight. The pilot lost control of the aircraft which fell while the right roll quickly increased. The engine speed decreased to 1,600 RPM.

At 11:20:33, as 59DUJ was dropping through an altitude of 4,500 ft with a vertical speed of 5,600 ft/min and a practically zero horizontal speed, the FIC agent told the pilot that with his altitude he could take his route (point ⑫). The pilot did not reply. In the space of five seconds, the engine speed briefly increased to 3,900 RPM and then descended to 2,600 RPM before holding at an average value of 1,300 RPM. The FIC agent called 59DUJ a first time without success.

At 11:20:57, the FIC agent repeated his call. The pilot twice replied that they were falling. 59DUJ was then at an altitude of about 2,270 ft with a rate of sink of around 5,800 ft/ min. Five seconds later, at an altitude of around 1,740 ft, the recorded parameters showed an engine shutdown (point ⑬).

The pilot repeated that they were falling. The vertical speed was close to -4,800 ft/min. The microlight collided with the ground a few seconds later.

1.2. Injuries to persons

The two occupants of the aircraft were fatally injured on impact with the ground.

1.3. Damage to aircraft

The aircraft was destroyed.

1.4. Other damage

Not applicable.

[12] Visual warning message which appears on the PFD. It is normally associated with an aural warning in the pilot's headset. However, it was not possible to establish with certainty the activation of this aural warning (see paragraph 1.16).

1.5. Personnel information

1.5.1. Persons on board

1.5.1.1. Pilot

Male, aged 73, of Belgian nationality.

- Licence

The pilot held a pilot licence for fixed-wing microlights issued by the Belgian authorities in 2002 and valid until 31 July 2020. He also held a (microlight) class 4 medical certificate[13] valid until 18 June 2021.

This licence included a microlight instructor rating valid until 31 July 2020.

Parallel to this, the pilot held a microlight pilot licence issued by the French authorities allowing him to pilot 59DUJ registered in France. This licence was obtained in 2006 and included the fixed-wing microlight rating with passenger carrying privileges. There was no mention of an instructor rating.

- Flight experience

The pilot's logbook was not recovered during the investigation.
The excerpt from his logbook appended to his licence renewal request in 2019 indicated that at 10 May 2019, he had a total experience of 3,381 flight hours including 2,433 hours as instructor and 9,311 landings.

- Professional experience

From 1988 onwards, the pilot held management positions in the aeronautic or civil aviation administration sectors. His curriculum vitae provided by the Belgian Civil Aviation Authority (DGTA of the FPS Mobility and Transport) indicated that during his career, he chaired a gliding club, was deputy director of an aerodrome, set up a microlight flying school and exercised management functions in the Belgian Microlight Federation (BULMF) in the field of training and flight safety. He had also set up a partnership with the DGTA for the development of microlight theoretical examination questions, pilot training and an 'Airspace' working group.

The pilot's curriculum vitae showed that he also held a glider pilot licence since 1983 and that he had worked as a glider instructor since 2003.

1.5.1.2. Passenger

Female, aged 33, of Belgium nationality.

- Licence

The passenger held a microlight student pilot authorisation dated 6 October 2017. She held a microlight pilot licence issued on 23 September 2019 by the Belgian authorities, valid until 19 October 2021. Her (microlight) class 4 medical certificate was valid until 27 September 2022.

[13] Unlike France, the Belgian regulations require a medical fitness certificate for certain microlight categories.

The passenger had carried out her initial microlight pilot training between October 2017 and September 2019 in the training school of the pilot of 59DUJ, principally on Lambert Mission type high fixed-wing microlights with the pilot of the occurrence as instructor.

The occurrence flight was her first flight on a VL-3-type low fixed-wing, high-performance microlight.

- Flight experience

No logbook for the passenger was recovered during the investigation.

1.5.2. Air navigation services personnel

Flight Information Centre agent (Paris FIC)
Male, aged 53

The FIC agent on duty at the time of the occurrence had trained as a senior civil aviation technician (TSEEAC). In 2016, he was assigned as an agent to the Paris FIC.

The FIC agent held a PPL(A) obtained in 2012 and had a total experience of 340 flight hours as aeroplane pilot.

Lille Flight Information Service (FIS) controller
Female, aged 36

The controller, an air traffic control engineer (ICNA), was assigned to the Lille-Lesquin control unit in October 2014. She was qualified as a "senior controller" on 30 September 2015 for all control positions at Lille, which included the flight information service.

1.6. Aircraft information

59DUJ was a VL-3-A type class 3 (fixed-wing) microlight built by the Czech company, JMB Aircraft, and put into service in 2018. It was equipped with a Rotax 912 ULS engine with a variable-pitch propeller, flaps and a retractable landing gear. 59DUJ was equipped with an airframe parachute (see paragraph 1.6.2.2).

As is the case for all microlights, the VL-3 was not certified by the European Aviation Safety Agency (EASA). 59DUJ had an identification card issued by the French authorities and was subject to the French regulations pertaining to microlights[14].

The VL-3 flight manual does not give any maximum flight altitude limitation. It gives the climb rate and cruise performance values up to a pressure altitude of 10,000 ft. The flight manual gives an indicated stall speed with flaps retracted of 75 km/h (Indicated AirSpeed (IAS) 40.5 kt).

1.6.1. Weight and balance

The pilot had refuelled the two fuel tanks before leaving Kortrijk from a private tank located in the hangar where the microlight was parked. It was not possible to obtain precise information about the quantity of fuel taken on board at the time of departure.

[14] Order of 23 September 1998 regarding microlights (version in force on the day of the accident).

The flight manual indicates that the fuel tank capacity is 59 l per tank, i.e. 118 l in total. The float-type fuel level indication system does not indicate the exact level for all the levels in the tanks. The maximum level that can be displayed by the gauges is 40 l per tank. The parameters recorded by the gauges of 59DUJ indicated for all of the flight up to the loss of control, 40 l per fuel tank, i.e. an actual total quantity of more than or equal to 80 l at the time of the loss of control.

If we take a minimum fuel quantity of 80 l, the weight of 59DUJ at the time of the occurrence was at least 483 kg (for a maximum weight of 472.5 kg) and a centre of gravity position at 24% of the mean aerodynamic chord (for a normal centre of gravity envelope between 21% and 35%).

1.6.2. 59DUJ onboard equipment and systems

1.6.2.1. Avionic system

The microlight was equipped with a Dynon avionics suite with an EFIS[15]-type SkyView HDX1100 screen, an ADAHRS[16] multi-sensor box, a two-axis autopilot (pitch and roll) and an EMS[17] connected to the Skyview screen. To maintain a constant propeller speed, a Flybox PR1-P propeller pitch controller, independent of the Dynon suite, was integrated into the instrument panel.

The EFIS screen (see **Figure 3**) can be used to manage autopilot modes, as well as displaying flight parameters, engine data and navigation charts.

An Angle-Of-Attack (AOA) indicator is also available on the EFIS screen. There are various visual (amber and red) and aural warning thresholds, which are calibrated before delivery. The AOA measurement is integrated into the Pitot tube.

An iPad Pro-type touchscreen tablet was positioned on the right-hand side of the instrument panel. The ForeFlight flight planning and monitoring application was installed on the iPad. A second tablet of the same model was also on board, but was not fixed to the instrument panel.

During the flight, the pilot could use the Skyview screen to display the aircraft's position and planned route, as well as the limits of the airspace he was flying through.

1.6.2.2. Airframe parachure

The aircraft was equipped with a Galaxy GRS airframe parachute.

	Parachute
Manufacturer	Galaxy GRS
Type	GRS 6/473 SD Speedy SOFT B4
Serial number	7453-18-0202-8762/N

The GRS system is composed of an ejection rocket, the parachute, straps and the firing control.

This system is activated manually by pulling the switch handle situated on the right-hand side of the pedestal (see **Figure 3**). A force of around 5 to 10 kg over a distance of at least 10 cm is required to do this.

[15] Electronic Flight Instrument System.
[16] Air Data/Attitude/Heading Reference System.
[17] Engine Monitoring System.

Figure 3: VL-3 cockpit with airframe parachute activation handle (source: BEA)

A safety pin located on the side of the handle protects the system from any untimely firing. This pin must be removed before any flight.

According to the manufacturer, the airframe parachute opens at a height of around 18 m above the airframe of the microlight a few seconds after the handle is pulled. Based on calculations[18], the manufacturer of the parachute indicates an opening time of 6 s in the case of a spin. The manufacturer shows that this corresponds to a height loss of 102 m. To take account of the possibility that the microlight is in an inverted position, the manufacturer adds a flat-rate value of 20 m to this height, giving a total of 122 m.

1.6.3. Operating procedures

1.6.3.1. Recovery from spin

The flight manual for the VL-3-A (retractable landing gear) with airframe parachute and variable-pitch propeller, published in January 2016 by the manufacturer, states that in the event of an unintentional spin, the following procedure must be applied:

[18] See site of parachute manufacturer.

Le VL3 n'a pas de tendance à rentrer en vrille si les bonnes techniques de pilotage sont utilisées.

Attention
Les vrilles volontaires sont interdites

Si l'ULM est entré en vrille les procédures suivantes sont obligatoires:

1. Gaz	-	ralenti
2. Manche	-	ailerons au neutre
3. Palonniers	-	à fond contraire à la rotation
4. Manche	-	En avant
5. Palonniers	-	après avoir neutralisé la rotation au neutre
6. sortir	-	tirer le manche en arrière

Figure 4: excerpt from flight manual

1.6.3.2. Parachute operation procedure

This flight manual, which cites the Galaxy GRS airframe parachute manufacturer's manual as a reference document, succinctly describes the procedures for using the airframe parachute in its supplement A. It advises that the emergency system should be used "in a situation that warrants it" (see **Figure 5**) and does not require the engine to be shut down before the system is activated. The Galaxy GRS procedure (see **Figure 6**) recommends shutting down the engine before activating the system, although it specifies that on an aircraft equipped with traction propellers (such as the VL-3), the engine can be shut down after the parachute has been activated.

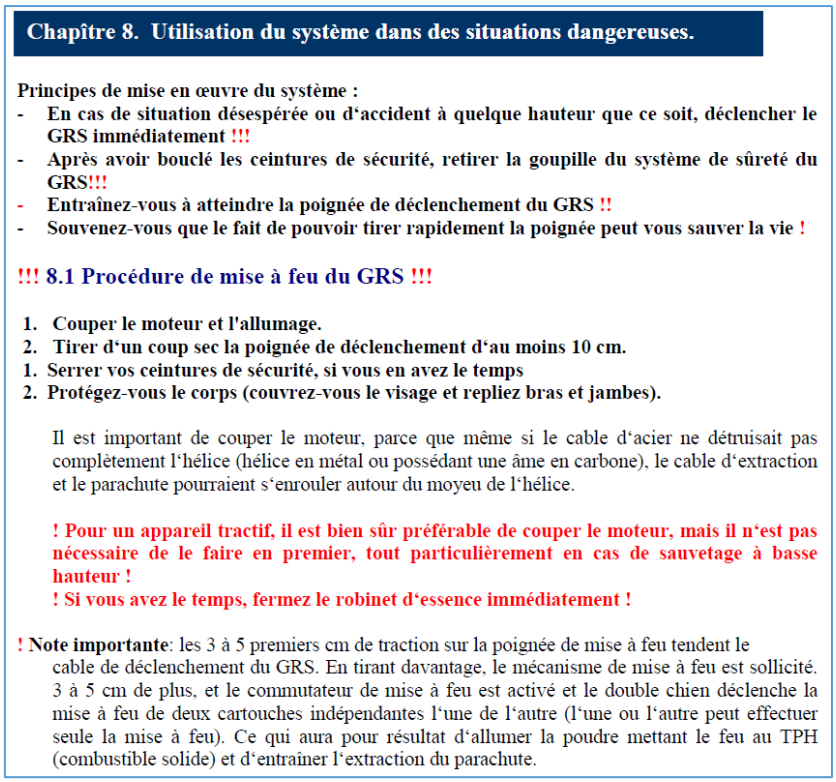
Section 1 – Général
Ce supplément apporte les informations nécessaires à l'exploitation d'un avion de type VL-3 Evolution équipé d'un système de sauvetage GRS.

Section 2 – Restriction
Les restrictions suivantes s'appliquent à l'utilisation du système de sauvetage GRS:
1. Vitesse maximale 305 km/h (165 nœuds) IAS
2. Masse maximale au décollage de l'avion MTOW=472,5kg
3. L'altitude minimale pour le déploiement complet du parachute en vol horizontal est de 150 m (500 pieds) au-dessus du sol.

Avertissement
Toute position autre qu'horizontale augmente significativement l'altitude nécessaire pour un fonctionnement fiable du système de sauvetage . L'utilisation du système de sauvetage ne garantit pas que le l'avion ne sera pas endommagé ou que l'équipage ne sera pas blessé !

Section 3 – Procédures d'urgence
Si vous devez utiliser le système d'urgence lors d'une situation qui le justifie, tirez la poignée de système d'activation en direction de votre corps. De cette façon, la fusée de traction sera activée et le parachute sorti et déployé. Apr ès ouverture du parachute il est préférable de couper le moteur avant impacte.

Figure 5: excerpt from supplement A of flight manual



Chapitre 8. Utilisation du système dans des situations dangereuses.

Principes de mise en œuvre du système :

- **En cas de situation désespérée ou d'accident à quelque hauteur que ce soit, déclencher le GRS immédiatement !!!**
- **Après avoir bouclé les ceintures de sécurité, retirer la goupille du système de sûreté du GRS!!!**
- **Entraînez-vous à atteindre la poignée de déclenchement du GRS !!**
- **Souvenez-vous que le fait de pouvoir tirer rapidement la poignée peut vous sauver la vie !**

!!! 8.1 Procédure de mise à feu du GRS !!!

1. **Couper le moteur et l'allumage.**
2. **Tirer d'un coup sec la poignée de déclenchement d'au moins 10 cm.**
1. **Serrer vos ceintures de sécurité, si vous en avez le temps**
2. **Protégez-vous le corps (couvrez-vous le visage et repliez bras et jambes).**

Il est important de couper le moteur, parce que même si le cable d'acier ne détruisait pas complètement l'hélice (hélice en métal ou possédant une âme en carbone), le cable d'extraction et le parachute pourraient s'enrouler autour du moyeu de l'hélice.

! Pour un appareil tractif, il est bien sûr préférable de couper le moteur, mais il n'est pas nécessaire de le faire en premier, tout particulièrement en cas de sauvetage à basse hauteur !
! Si vous avez le temps, fermez le robinet d'essence immédiatement !

! Note importante: les 3 à 5 premiers cm de traction sur la poignée de mise à feu tendent le cable de déclenchement du GRS. En tirant davantage, le mécanisme de mise à feu est sollicité. 3 à 5 cm de plus, et le commutateur de mise à feu est activé et le double chien déclenche la mise à feu de deux cartouches indépendantes l'une de l'autre (l'une ou l'autre peut effectuer seule la mise à feu). Ce qui aura pour résultat d'allumer la poudre mettant le feu au TPH (combustible solide) et d'entraîner l'extraction du parachute.

Figure 6: parachute operation procedure (source: instruction manual for assembly and use of GRS ballistic parachute rescue system (Galaxy GRS, April 2016))

The parachute manufacturer's manual also describes a few possible scenarios for using the parachute including entering a spin at low height (e.g. in last turn) or pilot disorientation.

1.7. Meteorological information

1.7.1. General meteorological situation

On the morning of the day of the accident, the north-western part of France was affected by a westerly airflow with an influx of cold upper air, creating instability and cumuliform clouds. Inland, low cloud had formed at the end of the night. Showers were forecast over the sea, associated with cloud layers from an altitude of 500 to 1,000 ft up to levels above FL 170.

A Météo-France analysis carried out for the purposes of the investigation indicated that, at the time of the occurrence, the microlight was on the left edge of a front of developed cumulus congestus (TCU), the highest top being at around FL 170, and that the 0°C isotherm was just above FL 083.

It was not possible to assert that the microlight was in the cloud layer. Near or in this type of cloud, turbulence is moderate to severe.

1.7.2. Meteorological information available before the flight

Terminal Aerodrome Forecasts (TAF) and meteorological reports (METAR)

The weather file (see Appendix 1) exchanged between the pilot and the passenger before departure included:

- a GAMET[19] text message issued for the Brussels FIR valid on 19 June from 08:00 to 14:00 local time indicating the advection of unstable maritime air, with broken clouds 800 to 1,500 ft agl between 08:00 and 09:00 to the west of meridian 003.5° E, then from 12:00, isolated TCU-type clouds extending from 2,500 ft agl to above 10,000 ft agl;
- the 07:30 METAR reports from Lille-Lesquin, Paris-Orly and Tours-Val de Loire[20] airports indicating visibility greater than 10 km and scattered clouds at 600 ft becoming overcast at 700 ft at Lille and 4,700 ft at Tours. CAVOK[21] weather was reported at 07:30 at Paris-Orly;
- the TAF forecasts from these same airports forecasting for 19 June at Lille, a cloud ceiling at 1,000 ft agl rising to 2,500 ft agl between 09:00 and 11:00, followed by rain showers and thunderstorms in the afternoon, and CAVOK followed by rain showers in the afternoon at Paris-Orly and Tours.

In addition to this information, the passenger had asked the pilot how to obtain weather information from the French services. The pilot gave her the address of the Olivia website[22]. The investigation was not able to determine if the passenger had consulted this site.

On the other hand, other TAF forecasts from Beauvais and Rouen airports, also close to the planned route, forecast lower ceilings, in particular overcast or broken clouds at 700 ft agl, associated with TCU. These TAF forecasts were not included in the exchanges between the pilot and the passenger that the BEA was able to recover. The investigation was unable to determine whether the pilot was aware of them.

SIGWX charts

The significant weather forecast charts available before the flight were those valid for 06:00 UTC[23] and 09:00 UTC, provided in **Figure 7** and **Figure 8**.

On the planned route, the 06:00 UTC SIGWX chart indicated visibility greater than 8 km for the first part of the flight, and locally, visibility between 5 and 8 km, followed by the presence of broken clouds (5 to 7 octas) up to an altitude of 7,000 ft, based at between 2,000 and 4,000 ft, overall visibility greater than 8 km, locally, visibility between 1.5 and 5 km, and the presence of local fog. To the west of the route, the 06:00 UTC chart showed a very overcast area unsuitable for VFR flight.

The 09:00 UTC chart forecast a higher cloud base, between 3,000 and 5,000 ft on the first part of the route, between 5,000 and 6,000 ft on the last part, and better visibility conditions. Between the 06:00 UTC SIGWX chart and the 09:00 UTC chart, the area of bad weather can be seen to retreat towards the north-east while not affecting inland areas.

[19] Area forecasts for low altitude flights and concerning a flight information region or one of its sub-regions.

[20] Tours-Val de Loire airport is situated at 45 km south-west of Blois-Le Breuil aerodrome.

[21] Meaning, in particular, that there was no cloud layer below 5,000 ft.

[22] Flight planning and filing, accessing aeronautical data tool. Subsequently replaced by Sofia-Briefing.

[23] The times on the SIGWX charts are given in UTC. Two hours should be added to obtain the legal time applicable in Metropolitan France on the day of the event.

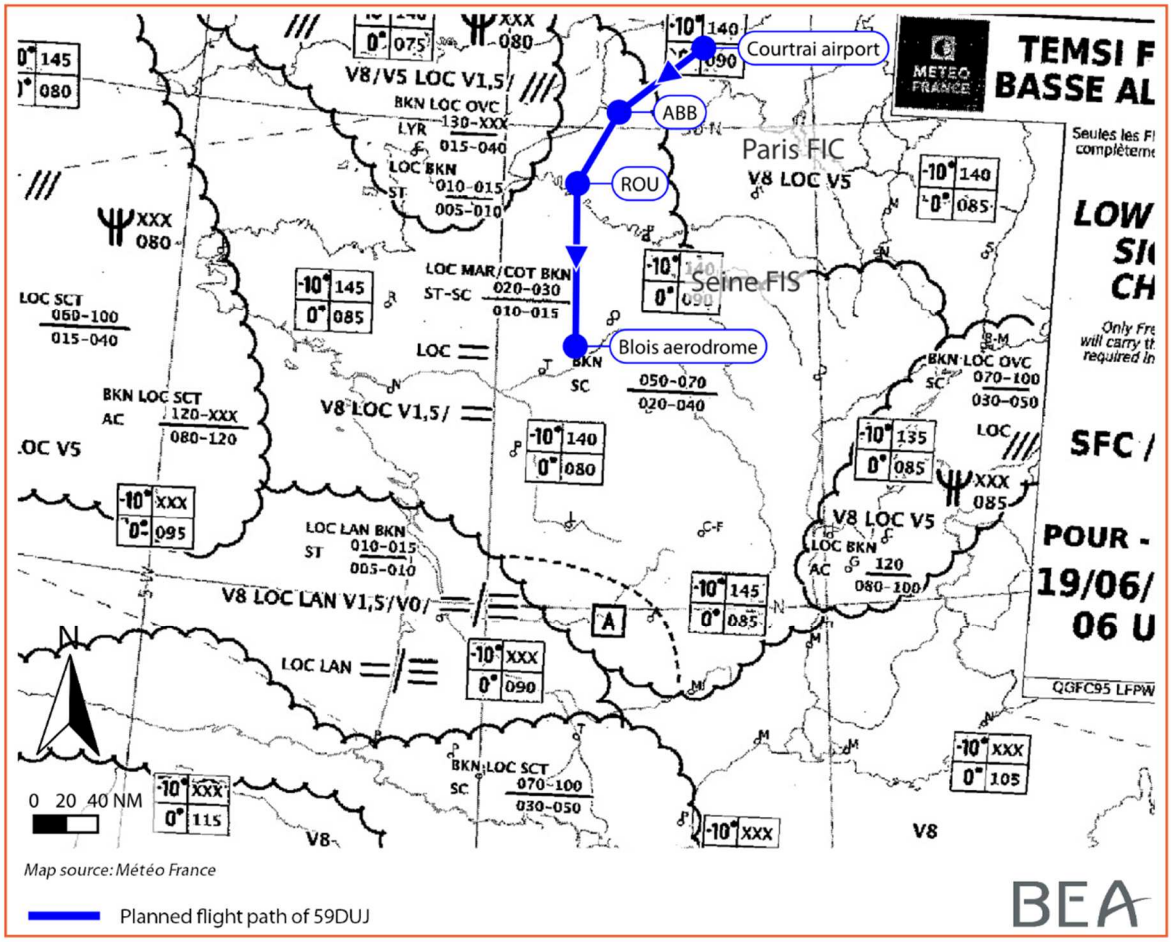


Figure 7: excerpt from 06:00 UTC SIGWX chart of 19 June 2020 (source: Météo-France)

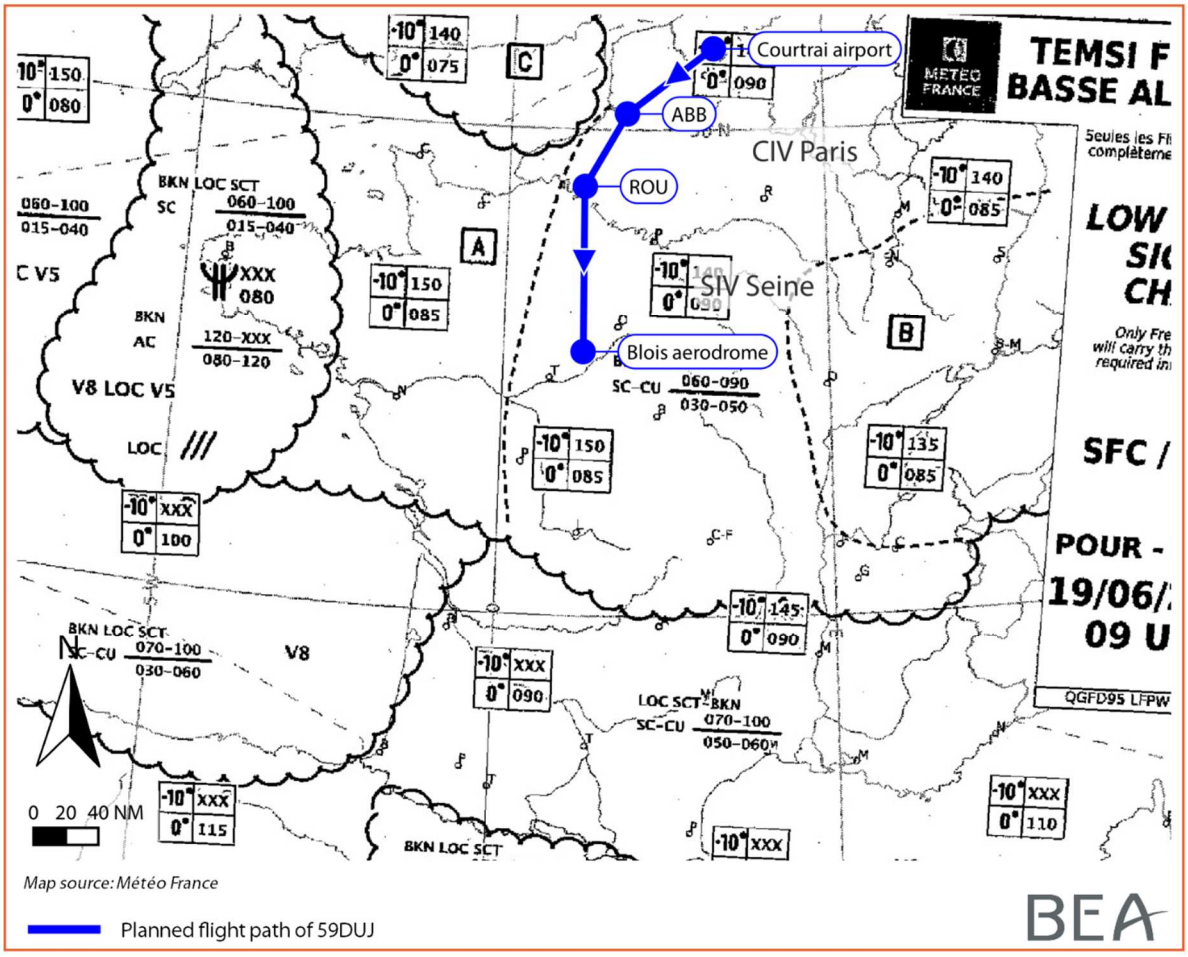


Figure 8: excerpt from 09:00 UTC SIGWX chart of 19 June 2020 (source: Météo-France)

The investigation was not able to determine whether the pilot was aware of the French SIGWX charts before his departure on the day of the accident. Statements from those close to the pilot indicated that he used the Olivia site most of the time for his cross-country flights in France.

1.7.3. Observed meteorological conditions

The occluded front coming from the British Isles moved further inland than expected. At 11:20, a line of precipitation associated with the cloud front was located roughly on a line from Abbeville to Rouen, possibly interfering with the planned flight path of 59DUJ level with Abbeville (see **Figure 9**).

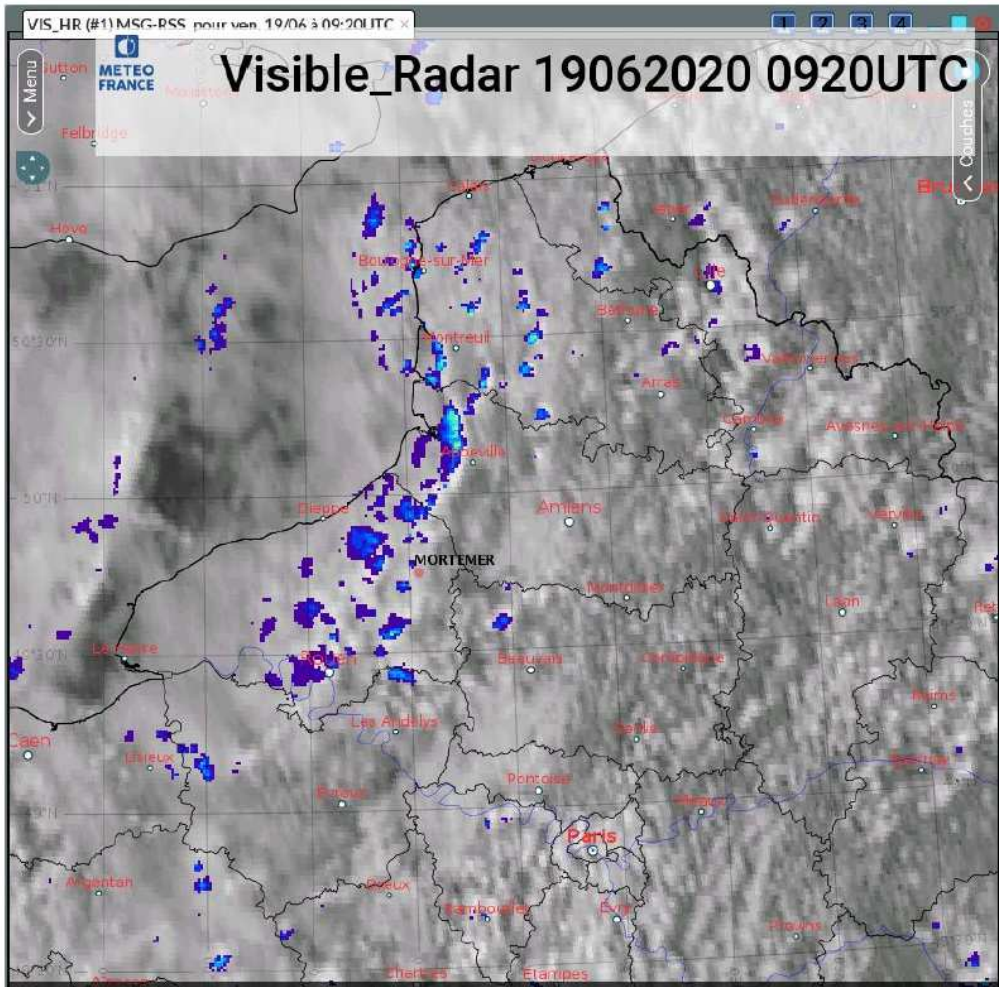


Figure 9: mixed visible satellite and weather radar image at the time of the accident (source: Météo-France)

The METAR reports from Rouen-Vallée de Seine airport located 48 km from the accident area indicated:

- at 10:30: a cloud ceiling of 1,000 ft and temporarily visibility of 4 km, showers and a reduced ceiling of 700 ft with the presence of TCU;
- at 11:00: similar conditions, with a ceiling of 1,500 ft;
- at 11:30: few clouds at 1,900 ft, scattered clouds at 2,400 ft, broken clouds at 3,700 ft and temporarily visibility of 4 km, showers and the presence of cumulonimbus based at 2,000 ft.

In practice, it would have been difficult for 59DUJ to fly cross-country below the cloud layer over Normandy.

1.7.4. Analysis of meteorological conditions for an on-top flight

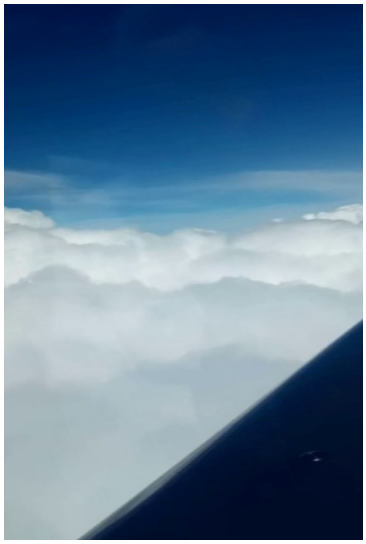
Over the north-west inland region of France, the 08:00 UTC SIGWX chart forecast a layer of strato-cumulus cloud reaching up to between 5,000 and 7,000 ft, which was compatible with an on top VFR flight.

The 11:00 UTC SIGWX chart showed the top of the cloud layer rising to an altitude of between 6,000 ft and 9,000 ft over the entire flight area of 59DUJ. According to the infrared satellite images, the top of the cloud layer was around 7,000 ft in the area of the

accident. This layer sometimes extended a little higher, with cumulus tops approaching or even exceeding 8,000 ft, as can be seen in the photos in

On left of flight path
(south-east)

Ahead



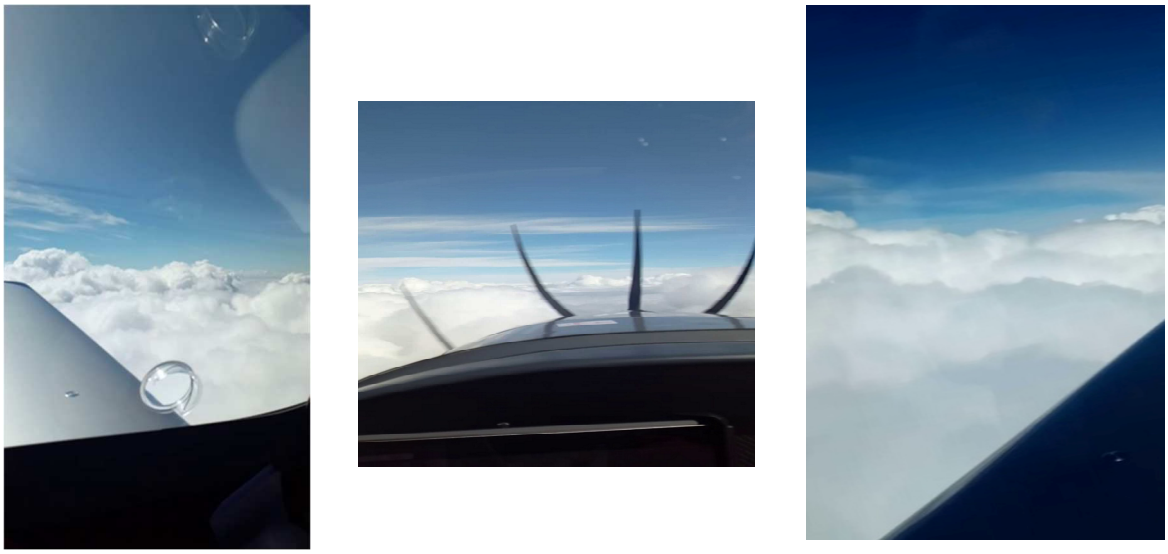
On right of flight path
(north-west)

*Figure **11*****Erreur ! Source du renvoi introuvable.**.

In addition, the occluded front arriving from the British Isles contained numerous clouds up to a high altitude, which made on-top flight very difficult, if not impossible in the area of the front. However, as mentioned in paragraph 1.7.1, the forecasts indicated that this front would remain out at sea or on the French coast.

In **Figure 10**, based on Météo-France's infra-red satellite images spaced 15 minutes apart for all of the flight of 59DUJ, the BEA shows the altitude of the top of the cloud layer abeam the flight path and relative to the altitude of 59DUJ during its on-top cross-country flight. The movement of the front was interpolated as 59DUJ advanced in increments of about one minute of flight, using successive infra-red images.

In **Figure 10**, each square or quadrant measures 3.2 by 5.8 km and its colour is determined by the altitude of the highest cloud in the quadrant, even if it is only an intermittent cloud top. Consequently, the fact that the flight path of 59DUJ passes through a "red" square does not necessarily mean that the microlight passed through clouds. It could simply have been flying close to the tops of cumulus clouds while avoiding them, as can be seen in the photos of



On left of flight path (south-east) | Ahead | On right of flight path (north-west)

*Figure **11**Erreur ! Source du renvoi introuvable.*.

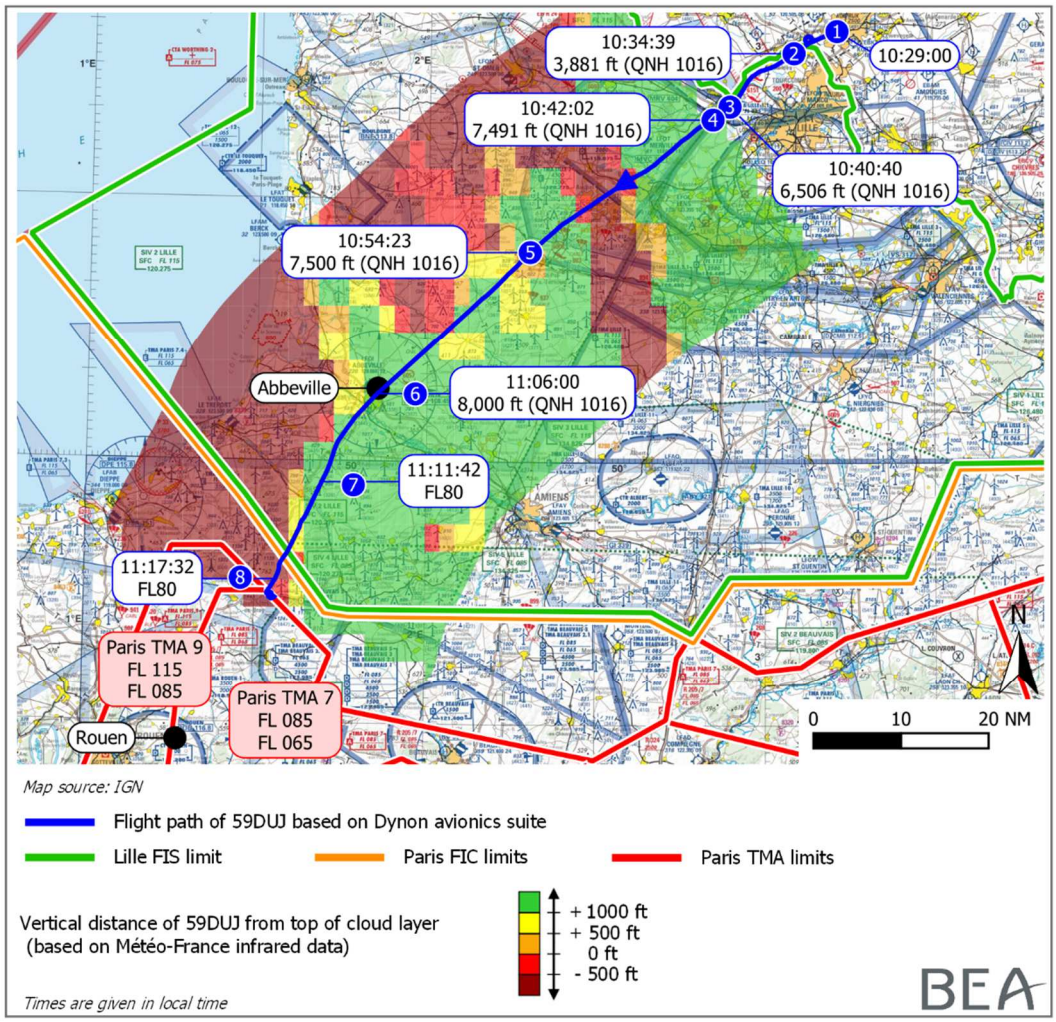
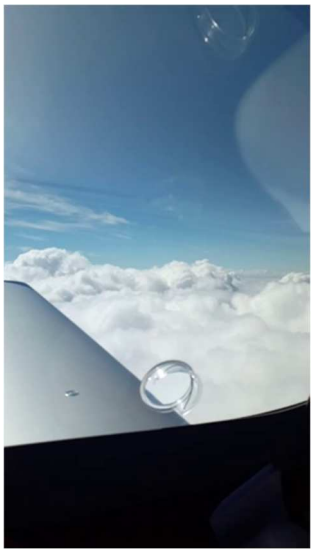
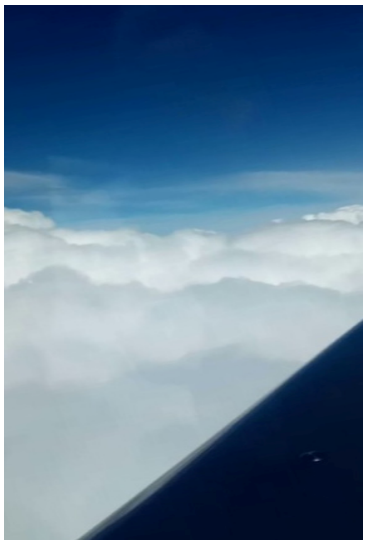


Figure 10: height of top of cloud layer with respect to 59DUJ during its on-top flight



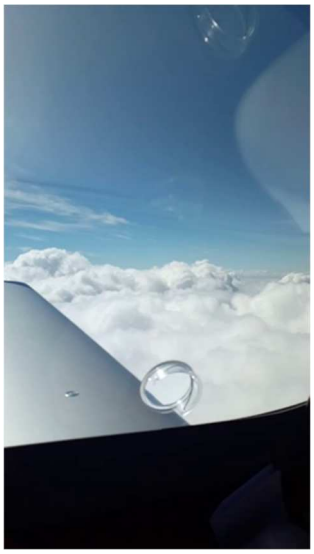
On left of flight path (south-east)

Ahead

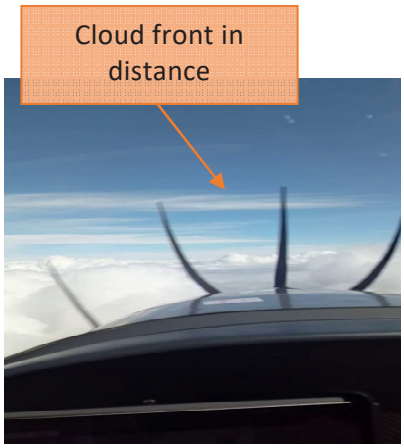


On right of flight path (north-west)

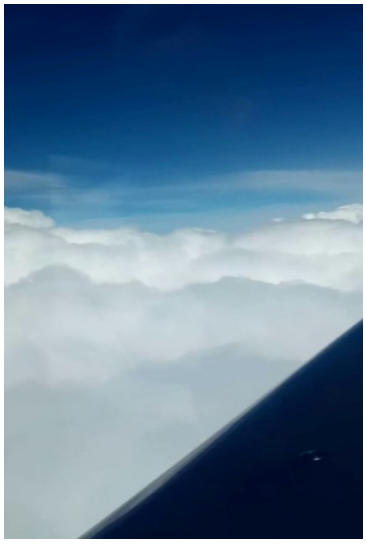
*Figure **11*** shows the occluded front, which contained clouds higher than the flight altitude of 59DUJ and appeared to the pilot as a "wall" of cloud to the right of his flight path (as seen in the distance in the photo of what was ahead of the aircraft).



On left of flight path (south-east)



Ahead



On right of flight path (north-west)

Figure 11: photos from a video taken by the passenger at 10:57 at 7,800 ft

1.8. Aids to navigation

Not applicable.

1.9. Communications

In French airspace, the crew of 59DUJ were successively in contact with the Lille FIS and the Paris FIC.

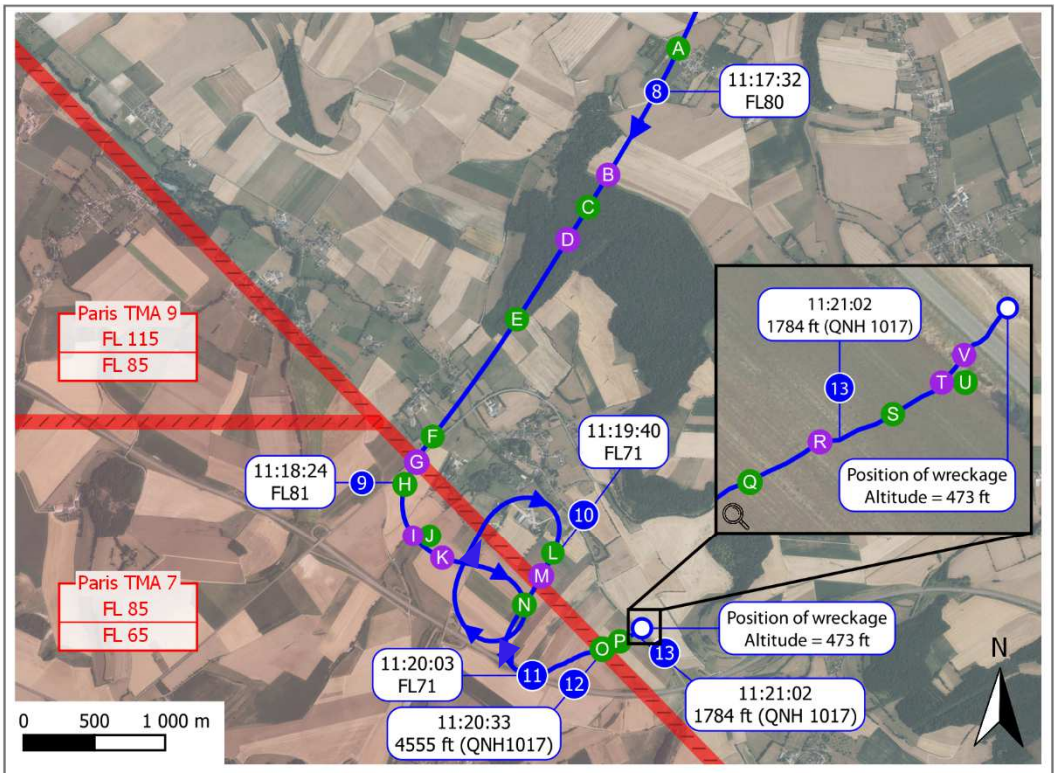
1.9.1. Radio exchanges with Lille FIS

A full transcript of the radio exchanges between 59DUJ and the Lille FIS is appended to this report (see Appendix 2).

1.9.2. Radio exchanges with Paris Info

The radio exchanges in English between the pilot of 59DUJ and Paris Info from 11:17:27 are described in **Figure 12**.

A full transcript of the radio exchanges between 59DUJ and the Paris FIC is appended to this report (see Appendix 2).



Map source: IGN

End of flight path of 59DUJ based on Dynon avionics suite data.
The altitude has been corrected with QNH 1017 (actual altitude) although the altimeter was at the standard setting.

A 11:17:27 Paris Info : Fox Juliet Delta Mike Bravo... in sight, ahead of you flight level area maximum 65, turn on your right now please

B 11:17:42 F-JDMB : euh... ok we will descend

C 11:17:45 Paris Info : no descent, turn on your right now, you are on the class area Paris

D 11:17:51 F-JDMB : Okay thank you will do

E 11:17:59 Paris Info : Foxtrot Juliet Delta turn on your right now

F 11:18:17 Paris Info : Foxtrot Juliet Delta Mike Bravo Paris information

G 11:18:21 F-JDMB : Foxtrot Juliet Delta Mike Bravo?

H 11:18:24 Paris Info : you are on the area prohibited for you, flight level maximum 65, turn on your right now please

I 11:18:32 F-JDMB : we are now descending

J 11:18:33 Paris Info : no descending, turn on right now

K 11:18:37 F-JDMB : turning right Fox Mike Bravo

L 11:19:37 Paris Info : Fox Mike Bravo Paris

M 11:19:40 F-JDMB : Fox Mike Bravo we are descending now, 7000 descending to maximum 65

N 11:19:46 Paris Info : copied, I suggest you take magnetic route 280, 280

O 11:20:33 Paris Info : Fox Mike Bravo with your altitude you can take your route

P 11:20:45 Paris Info : Fox Mike Delta Paris?

Q 11:20:57 Paris Info : Fox Juliet Delta Mike Bravo Paris information

In the following 13 s (between 11:20:57 and 11:21:11) – in response to the controller's questions – the pilot twice indicated that they were falling

Times are given in local time

Figure 12: last exchanges between 59DUJ and FIC agent

1.9.3. Squawk codes displayed by 59DUJ

The transponder of 59DUJ was continuously recorded by the ANS with the following codes and the time at which they were changed.

Time	Squawk code recorded by ANS
10:33:47	2000
11:12:27	6100
11:12:29	7000
11:13:58	7102
11:17:22	7012

1.10. Aerodrome information

Not applicable.

1.11. Flight recorders

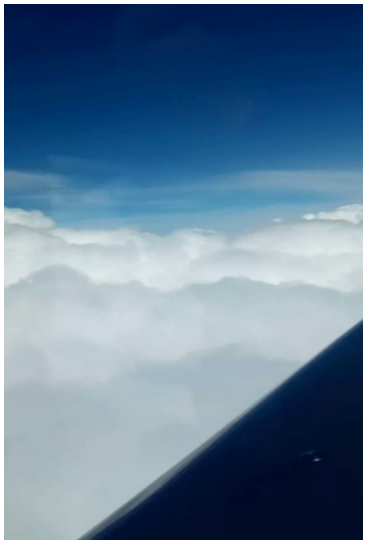
The aircraft was not equipped with a Cockpit Voice Recorder (CVR) or Flight Data Recorder (FDR). It is not a regulatory requirement.

Nevertheless, the SkyView HDX1100 EFIS, two tablets and two telephones, which may have recorded data from the flight, were recovered from the wreckage. The tablets were damaged and no data could be recovered from either of them. The flight path recorded by the ForeFlight application on the second tablet was recovered directly from the application's servers.

The occupants' telephones were read out and the aeronautical-related messages and emails exchanged between the pilot and the passenger before the flight were recovered (flight plan, METAR and NOTAM). The passenger's telephone also contained photos and videos taken during the flight (see

On left of flight path (south-east)

Ahead



On right of flight path (north-west)

*Figure **11***).

The data files recorded by the EFIS were recovered, including those containing data relating to the occurrence flight. These files were:

- ALERT DATA containing all the alerts (text or aural) issued by the Dynon system;

- USER LOG DATA containing the long-term flight and engine parameters, sampled every 0.25 s (4 Hz);
- BLACK BOX LOG DATA containing the flight and engine parameters, sampled every 0.0625 s (16 Hz), recorded over a 26-min period only.

A joint analysis of the recorded flight parameters was carried out by the BEA and Dynon.

The main flight parameters extracted from the EFIS are shown below in

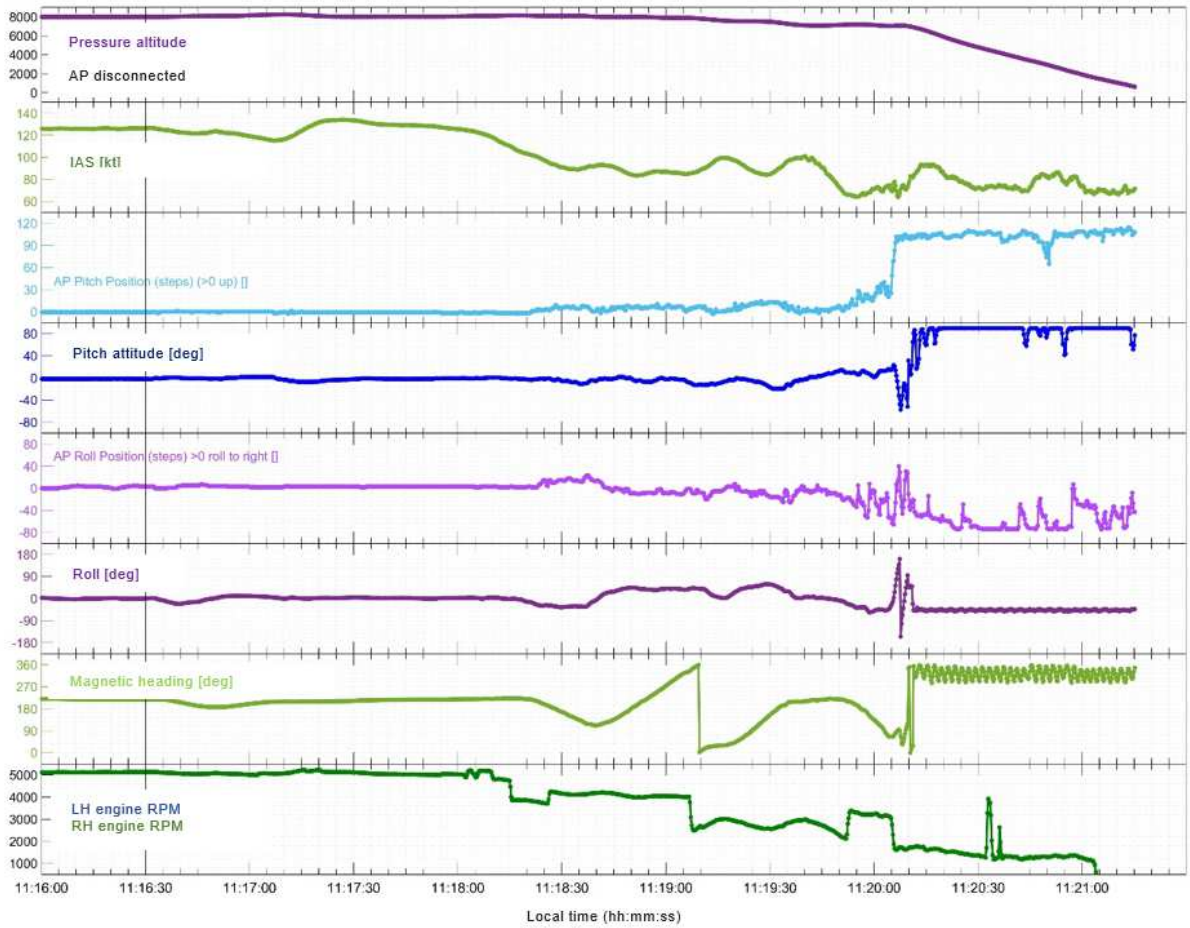


*Figure **13*** for the last five minutes of flight. The yaw flight control position was not recorded.

Magnetic heading [deg]

LH engine RPM
RH engine RPM

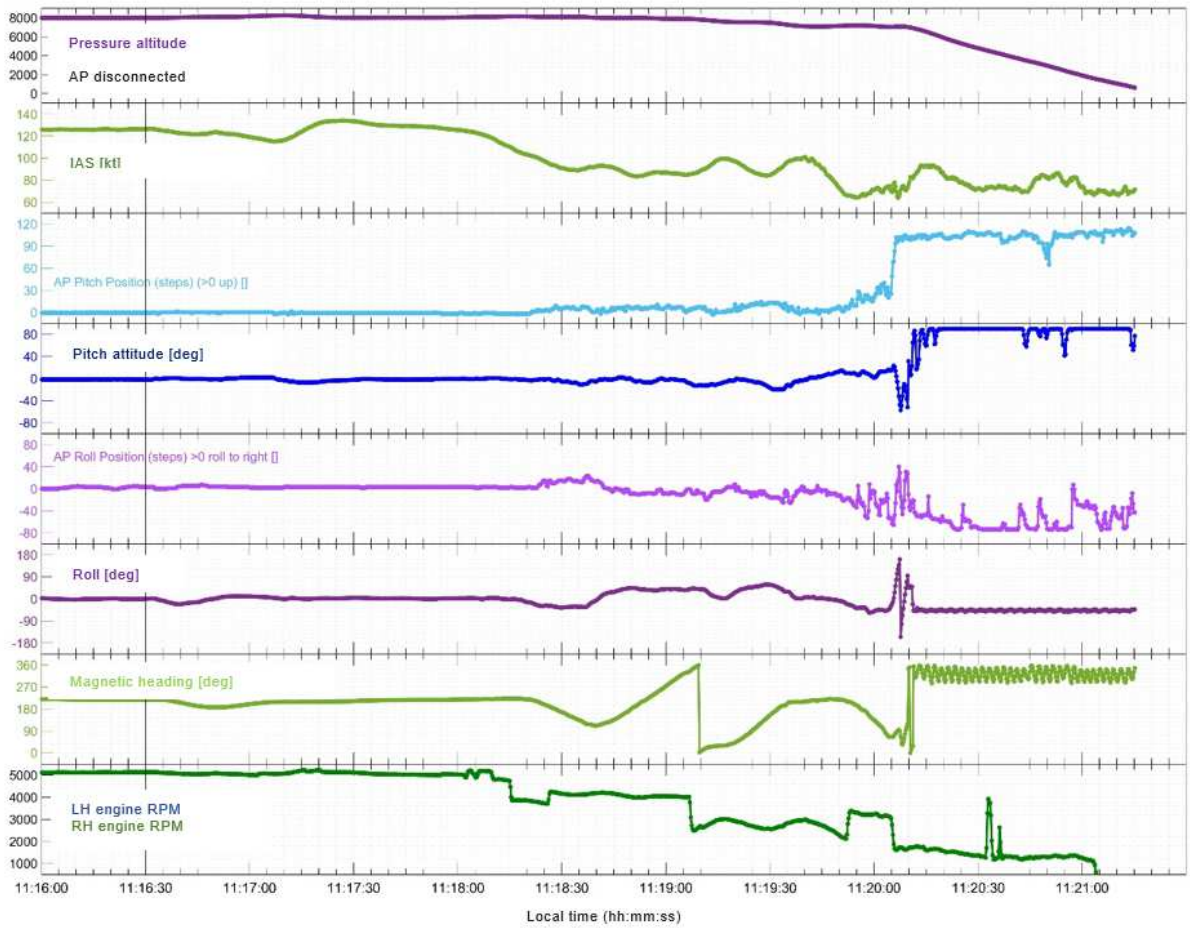


Figure 13: main flight parameters extracted from the EFIS, covering the last few minutes of the flight

Note: Dynon, the manufacturer of the EFIS indicated that the AP Pitch Position and AP Roll Position parameters corresponded to an image of the pitch and roll controls when the autopilot is disengaged.

From 11:17:58 until the end of the flight, the autopilot was disengaged. The last data recorded in the EFIS was marked 11:21:15.

After the autopilot was disengaged, it was not possible to fully correlate the flight control positions with the aircraft's attitudes.

If we consider that all the parameters recorded are valid, the possible inconsistencies between the pitch and roll control positions (*AP Pitch Position* and *AP Roll Position* parameters), the aircraft's attitudes, the altitude and the indicated airspeed could be explained by particular aerological phenomena having been encountered when the aircraft was close to the highly convective cloud layer (see paragraph 1.7.1): turbulence, updrafts or downdrafts, etc. These inconsistencies could also come from the recording of the parameters themselves, given that the conditions for recording the parameters as well as the conditions for installing the systems on microlights are not the subject of a documented certification process.

In particular:

- Between 11:18:00 and 11:18:18, the manifold pressure decreased from 22 inHg to 9 inHg, the indicated airspeed decreased from 125 kt to 102 kt, and the pressure altitude increased slightly from 8,063 ft to 8,137 ft. Over this period, no significant variation in the pitch input was recorded and the attitude decreased from -1° to -3° (nose down). Over this period, no significant variation in the roll input was recorded, the roll remained constant at around 0° and the heading was stable at around 220°:
    - an updraft could explain the increase in altitude.
- Between 11:18:22 and 11:18:36, the manifold pressure was between 10 inHg and 13 inHg. The pressure altitude was around 8,100 ft, the roll was stable at around 30° left, the heading decreased from 212° to 120°. The roll input was to the right. The pitch input was nose up and the attitude decreased from -3° to -11° (nose down):
    - when turning, a nose-up input has to be made to maintain altitude,
    - if the nose-up input is not sufficient to maintain level flight (particularly at steep angles of bank), the attitude decreases, the altitude decreases and the indicated airspeed increases.
- Between 11:18:46 and 11:19:11, the manifold pressure was stable at 13 inHg, then decreased to 7 inHg; the altitude decreased from 7,900 ft to 7,700 ft, the indicated airspeed was generally around 90 kt. The roll was between 35° and 45° to the right although the roll input was to the left. The pitch input was generally nose-up. The attitude oscillated, and overall decreased from 2° nose up to 13° nose down.
- Between 11:19:20 and 11:19:33, the manifold pressure was stable at 7 inHg. The pressure altitude decreased from 7,540 ft to 7,340 ft, the indicated airspeed decreased from 96 kt to 84 kt and then increased again to 93 kt. The roll input was to the left, while the roll increased from 32° to 59° right, before returning to 33° right. The heading increased from 49° to 194°. The nose-up input increased, while the attitude decreased from -1° (nose down) to -20° (nose down).
- Between 11:19:33 and 11:19:48, the manifold pressure remained stable at 7 inHg. The pressure altitude stabilised at 7,100 ft, and the roll returned to neutral. There was less of a nose-up input and the attitude increased from -19° (nose-down) to 10° (nose-up). The indicated airspeed peaked at 101 kt and then decreased to 78 kt.

From 11:20:06 (start of the loss of control), the recorded parameters indicated that the stick was held nose up and to the left, without it being possible to determine with any certainty the pilot's inputs on the flight controls.

The aural stall alarm was active from 11:20:00 until the end of the flight. The attitude parameters (pitch, roll and heading) became invalid from 11:20:09 until the end of the flight. These invalid values made it impossible to describe the aircraft's movements during its descent.

The last valid values seem to indicate a rapid stall dive and a roll, probably following an asymmetric stall.

At 11:20:14, as the altitude decreased, the GEES message was recorded for six seconds, corresponding to the vertical load factor exceeding 2.8 g (amber sector of the accelerometer). This message was also recorded at 11:20:53.

The recorded parameters did not reveal any technical fault.

In addition, at 11:21:05, the engine parameters (manifold pressure, fuel pressure and rpm) showed that the engine appeared to stop. The investigation was unable to determine whether

this possible engine shutdown was a pilot command or whether the engine suffered the shutdown.

However, it was possible to determine that, during the flight, the pilot had activated the option allowing Class A areas to be displayed on the navigation screen.

1.12.Wreckage and Impact Information

The wreckage was lying on its belly in a ditch, the wings aligned with the ditch (see

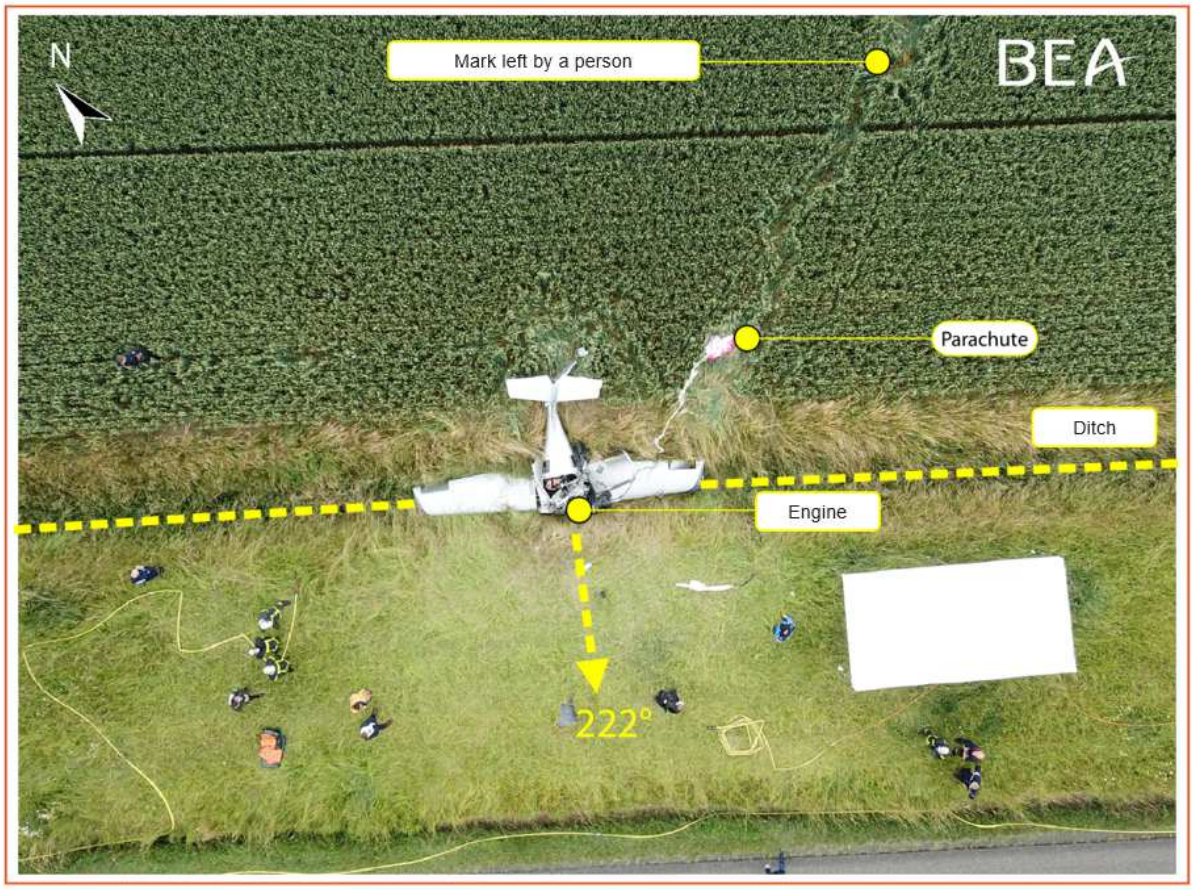


Figure *14*).

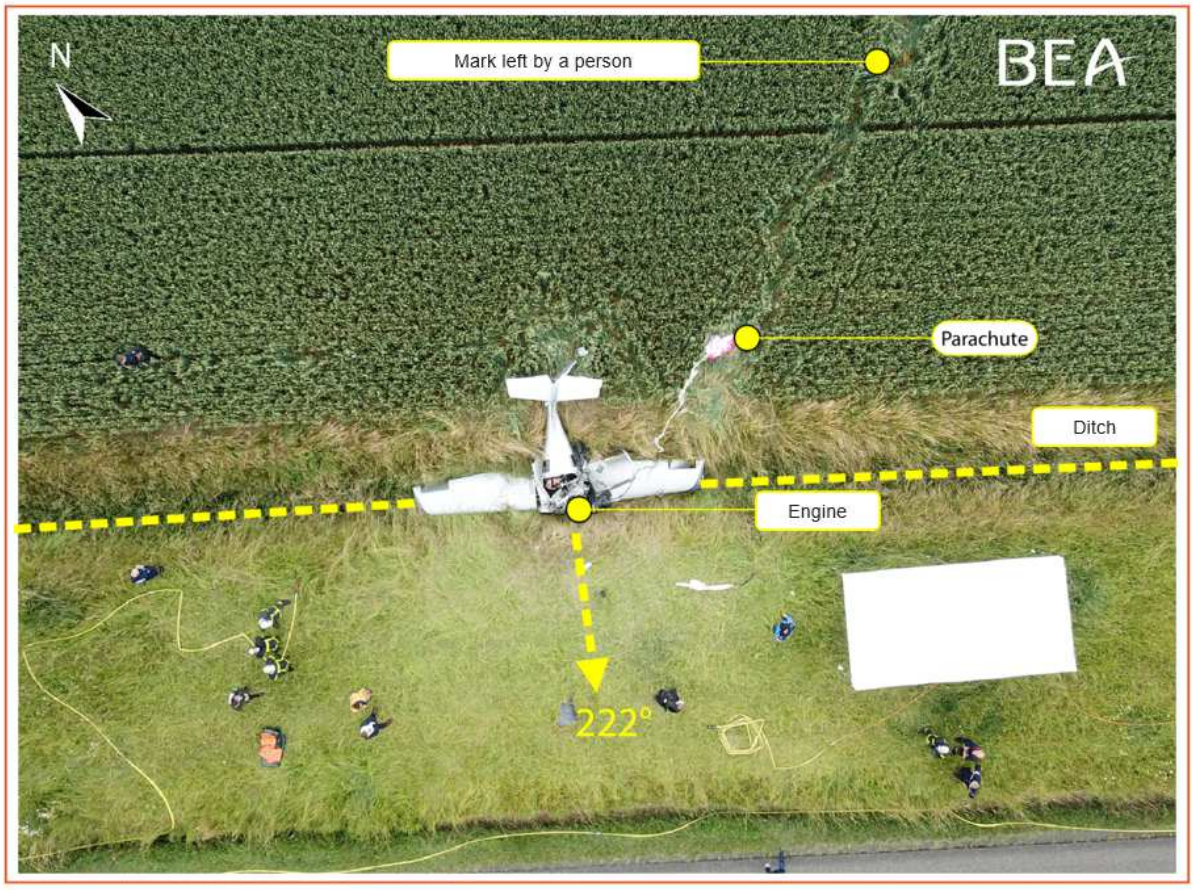


Figure 14: aerial view of wreckage taken by drone (source: GTA, annotations BEA)

Observations of the site and wreckage showed that the aircraft collided with the ground with its wings level and a very low horizontal speed.

The manual trim was in the cruise position. The electric flaps and the landing gear were retracted.

The examination of the wreckage found that the airframe parachute had been activated following the collision with the ground. The system had not been activated in flight. The safety pin of the activation system had been removed in accordance with the recommendations of the flight manual.

The aileron, elevator and rudder control linkages were continuous at the time of impact. The flap and trim control linkages were continuous at the time of impact. The propeller showed no obvious signs of rotation.

All the deformations and ruptures observed on the wreckage were the consequences of the aircraft's collision with the ground.

The examination of the wreckage did not find any technical element which could explain the loss of control.

1.13.Medical and pathological information

The autopsy did not find any element likely to explain the accident.

1.14.Fire

A fire did not follow the collision with the ground.

1.15.Survival aspects

The vertical speed and energy of the collision with the ground left no possibility of survival for the occupants.

1.16.Tests and research

Tests carried out at JMB Aircraft on identical aircraft to 59DUJ and on a VL-3 simulator checked that:

- in normal conditions, the parachute control was accessible from both the left seat and the right seat[24];
- the unintentional pressing of the push-to-talk (PTT) recorded on the Paris Info frequency came from the PTT on the pilot's stick (left stick);
- a visual warning on the PFD and an aural warning[25] in the headsets are activated when the angle-of-attack approaches the stall angle-of-attack.

Note: On the VL-3 used for these tests, it was noted that during a left turn, the two stall warnings (visual on PFD and aural in headset) were activated. However, during a right turn, the visual warning appeared on the PFD without the aural warning being activated in the headset. The manufacturer was unable to provide an explanation for this phenomenon and the BEA did not carry out tests on other VL-3s in order to determine if this particularity was specific to this aircraft or more widespread.

1.17.Organisational and management information

1.17.1. Airframe parachute information

Regulations regarding training in use of airframe parachute by microlight pilots

French regulations[26] only mention the item, use of the airframe parachute in the syllabus of the theoretical examination required to obtain the microlight licence, without giving any further details.

There are no other regulatory requirements concerning the training of microlight pilots in the use of an airframe parachute.

In Belgium, the regulations[27] applicable to microlights make no mention of the need for training in the use of an airframe parachute.

Information provided by microlight manufacturer

[24] The accessibility of the control in normal flight conditions (aircraft attitude and load factor) does not mean that the action to activate the parachute is easy when there is a loss of control and with a high load factor.

[25] On the VL-3, the aural warnings are only activated in the headsets of the occupants and cannot therefore be heard in the ground recordings of the radio transmissions.

[26] Order of 4 May 2020 on the syllabus and examinations for the microlight pilot certificate and licence (version in force on the day of the accident).

[27] Royal Decree of 25 May 1999 laying down the special conditions imposed for the admission of microlights to air traffics.

In February 2021, following an accident on 22 June 2020[28], JMB Aircraft published a document entitled *Safety Alert*, which was accompanied by an e-mail to French and Belgian owners. It set out the general circumstances of the accident and reminded pilots that in the event of a loss of control, it is essential to pull the airframe parachute as quickly as possible.

Information provided by French and Belgian Microlight Federations

The French powered microlight glider federation (FFPLUM) proposes training for unlicensed passengers accompanying microlight pilots in order to teach them how to return the microlight to the ground if the pilot is incapacitated. The use of the parachute is covered in this training. However, there is no practical training in the actions to activate the parachute for either pilots or unlicensed passengers.

The FFPLUM regularly publishes bulletins, "*Sécurité du pilote d'ULM*" covering pilot safety aspects. In the 6th edition of 2021, mention is made of the use of an airframe parachute for the pilot, but above all for the passenger. It recommends activating the parachute in the event of collision, wake turbulence, incapacitation, structural failure, loss of control, low-level spin, inhospitable terrain, after touchdown and if the terrain is too short. A video has also been produced by the FFPLUM to raise pilot awareness of the use of the airframe parachute.

In Belgium, at the time of publication of this report, there was no specific training or information given by the BULMF for microlight pilots concerning the use of airframe parachutes.

Training in use of airframe parachute carried out by the French Air Force

The French Air Force (Armée de l'Air et de l'Espace) uses Cirrus SR20s, certified aircraft fitted with airframe parachutes, for initial pilot training. Pilots, as well as passengers, follow compulsory and recurrent practical training in the use of the airframe parachute, on a simulation tool fitted with a parachute control.

1.17.2. Organisations providing the Flight Information Service in France

The route filed on the flight plan of 59DUJ concerned the Lille and Melun (Seine Info) FIS and the Paris FIC (see **Figure 15**).

1.17.2.1. General information about the Flight Information Service in France

Regulatory aspects

In France, the rules of the air are governed by Regulation (EU) No 923/2012 (SERA)[29]. The flight information service is described in it in part 9:

Paragraph, SERA.9001 *Application* indicates that the:

> *"(a) Flight information service shall be provided by the appropriate air traffic services units to all aircraft which are likely to be affected by the information and which are:*
>
> *(1) provided with air traffic control service; or*
>
> *(2) otherwise known to the relevant air traffic services units.*
>
> *(b) The reception of flight information service does not relieve the pilot-in-command of an aircraft of any responsibilities and the pilot-in-command shall make the final decision regarding any suggested alteration of flight plan.*

[28] Accident to VL-3-A identified 59DAE at Ferté-Bernard.

[29] Commission Regulation of 5 October 2012 laying down technical requirements and administrative procedures related to air operations (*Version in force on the day of the accident*).

(c) Where air traffic services units provide both flight information service and air traffic control service, the provision of air traffic control service shall have precedence over the provision of flight information service whenever the provision of air traffic control service so requires."

Paragraph, SERA.9005 *Scope of flight information service* specifies that the "*Flight information service provided to VFR flights shall include [...] the provision of available information concerning traffic and weather conditions along the route of flight that are likely to make operation under the visual flight rules impracticable*" and any other information likely to affect safety. It is specified that the "*available information*" concerning traffic and weather conditions along the route is that which is known to the controller.

The DSNA informed the BEA that a FIC agent is not authorised to issue a clearance. Moreover, s/he is not trained to give radar vectors. S/he can however provide information to the pilot, in particular based on her/his view of the air situation.

In the acceptable means of compliance, AMC1, of article ATM/ANS.OR.B.005(a)(6), the European regulations specify the actions that the service provider should implement in terms of personnel training, expected skills, necessary assessments and personnel awareness of the relevance and importance of their activities.

A change in European regulations came into force in January 2022. It incorporates the provisions of the International Civil Aviation Organisation (ICAO) already in force before the accident (Chapter 9 of ICAO Doc 4444, Procedures for Air Navigation Services) and specifies the following points:

- AMC1 relating to requirement ATS.TR.300(c)(1) states that information on the actual progress of flights shall be passed by the air traffic services unit receiving the information to the other air traffic services units concerned, where this is required for the purposes of coordination between air traffic services units providing flight information services in adjacent FIRs for IFR and VFR flights;
- GM2 ATS.TR.300(c)(2) specifies in points (b) and (c) that coordination should include the transmission of the appropriate elements of the flight plan and should be made to the organisation in charge of the next FIR before the aircraft enters that FIR;
- in addition, as in SERA.9005 quoted above, article ATS.TR.305 "Scope of flight information service" indicates in paragraph (e) that the flight information service provided to VFR flights must include the information available concerning the meteorological conditions along the route which are likely to make the continuation of a VFR flight impossible.

Organisation of off-aerodrome flight information service in France

In France, the off-aerodrome flight information service can be provided:

- either in the Flight Information Sectors (FIS) attached to major airport approaches;
- or in Flight Information Centres (FIC) located in Area Control Centres (ACC).

Radio contact with a flight information service is not compulsory.

A few years ago, the DSNA initiated a project to have adjoining FIS. As this project has not yet come to fruition, the FIS are still not contiguous. Outside of these airspaces and those managed by the military ATC, the flight information service is provided by the FICs.

At the time of the accident, only the Paris and Aix-en-Provence ACC (ACC/N and ACC/SE respectively) had a FIC, the FIS being adjoining in the other airspaces. This is still the case at the time of publication of this report.

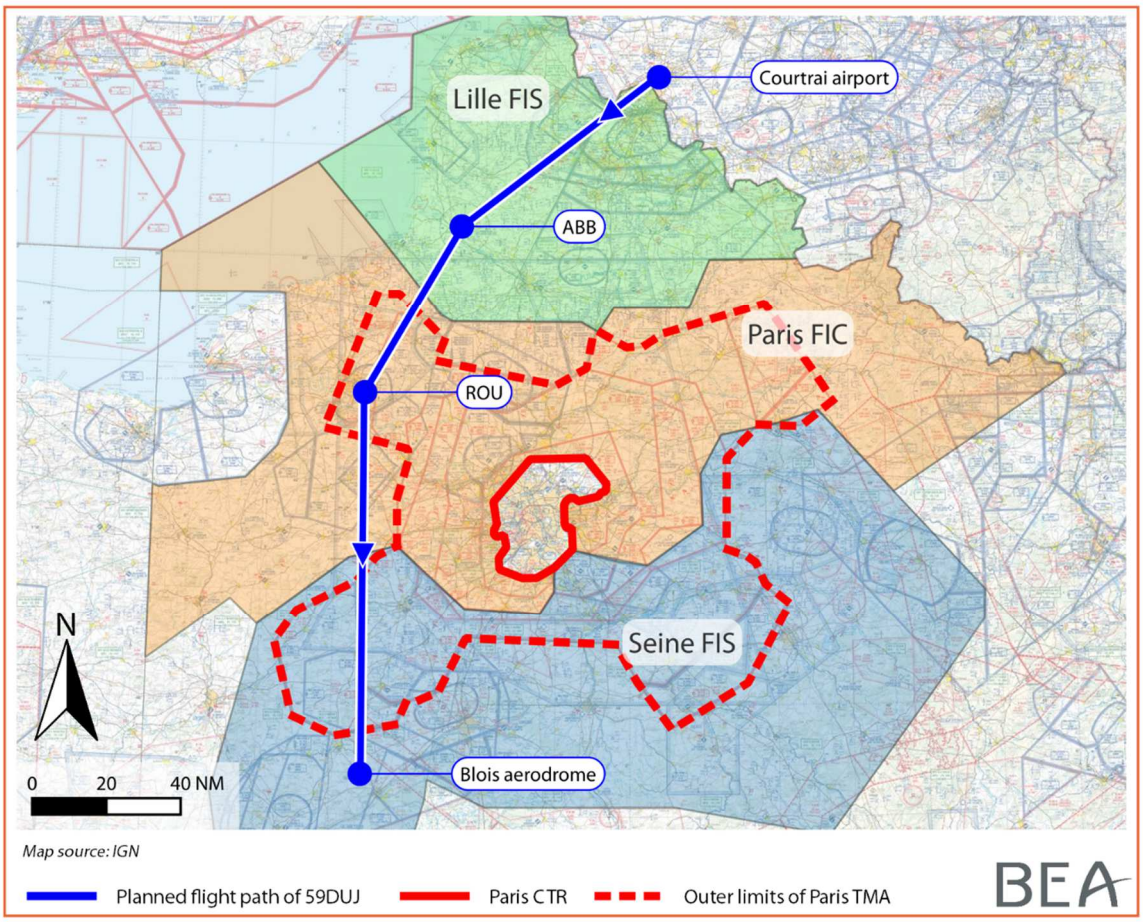


Figure 15: flight information sectors in north France (source: DSNA, annotations BEA)

In France, the agents who provide the flight information service have different statuses and training:

- flight information is provided in the FIS by air traffic control engineers (ICNA) and for its implementation throughout France, relies on significant human resources which the DSNA does not necessarily have in each approach unit;
- the flight information service in the FICs is provided by senior technicians in aviation operations (TSEEAC) who do not hold an ATC licence The latter are required to perform a certain number of tasks over a large geographical zone, including a significant volume of traffic, without any standardised training.

In the FIS, all aircraft with an active transponder are displayed on the controller radar screens. Risk of collision information can thus be provided to any VFR flight that has established radio contact, even with respect to another VFR flight which is not in radio contact with the FIS. Meteorological information is also available on various tools.

However, in the FICs, as a general rule, only VFR flights which have made a radio call to the FIC concerned and been assigned a specific squawk code are displayed. Other traffic, including VFR aircraft displaying code 7000 on their transponder or other codes, are not systematically displayed. They can be displayed by activating a specific button at the control position, known as

the "all codes" button. Some agents use this button to have an overall view of the traffic, but this is not the case for the majority of the agents, due to the extent of the airspace they manage and the large number of aircraft displayed on their radar screen in this case.

The ACC/N FIC is in charge of supplying the flight information service for all the flights in the Paris FIR[30] flying in zones not already covered by a FIS.

1.17.2.2. Lille FIS

In the Lille control service, there is no position or frequency dedicated solely to the flight information service. Approach controllers manage IFR and VFR flights from their control position, on the control frequencies.

All the traffic is displayed on the controller screens. There is no filter to make the blips from aircraft with the squawk code 7000 disappear. When a VFR traffic wishes to benefit from the flight information service, the pilot contacts the FIS. Once contact has been made, the controller assigns him a squawk code. The radar blip of this aircraft is automatically identified and displayed on the radar screen.

Flight information on other traffic is provided to flights in radio contact, in the event of a risk of loss of separation, including on those which have not contacted the Lille FIS.

In accordance with regulation SERA.9005, when they are aware of them, controllers must inform pilots in VFR flight when they are likely to encounter adverse weather conditions. Aerodrome weather conditions (METAR and TAF for example) are available, via the CIGALE tool at the workstation, for aerodromes located in FIS airspace.

Class A airspace, such as the Paris TMA, is not displayed. It can be displayed when requested by the controller.

The flight plans can be "called up" by the controllers on the SMGCS screens at the workstation if necessary. They are not displayed automatically, even when they are active for aircraft planning to cross Lille airspace.

Apart from the ASPOC system, which principally gives information about storm clouds, the Lille controllers do not have at their workstations a means of displaying the cloud layers present, which could be a hindrance to VFR flights.

1.17.2.3. Paris FIC in ACC/N

The ACC/N FIC is in charge of supplying the flight information service for all the flights in the Paris FIR flying in zones not already covered by an approach FIS.

The Paris FIC was reopened in 1996 after being closed for several years. At that time, the DGAC decided that the FIC would be manned by TSEEACs with the service reduced to the provision of parameters on the pilot's request. As a consequence, the radar tool was removed for the Paris FIC agents, this tool being reserved for ICNAs in the control centre.

Seven years later, the DGAC decided to provide the FIC agents with the radar display. Initial training in the use of the radar consisted of six simulator sessions in the centre.

[30] Division of French airspace situated below FL195 which the ACC/N is responsible for.

From 2011-2012, initial and continuation training began to be structured locally. The training does not include a module specifically dedicated to the recognition of VFR aircraft in difficulty.

Furthermore, FIC agents are not required to have a minimum ICAO level in aeronautical English, as is the case for air traffic controllers. Priority for English language training slots is given to air traffic controllers. Slots for access to the English language lab are offered to non-controllers depending on the availability of the teachers, with it being left to the agents to enrol. The statements indicated that it was difficult for Paris FIC agents to access the English language lab.

The very large area covered by the Paris FIC makes it impractical for all aircraft with the squawk code 7000 to be displayed. Consequently, only aircraft which have checked in on the frequency and been allocated a specific code are displayed. Furthermore, when Seine Info closes one of its FIS sectors[31], the corresponding airspace is taken over by the Paris FIC, thus increasing the area to be covered as far as Poitiers - Le Mans.

The Paris FIC positions are situated at Athis-Mons, in the same room as the ACC/N control services, and the workstation is equipped in much the same way as the controller positions (see

Figure *16*).

[31] The Melun FIS is divided into three sectors: FIS1, FIS2, FIS3.

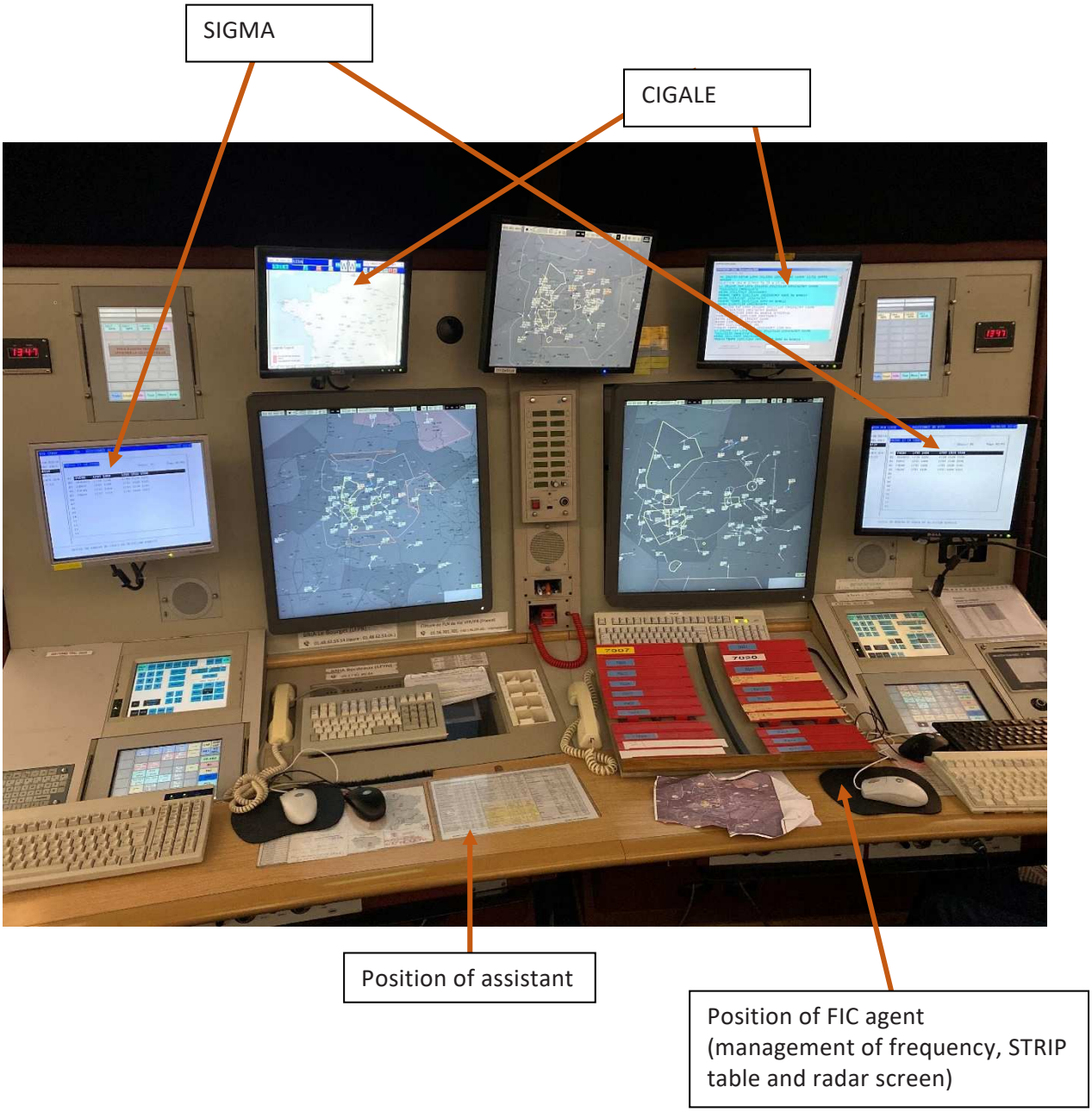


Figure 16: Paris FIC position in ACC/N (source: BEA)

If a VFR pilot cannot avoid the class A TMA, the Paris FIC agent can coordinate with the control sector concerned according to the aircraft's position: Paris – Charles de Gaulle, Beauvais or ACC/N.

In this case, given the position of the microlight, the FIC agent could have coordinated with the ACC/N IFR sector controller concerned (located in the same room). The latter could then have displayed the VFR flight by forcing the display on his radar screen.

The weather information provided to pilots only concerns weather reports and forecasts (METAR and TAF) which are available via the CIGALE tool (see

Figure 16). The FIC position also has a PC that can be used to access websites such as Météo-France PRO to obtain SIGMETs and SIGWX charts. Agents can use this PC to consult other meteorological sites as a personal initiative.

Flight plans can be printed at the agent's request after the pilot has made radio contact with the FIC when the agent needs them or after the pilot has made a radio call.

1.17.2.4. Procedures for transferring between Lille FIS and Paris FIC

A letter of agreement entitled "LoA between Paris ACC and Lille APP" specifies, in its version of 3 March 2016 revised on 28 March 2019, that there may be an exchange of information between the Paris FIC and the Lille FIS for VFR flights passing from one unit to the other. This letter specifies in paragraph D.6 that VFR flights above FL 065 in contact with Lille must be notified to the Paris FIC in order to anticipate possible penetrations into the Paris class A TMA.

The operations manual of the Lille control unit (version of 4 September 2018) adopts this wording in its chapter 11, specifying, however, that the obligation of coordination[32] before transfer to Paris Info for VFR flights above FL 065 only applies for Lille FIS 3, i.e. the part to the south-east of the Lille FIS, which did not concern the flight path of 59DUJ (located in FIS 1 and FIS 2). The heads of the ANS/North indicated that this had certainly been overlooked when the operations manual was updated and that controllers had generally kept to the habit of coordinating only for VFR flights located in FIS 3.

Subsequent to the LoA of March 2016, a directive ref NS-17-37-SC was drafted in 2017 by the ANS/North. It quoted this new LoA and included some of its modified elements, without mentioning the change relating to the need for coordination with the Paris FIC for certain VFR flights.

1.17.3. Filed flight plan information

1.17.3.1. Flight plan regulations

SERA.4001 *Submission of a flight plan* indicates that:
" […]
(b) A flight plan shall be submitted prior to operating:

- *(1) any flight or portion thereof to be provided with air traffic control service; […]*
- *(3) any flight within or into areas, or along routes designated by the competent authority, to facilitate the provision of flight information, alerting and search and rescue services; […]*
- *(5) any flight across international borders, unless otherwise prescribed by the States concerned; […]"*

1.17.3.2. Transmission of flight plan to competent French control services

A flight plan was filed by the pilot at 08:04 and received by the air navigation services for a departure at 09:35 indicating a cruising altitude of 3,000 ft and a route via the Abbeville and Rouen VORs.

[32] This coordination is done by telephone.

1.17.4. Rules of the air applicable to flight of 59DUJ

1.17.4.1. Rules linked to class of airspace crossed

During its flight in French airspace, 59DUJ crossed class D and G airspace:

- class G from the time it crossed the border (see **Figure 1**, point 2) until it entered the Lille TMA (point 3);
- class D from when it entered the Lille TMA at 6,500 ft (point 3) then at 8,000 ft until it exited it at point 5;
- class G from when it exited the Lille TMA at 8,000 ft (point 5) up to the accident.

Class D airspace is controlled airspace where radio contact is mandatory. Entering and manoeuvring in this airspace is subject to air traffic control authorisation (clearance). On the other hand, entering and manoeuvring in class G (uncontrolled) airspace does not require air traffic control clearance. Radio contact in this airspace is not mandatory. A VFR pilot who has nevertheless made contact can inform the controller or agent of the manoeuvres he is carrying out without waiting for specific clearance.

1.17.4.2. VMC conditions

VMC conditions differ according to the flight altitude and the class of airspace being crossed.

SERA.5001 *VMC visibility and distance from cloud minima* indicates that a VFR pilot must be 1,500 m horizontally and 300 m (1,000 ft) vertically from clouds except if s/he is manoeuvring below an altitude of 3,000 ft or a height of 1,000 ft above terrain whichever is the higher, in class F or G airspace in which case the pilot must be clear of cloud with the surface in sight.

SERA.5001 envisages the possibility of a VFR flight entering class A airspace as it specifies in the table in this paragraph, the conditions to be complied with in the case of a VFR flight being exceptionally allowed in. A note specifies that the VMC minima in class A airspace are given for guidance to pilots and do not imply acceptance of VFR flights in Class A airspace.

1.17.4.3. Rules for using flight levels and altimeter settings

SERA.3110 *Cruising levels* indicates:

"*The cruising levels at which a flight or a portion of a flight is to be conducted shall be in terms of:*

(a) flight levels, for flights at or above the lowest usable flight level or, where applicable, above the transition altitude;

(b) altitudes, for flights below the lowest usable flight level or, where applicable, at or below the transition altitude."

SERA.5005.g) specifies that, "*Except where otherwise indicated in air traffic control clearances or specified by the competent authority, VFR flights in level cruising flight when operated above 900 m (3 000 ft) from the ground or water, or a higher datum as specified by the competent authority, shall be conducted at a cruising level appropriate to the track […].*"

59DUJ's route globally heading south-west was on flights levels with an even number and ending in five (FL 045, 065, 085 or 105 for example). Flight levels finishing with a zero are for aircraft flying under IFR.

1.17.4.4. Rules concerning microlight “on top” VFR flight

In France, regulations require that equipment be carried for “on top” VFR flights. On the day of the accident, 59DUJ was able to fly “on top” under VFR in French airspace.

In Belgium, article 52 of the Royal Order of 25 May 1999[33] stipulates that in Belgium, microlights must comply with the Royal Order of 15 September 1994 laying down the general rules of the air[34] and that they may only operate during the day, within sight of the ground or water. As a result, microlight “on top” VFR flights are not authorized in Belgian airspace.

1.18. Additional Information

1.18.1. Statements

1.18.1.1. Statements from Lille FIS controller and deputy head of the Lille unit control subdivision

The controller who was on duty in the Lille tower indicated that she managed all the control functions of the Lille unit (Ground, Tower, Approach, FIS).

She specified that there were a lot of pilots flying under VFR on the frequency at the time, and very few (if any) under IFR, given the post-Covid situation.

The deputy head of the control subdivision added that a NOTAM[35] indicating that the flight information service was not provided throughout the Lille sector had been in force since the start of the lockdown. The aim was to protect controllers from too many calls from VFR flights and to give them the option of providing the flight information service or not, depending on their workload at the time. If the controller chose not to provide the service, s/he notified the pilot checking in, indicating that only the alert service was provided. At Lille, there is no specific FIS frequency. The approach frequencies shown on the charts are used.

The controller indicated that after the initial call from the pilot of 59DUJ, she took charge of him without any particular restrictions.

The controller indicated that she had not been particularly concerned by the fact that the pilot asked her to climb to FL 080, even though this is a level usually reserved for IFR flights[36].

She considered that the pilot must have "good reasons for requesting this" and there was no traffic that might interfere with this flight at this level. Although she had thought that the pilot's request was related to the weather conditions, she believed that the management of flight conditions is a matter for the pilots. She felt that it was not her role to educate on this point.

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[33] Op. cit. p. 35.

[34] Royal Order concerning rules of the air and operational provisions regarding services and procedures in air navigation.

[35] NOTAMR No A2016/20 indicating that the flight information service was not provided in the Lille FIS 1 to 5.

[36] The DSNA specified that requests from pilots operating under VFR to fly at IFR levels or at levels that do not comply with the semi-circular rule can be accepted by the air traffic services as long as they do not generate a conflict with IFR flights.

She pointed out that in the operations manual for the Lille air navigation service, coordination with the Paris FIC is only provided for in the south-east part (FIS 3) for VFR above FL 065. This was not the case for 59DUJ. She was therefore not obliged to warn the FIC agent of the imminent arrival of 59DUJ in his sector.

Furthermore, the controller stated that she was not aware of the Paris FIC's working method, which consisted of only displaying aircraft that actually contacted the FIC, and that aircraft that had squawked code 7000 were not systematically displayed on their radar screen. In the Lille FIS, all traffic was displayed.

The controller indicated that there was no specific training in recognising VFR flights in difficulty. Nevertheless, pilots are sometimes questioned if their flight path is fluctuating or if they are flying too low and the transponder disappears, for example.

59DUJ's flight plan was not printed off after the radio contact.

The deputy head of the control subdivision explained that it might be possible to pre-print VFR flight plans transiting through the Lille sector or display them, as is done in a "DISCUSS" list for IFR flights. This would make it easier to anticipate the arrival of VFR flights transiting through the area.

1.18.1.2. Statement from Paris FIC agent

The Paris FIC agent on duty at the time of the accident took up his position at 10:00 after relieving his colleague. He stated that at this time there were five or six VFR aircraft on the frequency.

The Paris Info frequency opens at 09:00. From 07:00 to 09:00, the FIC agents primarily manage the flight plans and the alerting service in the telecommunications and flight information unit (BTIV).

From the end of March to the end of October, there are normally two agents in the flight information position: one agent who manages the frequency and a support assistant to manage the telephone if necessary. The FIC agent explained that on the day of the accident, just after the end of the lockdown, there was only one agent in the flight information position.

The FIC agent added that the main part of his job was to ensure that VFR aircraft did not enter the Paris Class A TMA. This is the absolute priority required of FIC agents.

He stated that when the pilot of 59DUJ checked in, he assigned him a squawk code and looked for him in the north-east sector of Paris usually used for aircraft arriving from Belgium. Seeing no blip on his radar screen, he initially thought it was a problem with the transponder.

The agent indicated that he only displayed aircraft which had squawked the transponder code he had assigned. The 7000 codes are not displayed systematically as this clutters the radar screen due to the very large area covered by the Paris FIC. However, a button can be used to display them if required. He did not use it on the day of the accident.

A flight plan was available in the system. The flight plan strip is only printed by the agent upon the pilot’s first radio contact.

It was when he saw ABB (Abbeville) as the planned point on the route that he realised he was looking in the wrong sector. He then saw 59DUJ on the left-hand side of his radar screen and

realised that the microlight was about 1 NM from the class A TMA and above the TMA lower limit. He explained that he was "seized by panic" and asked the pilot to turn right, which was the quickest way for 59DUJ to head for the part of the TMA where the lower limit is at FL 085. The pilot wanted to descend instead. The FIC agent insisted that he turn right and asked him not to descend.

The FIC agent stated that he was not aware that the weather was not good to the west of the position of 59DUJ. The information indicating the weather situation in real time over the area covered by the FIC is not displayed at the workstation. You have to get them from personal applications used by certain agents. The training received in meteorology is also "light" according to him. He indicated that the agents were simply expected to know how to read TAFs and METARs.

The FIC agent also specified that a derogation to enter a class A TMA with the approval of the Paris-Charles de Gaulle control centre which manages this area, is not conceivable in his opinion[37]. He stated that penetration of this area should be avoided at all costs.

The agent explained that if he had known that the pilot was facing weather related difficulties, he would probably have suggested the possibility of diverting to Beauvais aerodrome, for example.

Lastly, the agent indicated that he was aware that he had difficulty speaking English on the radio. Due to equipment availability, it is generally not possible for FIC agents to have access to the English laboratory provided for their colleagues in the Athis-Mons control room.

1.18.1.3. Statement from head of BTIV (Paris FIC)

The head of the BTIV explained that he joined the Paris BTIV in 1994. When the Paris FIC opened in 1996, training was very basic and consisted of a period of the agents working in pairs, with no theoretical training beforehand.

He explained that he was appointed deputy head in 2011 and then head of the BTIV. He was involved in setting up more structured initial training from 2011, which was reviewed in 2018-2019. This training was carried out internally in the BTIV without giving rise to a licence. This training was reserved for new agents appointed to the Paris BTIV; the agents who already held the position were not required to attend.

There was no training in assisting VFR flights in difficulty, such as a VFR flight in a situation of difficulty not announced by the pilot but whose flight path was indicative of a “problem”, for example. The main objective taught in the FIC training was to avoid having VFR flights enter Paris class A airspace.

[37] This part of the class A TMA is actually managed by the ACC/N from a position next to the FIC position.

The head of the BTIV added that the training provided in the FIC was "fairly light" with respect to meteorological aspects and that private meteorological applications giving more details were installed on the workstation.

The FIC position was manned by two agents (an agent on the radio and an assistant to cover the telephone and coordination) every day between the end of March and the end of October from 10:00 to 18:00 local time. On some winter weekends with good weather conditions for VFR flights, it would be preferable to have two agents on duty. Even when the number of staff was not nominal, the sector remained open with just one agent. The areas covered and the services provided remained the same.

After the lockdown period, only one agent was in the Flight Information position between 17 May 2020 and 1 July 2020, due to the "Covid" context.

Flight information was only provided to aircraft that had checked in.

The head of the BTIV indicated that coordination with Lille was not always carried out for the south-west part of the Lille FIS (FIS 1 and FIS 2) which, in his opinion, was not compulsory and that systematic coordination before transfer was really the best way to be able to anticipate.

He specified that if the penetration was foreseeable, the best policy was for the FIC agent to call the Paris-Charles de Gaulle control centre beforehand to see if the transit of a VFR flight in class A TMA could be authorised. The head of the BTIV would like the agents to systematise this coordination, which was not the usual practice. There had been no specific training on this point.

1.18.1.4. Statement from management of Paris-Charles de Gaulle control subdivision

The Paris-Charles de Gaulle control subdivision assistant explained that the Paris-Charles de Gaulle approach did indeed manage certain parts of the Paris class A TMAs, but not the TMAs 7 and 9 concerned by the event. These two TMAs were managed by the ACC/North located at Athis-Mons. A small additional portion of TMA 7 and/or 9 can be temporarily assigned to the Paris-Charles de Gaulle approach to protect the holding sectors when commercial aircraft bound for Paris-Charles de Gaulle have to hold. This portion is located a little further south than the accident site and was not active that day. The portion of TMA 7 affected by the event was therefore managed by the ACC/North.

In the event of an urgent situation, the Paris-Charles de Gaulle unit confirmed that it was possible to authorise the transit of VFR flights in Paris class A TMA, with prior coordination with the sector concerned and on condition that it was a real imperative and not simply a wish on the part of the pilot of the VFR aircraft to facilitate his navigation. The management of the Paris-Charles de Gaulle control centre indicated that the Paris FIC could have asked the ACC/North sector for a transit authorisation for 59DUJ in the portion of the Paris TMA 7 concerned (the Paris-Charles de Gaulle unit not being competent to authorise such a transit in this airspace) when the microlight encountered weather-related difficulties. What is more, there was no interfering IFR commercial traffic at this time in the Paris areas.

1.18.1.5. Statements from crew's relatives

1.18.1.5.1. Statement from passenger's parents

The passenger's parents explained that they were staying in their holiday home at Figeac until Sunday 21 June on which day they were to return to Belgium.

They indicated that the purpose of the flight of 59DUJ was both for their daughter to visit them and to test the feasibility of flying in a microlight from Belgium and accommodating future cross-country flights by a group of several microlights in their holiday home. The departure of the flight was initially planned for Thursday 18 June 2020. Due to adverse weather conditions (heavy rain and very poor visibility), the flight had been postponed to the next day, Friday 19 June. It was therefore the last possibility for carrying out this flight before they went back to Belgium.

The passenger's return flight to Belgium was to take place the morning of the next day as she had to be back at her home by Saturday evening. The passenger had told her parents that there would be a stop for "physical needs" along the route. Around 15 min before taking off, she told her parents that she was a bit nervous as there were clouds on their flight path but that everything had been well planned.

1.18.1.5.2. Statement from pilot's widow

The pilot's widow indicated that the flight had been planned for several weeks. Her husband was enthusiastic about the idea of doing this flight as the majority of his flights were local. The few cross-country flights that he had carried out had been to the north of France, and Touquet in particular.

The day of the flight, he told his family that everything was ready. She stated that her husband always prepared his flights in a very professional manner. On flights on aircraft equipped with a parachute, he mentioned the principle of the parachute to the passenger (case of a flight with his son). The pilot's relatives specified that the Covid epidemic had considerably reduced his activity from January up to and including March.

1.18.1.6. Statement from pilot's former students

A former student indicated that the instruction flights were generally carried out on the school's Lambert Missions and sometimes also on Flight design CTLS, both of which had high wings and were fitted with a parachute. Training regarding the operating principle of the parachute was essentially theoretical. There was no real explanation with respect to who should or could activate the parachute or when. It was simply stated that in the event of pilot incapacitation, the passenger could activate the parachute.

She added that the pilot was a conscientious instructor when it came to preparing flights and was extremely demanding with his students. All flights were followed by a full debriefing.

Another former student said that the pilot of 59DUJ was in the habit of giving the parachute briefing as required by the Belgian order. He also taught the absolute necessity of making a U-turn if the weather conditions became adverse.

1.18.1.6.1. Statement from pilot who witnessed departure

This witness was present on Thursday 18 June when the pilot decided to cancel the flight due to the meteorological conditions. In his opinion, the decision was thought through and taken in a level-headed manner.

The next day, the day of the accident, this witness was also present during the preparation of the flight of 59DUJ. He commented to the pilot that straight ahead in the distance the sky was quite grey. The pilot of 59DUJ replied that it was nothing serious and that they would fly “on top”. This surprised him as usually the pilot cancelled his flights for less than that. He did not seem to be particularly stressed.

The witness added that in his briefing with the passenger, the pilot usually placed emphasis on the parachute safety pin which was to be removed before the flight.

1.18.1.6.2. Statement from owner of 59DUJ

The owner of the VL-3 did not like flying on his own and had performed nearly all of his 90 flight hours with the pilot of the accident. For the most part, these flights on the VL-3 were carried out in Belgium. They also both flew on the MCR and with this microlight, had carried out cross-country flights to the south of France or Switzerland. They liked flying quite high. For example, for a flight to Switzerland, they had cruised at 10,000 ft as this flight altitude was possible in France and a lot more complicated in Belgium. They were also in constant contact with the air traffic services which they found more comfortable and reassuring.

The Sunday before the day of the accident, the pilot of 59DUJ had asked him if he could use his VL-3 to carry out a cross-country flight to France without specifying the date. The owner indicated that, rather surprisingly, he had not been informed of the exact date of the microlight's departure, which was unlike the pilot. He subsequently learnt of the accident in the press.

The owner also stated that the pilot of 59DUJ effectively gave information about how to activate the parachute, the need to fire it if necessary and recommended reducing the power of VL-3 before pulling on the parachute control.

The owner recommended using the parachute if necessary, putting people before money.

1.18.2. Previous occurrences Activation of airframe parachutes during loss of control in microlights

The BEA extracted from its database the accidents following an in-flight loss of control on microlights equipped with airframe parachutes which had occurred since 2015 in France[38]. This represented 67 accidents.

If the losses of control at an estimated height of less than 100 ft (or at an undetermined height during a go-around manoeuvre) as well as events linked to pilot incapacitation during a flight alone on board are excluded, this leaves 43 events where the occurrence conditions are thought to be favourable to the use of the parachute.

[38] This also included the occurrences for which the BEA had not opened an investigation. These occurrences contain data which has not been validated by the BEA, notably with respect to the precise circumstances.

The following graph details the cases of parachute activation and non-activation during these losses of control and the severity of the corresponding injuries.

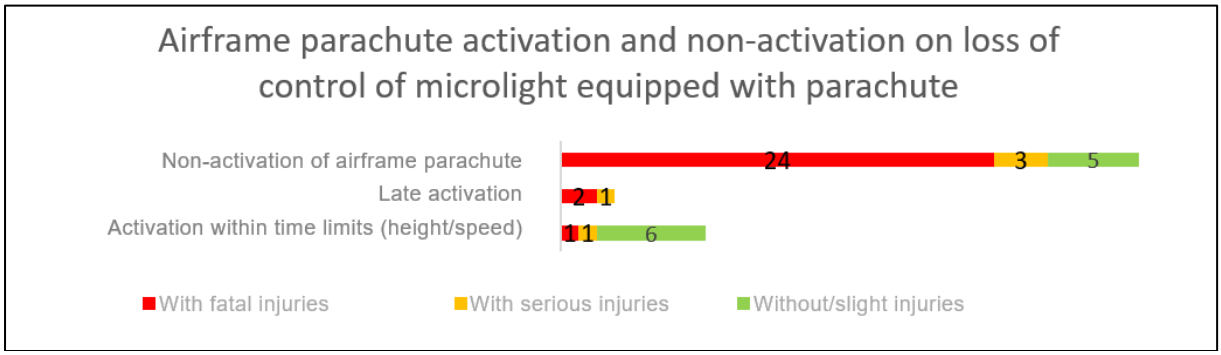

Figure 17: nature of injuries according to whether or not the parachute was opened during loss of control of a microlight fitted with a parachute (source: BEA)

In 32 of the 43 cases, i.e. nearly 3 out of 4 occurrences, the parachute was not activated.
There were fatal injuries in 75% if the cases (24 out of the 32 cases) when the parachute was not activated and 27% of the cases (3 out of the 11 cases) when it was activated.

When the parachute was activated in the timeframe which would have permitted its deployment (third line of **Figure 17**), the case with fatal injuries is linked to the technical malfunction of the ballistic system.

1.18.3. Previous occurrences concerning assistance to VFR flights

The BEA published 17 accident reports between 2010 and 2019 involving a failure by air traffic control agents to detect pilot problems linked to adverse weather conditions and/or insufficient or inappropriate assistance, when the pilot was in contact with an air traffic control unit at the time of the accident. These events are listed in Appendix 3 and resulted in the deaths of 30 people, pilots or passengers on board the aircraft.

These investigation reports show that in the vast majority of the cases, there were prior signals of a problem such as :

- requests to change altitude, to climb or descend, with the pilot sometimes specifying that these requests were motivated by the weather;
- requests to change route;
- requests from the pilot to anticipate a change to flight under IFR (1 event).

In addition, the BEA issued safety recommendations following two fatal accidents:

- **Accident to the Piper PA28 registered F-HEHM**[39] :

The investigation brought to light that the pilot's determination to get to his destination, his overconfidence due to his very good knowledge of the route and the proximity of the destination aerodrome may have led him to continue the flight despite the deterioration in conditions.

In such a situation, an outside aid can help a pilot relinquish his initial intentions and lead him to anticipate a modification in his flight path or envisage turning around.

[39] Accident on 1 July 2015 at Treilles.

The systematic passing on to VFR pilots, of information related to meteorological conditions making the continuation of the VFR flight impossible, and pilot reports is not one of the practices of the French control unit.

As a consequence, in July 2019, the BEA issued a safety recommendation in order that ***"The DGAC ensure the effective provision of the flight information service by the control units as described in SERA.9005 c), when the weather conditions make operation under the visual flight rules impracticable and this even when not explicitly requested by the pilot."*** **[Recommendation-FRAN-2019-027]**

- **Accident to the Extra 200 registered F-GPIT**[40]:

The pilot of F-GPIT found himself in poor weather conditions at the controls of an aircraft not equipped for blind navigation. The investigation showed that the pilot continued his flight without informing ATC of the degraded weather conditions in which he was manoeuvring for around thirty minutes. In the absence of such information, the controller, not trained to detect this type of situation, was unable to quickly understand the difficulties encountered by the pilot of F-GPIT, delaying the setting-up of suitable assistance.

As a consequence, in March 2019, the BEA issued a safety recommendation in order that ***"The DSNA ensure that in the training covering unusual situations, the aspects permitting the detection of situations where pilots flying under VFR could require assistance are studied in the same way as the management of these situations. These training courses could be based, in particular, on the study of real incidents or accidents."*** **[RecommendationFRAN-2019-004]**

This recommendation was based on a study of previous events. The list in this study has been updated in this report (see Appendix 3).

In the DSNA's final response to the above recommendations for the accidents involving F-HEHM and F-GPIT, it indicated to the BEA in April 2021 that it would take the following measures:

- draft a national training guide for FIC and FIS controllers, the distribution details of which are still to be worked out with the centres, and which was to:
  - introduce the main dangerous weather phenomena and their impact on VFR flights,
  - remind controllers of the regulatory obligation to:
    - inform VFR flights of weather conditions likely to prevent them from continuing their flight, including those received via a pilot report, without waiting for a pilot request, subject to having the availability to give flight information (control always takes precedence over flight information),
    - during the position handover, transmit pilot reports and information relating to weather conditions likely to affect the continuation of a VFR flight. If necessary, the support shall include a section on working methods and it could include the DO REX of 07/20 concerning the passing on of weather information to the relieving controller,
  - mention the detection (points of vigilance, signs, response to Recommendations FRAN-2019-004, FRAN-2019-029 and FRAN-2019-030) and the management of VFR pilots in difficulty by adopting the list of signs identified by the BEA;

[40] Accident on 25 February 2016 at Saint-Héand.

- check that all OMs include details on the reception and transmission of pilot reports as well as information on weather conditions likely to affect the continuation of a VFR flight;
- check that in the ENAC training, it is effectively taught that pilot reports and weather information likely to affect the continuation of a VFR flight must be transmitted during handovers.

Neither the Lille FIS controller nor the Paris FIC agent seemed to have been exposed to training related to the recognition of VFR aircraft in difficulty or the provision of meteorological information, and they mentioned that they were not aware of any additions to the units' operations manuals on these subjects.

1.19.Useful or effective investigation techniques

Not applicable.

2. ANALYSIS

2.1. Introduction

The pilot and passenger had planned to fly to Figeac-Livernon aerodrome to visit the passenger's parents and prepare the organisation of future group cross-country flights in the region. The day preceding the day of the accident, the crew had postponed the flight due to adverse meteorological conditions.

The day of the accident, a flight plan was filed for a cruise altitude of 3,000 ft with the route passing via the Abbeville and Rouen VORs. Just before departing, the pilot told a witness that he was going to try and fly on top of the clouds that were straight ahead in the distance.

On crossing the border and on first radio contact with the Lille approach managing the Flight Information Sector (FIS), 59DUJ was at an altitude of 3,500 ft. At this point, the pilot asked the controller several times for clearance to climb to avoid clouds on his route. The highest level reached was FL 080 which is usually reserved for IFR flights.

Shortly after flying over the Abbeville VOR, the pilot progressively turned left, changing direction by around 20°. He probably wanted to avoid the cloud front that was on his right. Once established on this new route, he was around 15 NM from the Paris TMA 7 which is class A airspace prohibited to VFR flights above FL 065.

Soon after, the Lille controller asked the pilot of 59DUJ to contact the Paris Info Flight Information Centre (FIC) without having first coordinated with the latter. The radar blip for 59DUJ was only displayed on the screen of the Paris FIC agent three minutes after first contact with the FIC due to the pilot having initially made an error when squawking the transponder code.

This error could be explained by the heavy workload from having to skirt around cloud masses. When the radar blip appeared on the screen of the FIC agent, 59DUJ was in class G airspace at FL 080, around one flight minute from entering Paris TMA 7.

The FIC agent repeatedly ordered the pilot to turn right in order to join the area where the TMA lower limit was FL 085 (TMA 9) and asked him not to descend.

The pilot did not mention that he could not turn right because of the cloud front. He initially turned left and entered the class A area by around 500 m inside the limit. The FIC agent was focused on the pilot avoiding TMA 7 by the west. The pilot for his part then reduced his speed, descended and started piloting manually in order to then continue his route below FL 065 and TMA 7, announcing this over the radio. The tight turns in descent suggest that the pilot might have wanted to spiral in an opening in the cloud layer while trying not to continue manoeuvring inside the class A area. He performed two right-hand turns in a globally descending trajectory which resulted in him exiting TMA 7 and then entering it again.

Then during a left turn with a bank angle of 49° and an indicated airspeed of 73 kt, the microlight reached the stall angle and the pilot lost control of the aircraft. The pilot, although he was aware they were falling, was unable to regain control of the microlight. The airframe parachute was not activated before the collision with the ground.

It was not possible to determine if, during the descent to avoid the TMA, the microlight entered the cloud layer.

The analysis covers the following points:

- get-home-itis;
- non-activation of the airframe parachute by the pilot;
- organisation of the flight information service.

2.2. Get-home-itis

The pilot and passenger, who were due to leave on Thursday 18 June, had finally postponed their departure by one day due to poor weather conditions. This was the last opportunity to make the flight to where the parents of the passenger were staying.

These circumstances may have led the pilot not to postpone the flight once again, despite weather conditions that were certainly better than the day before but still marginal for a visual flight. The fact that, contrary to his usual practice, the pilot did not inform the owner of the microlight prior to this departure could indicate a final decision taken late in the day.

It is likely that the pilot underestimated the risks associated with flying “on top”, such as the difficulty of passing below the cloud layer again if necessary (broken layer with few openings in the cloud layer) and entering airspaces prohibited to VFR flights if the altitude of the top of the cloud layer below him was higher than the lower limit of the area.

The possibility of turning back in the event of adverse weather encountered during the flight was not mentioned during the messages exchanged between the pilot, the passenger and her parents, nor during the conversation reported by a pilot present at the departure of the flight, which seems to indicate that the pilot undertook the flight without clearly considering turning back.

Furthermore, before departure, the pilot had reassured the passenger that the flight to Figeac was feasible, which probably increased her level of commitment to the success of the flight.

This determination to arrive at the destination may have biased the pilot's risk assessment, leading him to give preferential consideration to factors suggesting that he should continue the flight rather than turn back, particularly when he was confronted with the cloud front taking him further east towards the area prohibited to VFR flights (Paris TMA 7), interfering with his navigation at FL 080.

2.3. Non-activation of the airframe parachute by the pilot

During the fall following the pilot’s loss of control, 59DUJ was in a situation where activation of the airframe parachute is typically recommended:

- sufficient altitude for deployment of the parachute (7,000 ft);
- loss of control not immediately recovered.

The pilot's radio exchanges show that he was aware they were falling and of the loss of control. Furthermore, he was familiar with the advantages of the airframe parachute and the activation procedure that he taught to his students. However, the parachute was not activated.

The investigation was unable to determine whether the pilot:

- did not think of activating the parachute;
- thought about it but did not activate it; or
- wanted to activate it but did not manage to do so before the impact.

More generally, the statistics described in paragraph 1.18.2 indicate that, in the majority of cases, pilots either do not activate the airframe parachute or activate it late.

On losing control, the pilot's first actions are directed towards trying to regain control. To take the decision to activate the parachute requires the pilot to make a major effort to change his plan of action, particularly in view of the consequences (possible damage to the aircraft, failure of the mission, potential impact on reputation).

Given the small amount of time available to pilots in these highly dynamic situations, decision-making cannot be the result of a complex process consisting of an evaluation all the possible alternatives.

Identifying the situation and understanding its urgency must be the trigger. To this end, the clear pre-definition of trigger rules beforehand means that the pilot will not have to make a real assessment of the risks or advantages associated with this option.

The stress and surprise generated by the situation can slow down this decision-making process. However, it can be facilitated if the parachute activation procedure has been recalled during a briefing.

What's more, having practised the actual action previously during specific training and by simulating it just before the flight can ensure that the pilot performs the action nearly automatically in an emergency.

Lastly, good command of the activation action (position of the parachute handle, amplitude of the action and force to be applied) facilitate its execution in stressful situations and in unusual flight attitudes. However, there can be additional difficulties when control is lost, due in particular to any consequent roll movements and the load factor.

2.4. Organisation of flight information service

2.4.1. Detection of difficulties encountered by pilot of 59DUJ by air navigation services

The statement from the Lille controller who managed 59DUJ suggests that she maintained her view that a VFR pilot is solely responsible for managing the weather conditions.

She therefore did not ask herself why the pilot was asking for levels that did not comply with the semi-circular rule or with the rules under which he was flying. She did not pass on the information to the Paris FIC that the pilot of 59DUJ had had to climb to FL 080 because of cloud, which implied that it would be difficult for him to descend below the cloud layer, even though he had already taken a heading that took him into Paris TMA 7 when he was released by the Lille FIS. This information might possibly have enabled the Paris FIC agent to anticipate 59DUJ's change of route and not react under stress when he realised that 59DUJ was about to enter the class A area.

It frequently occurs that pilots do not report their difficulties, either because they are not aware of the risk or because other reactions such as get-home-itis or overconfidence mean that they hide certain risks from themselves, or because their workload is such that they do not have sufficient resources to detect them, or lastly because of concerns about being sanctioned if they are in non-regulatory flight conditions.

Requests from a pilot to change route or altitude because of clouds can sometimes be the first signs of difficulties to come.

The various interviews carried out in the ANS/North, Paris FIC and the BEA reports quoted in paragraph 1.18.3 show that the agents providing the flight information service are not specifically trained to detect an emergency situation and encounter difficulties in recognising it when the pilots do not report it.

Furthermore, the FIC and FIS do not have specific official tools allowing the agents to have an overview of the cloud masses which might make it impossible to continue a VFR flight or help a VFR pilot in difficulty due to cloud fronts except for the specific case of storm cells solely available for FIS controllers and with the limitation that this display is proposed on a separate dedicated screen.

However, better detection of situations where a VFR pilot is in difficulty could allow the agent to anticipate the situations before they become critical.

2.4.2. Work methods associated with coordination between centres and assistance to pilots

When 59DUJ left the Lille FIS frequency, there was no coordination with the Paris FIC in order to inform them of the arrival of the microlight in this area at FL 080.

The coordination for all VFR flights above FL 065 in order to anticipate the Paris class A TMA is requested by a letter of agreement between the ANS/North and the ACC/North. This prior coordination was not however set out in the ANS/North operations manual which continued to indicate the obligation for coordination for only one of the Lille flight information service sectors (FIS 3 with which the pilot of 59DUJ was not in contact).

The pilot of 59DUJ had filed a VFR flight plan for his cross-country flight. The VFR flight plans are not automatically displayed in the flight information services with which he was in contact (FIS or FIC). The agents in charge of flight information therefore have to display them manually after the first radio contact. The Lille controller and the Paris FIC agent could not therefore use the filed flight plan to anticipate the arrival of the aircraft. Moreover, the FIC agent who was alone in the position during this post-COVID period had not had the time to immediately display the flight plan.

The anticipation of the arrival of 59DUJ in this geographical sector at FL 080 by means of a telephone coordination by Lille might have helped the Paris FIC agent to gain time in displaying 59DUJ on his radar screen and thus anticipate the pilot flying around the Paris TMA.

2.4.3. Training of agents in charge of flight information service

The training of FIC agents is very different to that of air traffic controllers in the FIS positions (see paragraph 1.17.2). The FIC agents do not hold an air traffic control licence and do not follow complete and standardised training unlike other personnel in charge of air traffic control.

The statements from the Paris FIC agent and the head of the telecommunications and flight information unit (BTIV) collected during the investigation tend to show that the training of the Paris FIC agents was principally based on preventing VFR flights from penetrating Paris class A TMA at all costs, to the detriment of supplying a flight information service and assistance to VFR flights in difficulty. This became the FIC agent's priority when he realised at a late stage the imminence of the penetration. He did not know that it was possible to coordinate the penetration of a VFR flight in class A airspace and that in this case, the VFR flight could be displayed in the control sector concerned.

The insufficient training of the Paris FIC agent at the time of the occurrence possibly contributed to:

- the non-detection of the problem encountered by the pilot of 59DUJ when the latter did not comply with his repeated instructions to turn right;
- the difficulties in understanding and expressing himself in English possibly making him reluctant to communicate on the radio with the pilot. The FIC agent's radio messages showed frequent errors or inaccuracies in the expressions used ("in sight" instead of "identified" for example to indicate that he had radar contact) and difficulty in expressing clear messages in English. This did not incite the FIC agent to enquire about the nature of the problem encountered by the pilot as such a request would risk creating discussions in English with the pilot without the agent having the level of English to do so;
- lack of knowledge of the surrounding control areas, notably that TMA 7 and 9 are managed by the Athis-Mons control services (situated in the same room as him) and not as he thought, by the Paris-Charles de Gaulle services;
- not knowing that in the case of a *force majeure* or emergency, a VFR flight can be cleared to fly inside Paris class A TMA subject to prior coordination with the control sector concerned. The non-existent IFR traffic in the portion of the Paris TMA 7 concerned would have probably permitted 59DUJ to be exceptionally cleared to continue its flight at FL 080 if the FIC agent had asked the Athis-Mons controllers for this.

The Lille FIS controllers indicated that they did not have the means or the knowledge to identify VFR pilots in difficulty due to degraded meteorological situations.

2.4.4. Manning of Paris FIC

The fact that the FIC agent was on his own in the position on the day of the occurrence probably contributed to the very sudden increase in his workload and stress when he finally identified 59DUJ on the point of entering Paris TMA 7. This meant that he did not have the necessary resources to envisage another solution to 59DUJ turning right.

The presence of an assistant in the position with him would have probably meant that a competent control sector would have been contacted to warn that 59DUJ was flying through TMA 7 at FL 080 and the possibility that he continue his route envisaged.

2.5. Pilots' verbalisation of weather related difficulties

The pilot of 59DUJ did not inform the Paris FIC of the difficulties he was encountering at FL 080 due to the cloud front which was preventing him from turning right, the dense cloud layer below him probably making it problematic to descend below the layer under VFR and the Class A TMA 7 ahead of him from FL 065.

However, on a pilot immediately informing the air navigation services with whom he is in contact of the problems he is encountering, even without an emergency or distress message, the services have a better awareness of the situation, can better anticipate the information to be transmitted to him or the possible coordination with other sectors.

In this occurrence, although the pilot had informed the Lille FIS of his successive climbs made necessary by the top of the cloud layer, once he was in contact with the Paris FIC, the pilot no longer mentioned his difficulties with the "wall of cloud" to his right, which initially prevented him from maintaining his initial route and then from following the instructions to turn right given by the FIC agent.

It is often observed that pilots do not express their difficulties caused by bad weather conditions over the radio.

Several BEA reports mention pilots who do not verbalise problems linked to adverse weather conditions to air traffic control or flight information services, who are themselves not trained to detect such situations (see Appendix 3).

Actions by training organisations to raise pilot awareness and communication campaigns by pilot federations directed at their members could encourage them to report any weather problems they encounter more effectively to air navigation services.

Seventeen occurrences were recorded by the BEA between 2010 and 2020 on the subject of assistance to VFR pilots in poor weather conditions. These occurrences represent 30 fatalities. A more proactive approach by agents to detect the difficulties encountered and offer assistance to the pilot could have had an influence on the progression of these flights.

3. CONCLUSIONS

3.1. Findings

- The pilot held the French microlight pilot licence required to fly 59DUJ as the pilot in the left seat.
- The pilot also held a Belgian microlight pilot licence with a class 3 microlight instructor and examiner rating.
- The pilot exercised management functions in the Belgian Microlight Federation (BULMF) and took part in working groups on microlight pilot training and flight safety.
- The pilot was experienced on the VL-3 and had carried out flights on 59DUJ with its owner, as well as flights as an instructor for trainees from the microlight manufacturer.
- The microlight took off from Kortrijk-Wevelgem airport (Belgium) bound for Figeac-Livernon (Lot) with a short stopover in Blois.
- The crew had originally planned to leave on Thursday 18 June and return on Saturday 20 June. The flight was postponed to Friday 19 June due to adverse weather conditions, with the same return date.
- A permanent NOTAM completely closing the Lille FIS was in force. The purpose of this NOTAM was to allow the controllers on duty to decide on the level of flight information service provided according to their workload.
- The controller nevertheless accepted 59DUJ and did not inform the pilot of any possible reduction in the flight information service provided.
- A cloud front from the west which could not be crossed under VFR forced the pilot to alter his route to the left.
- This new route led him to fly at FL 080 towards Paris TMA 7, which is closed to VFR traffic above FL 065.
- Class A areas were displayed on the pilot's navigation display.
- The Lille controller asked 59DUJ to contact the Paris Info FIC. No prior coordination was made by the Lille controller with the Paris Info FIC.
- The display of all VFR aircraft was filtered on the FIC agent's screen, who could only see aircraft in radio contact with him on his radar screen.
- After the pilot of 59DUJ had checked in, the FIC agent took more than three minutes to identify him on the radar because the pilot had squawked an incorrect transponder code.
- When the flight was identified, the Paris FIC agent was surprised to see 59DUJ very close to entering the Paris TMA 7.
- The FIC agent instructed the pilot five times to turn right and not to descend in order to head more to the west and to avoid Paris TMA 7, going beyond the prerogatives of the FIC, which cannot provide control instructions.
- The Paris FIC agent did not detect the weather situation encountered by the pilot, which prevented him from following his instructions to turn right.
- The FIC agent did not call a control sector to coordinate the possibility of 59DUJ crossing Paris TMA 7 at FL 080.
- The pilot did not report the problem he was encountering due to the combination of Paris TMA 7 ahead of him, the impossibility of turning right because of the cloud front and the almost overcast cloud layer below.
- After being instructed to turn right and not descend several times, the pilot finally turned left and descended.
- The pilot reduced speed, announced to the FIC agent that he was going to descend below FL 065 and began spiralling downwards.

- The angle of attack of the VL-3 increased and then exceeded the stall warning activation threshold. The investigation was unable to establish whether the stall aural warning sounded in the pilot's headset, as flight tests carried out by the BEA on another VL-3 had shown that this was not always the case.
- During a tight left turn at a reduced speed of around 70 kt, the pilot lost control of the microlight.
- As 59DUJ passed an altitude of 4,600 ft in a near-vertical fall at a vertical speed of 5,600 ft/min, the Paris FIC agent called the pilot to inform him that he was below FL 065 and that he could now resume navigation.
- The pilot of 59DUJ twice indicated that they were falling which shows that he was very probably aware of the loss of control of the microlight.
- During the fall, at an altitude of around 1,600 ft, the engine parameters show a probable engine shutdown.
- The pilot was aware of when and how to activate the airframe parachute and taught the procedure to his students.
- The microlight airframe parachute was not activated during the fall.
- The observations on the site and of the wreckage found that the aircraft struck the ground with the wings level, in cruise configuration with a very low horizontal speed and a vertical speed which left no chance of survival for the occupants.
- The letter of agreement between the ANS/North (Lille) and the ACC/North (Paris) of 2016 and modified in 2019 specified that the centres would coordinate with each other for all VFR flights above FL 065. This provision was not included in the 2018 version of the Lille control unit's operations manual.
- The FIC agent position did not have a weather information display at the workstation to enable the agent to inform pilots of any adverse conditions on their route which might prevent the continuation of a VFR flight.
- The Paris FIC agent was in the position on his own being in the post-Covid period whereas the Athis-Mons unit usually planned for the presence of two agents in the summer period.
- The printout or display of VFR flight plans were not automatic in the Lille FIS and Paris FIC.
- In an emergency situation, a VFR flight can be allowed to manoeuvre in a class A TMA subject to coordination with the appropriate control sector. The FIC agent was not aware of this procedure and therefore did not implement it.
- The locally-defined scope of the training of Paris FIC agents, designed and given in-house, did not include specific information about assisting VFR flights in difficulty or recognising emergency situations nor systematic access to the English language lab.
- The Paris FIC agents were taught the importance of giving priority to preventing VFR flights from entering Paris class A TMA in their training.
- The FIC agent had had to manage difficulties in expressing himself and understanding English over the radio which may have delayed 59DUJ being displayed on his radar screen.

3.2. Contributing factors

The progress of the cloud front inland, difficult to anticipate on the basis of the meteorological information available before the departure made it impossible to continue the cross-country flight on the flight path planned by the pilot of 59DUJ. This resulted in him heading towards a class A airspace (Paris TMA 7), which is prohibited to VFR flights above FL 065.

The fact that it was not possible for the pilot to turn right due to the cloud front and the repeated messages from the FIC agent to stop him from entering the class A airspace probably led him to try and descend in a spiral to below the cloud layer and continue his flight below FL 065.

At an altitude of around 7,000 ft, during a steep-bank steep angle-of-attack left turn, the microlight very probably experienced an asymmetric stall resulting in an unrecovered loss of control.

The following factors may have contributed to the FIC agent not detecting the difficulties encountered by 59DUJ and to the absence of assistance to the pilot of 59DUJ from the flight information service:

- the non-coordination of the flight of 59DUJ by the Lille FIS which did not enable the Paris FIC agent to anticipate the arrival of the microlight and to quickly identify it on his radar screen;
- the late identification of 59DUJ by the Paris FIC agent due to the pilot initially squawking an erroneous code which did not allow him to envisage other options than have the pilot absolutely and urgently avoid the Paris class A TMA 7;
- the absence of meteorological information which could have allowed the Paris Info agent to provide the pilot of 59DUJ with a flight information service adapted to the actual and future meteorological conditions in the Paris FIC airspace;
- inadequate training of the Paris FIC agents;
- difficulties in understanding and expressing himself in English experienced by the Paris FIC agent.

The lack of information from the pilot with respect to the presence of the cloud front and that it was not possible for him to turn right, the FIC agent not being aware of the nature of the difficulties encountered by the pilot.

The following factor may have contributed to the flight being continued despite the adverse meteorological conditions:

- the pilot's determination to reach the destination for an appointment that had been planned some time ago, put off the previous day and which could not be postponed again.

The following factors may have contributed to the loss of control of the microlight and to it not being recovered before the ground:

- the possible globally nose-up, left input maintained on the controls[41], preventing the aircraft from exiting the stall and the probable recovery from the spin.

The non-activation of the parachute to mitigate the consequences of the microlight's fall.

[41] See paragraph 1.11 with respect to the consistence of these parameters.

3.3. Safety lessons

Activation of the airframe parachute

During the fall following the pilot's loss of control, 59DUJ was in a situation where activation of the airframe parachute is typically recommended:

- sufficient altitude for deployment of the parachute (7,000 ft);
- loss of control not immediately recovered.

Despite the stance taken by the pilot in favour of the parachute and its activation, and the elements collected during the investigation which seem to show that he was aware of the loss of control, the airframe parachute was not activated.

Following several accidents including the one involving 59DUJ in which the airframe parachute was not used, the BEA has initiated a study on the activation of the airframe parachute and the associated training.

4. SAFETY MEASURES TAKEN SINCE THE OCCURRENCE

4.1. Safety measures planned by the manufacturer

JMB Aircraft has set up a training centre on its premises at Amougies (Belgium). This centre is equipped with a VL-3 simulator with a functional parachute handle. At the time of the BEA's visit to the distributor's premises, adjustments still had to be made to the parachute handle in terms of the force and amplitude of movement required to activate it.

JMB Aircraft informed the BEA that the practical training on the simulator will be part of the initial or advanced training of a microlight pilot and will include modules dedicated to the use of the airframe parachute with specific scenarios dealing with the loss of control.

The company has also developed, in coordination with its Greek partner, an independent unit capable of recognising loss of control situations using accelerometers and orally informing the pilot in real time, of the advisability of activating the parachute.

4.2. Safety measures taken by the ANS/North

After the occurrence, the ANS/North updated its operations manual. It is now specified in chapter 11.4.7.2 of the operations manual (version 5.4 of 24 June 2021) that VFR flights above FL 065 coming from FIS 2 and 4 (sector W) should be notified to the Paris FIC before being transferred and this in order to anticipate the Paris class A TMAs.

5. SAFETY RECOMMENDATIONS

Note: in accordance with the provisions of Article 17.3 of Regulation No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation, a safety recommendation in no case creates a presumption of fault or liability in an accident, serious incident or incident. The recipients of safety recommendations shall report to the safety investigation authority which issued them, on the measures taken or being studied for their implementation, as provided for in Article 18 of the aforementioned regulation.

5.1. Organisation of the flight information service and assistance to VFR flights in difficulty

The investigation showed that the flight information service is not provided in a homogeneous way across France. Major differences exist between the Flight Information Sectors (FIS) and the areas covered by the Flight Information Centres (FIC), notably with respect to the principles of displaying VFR flights on the radar screen and the qualification and training of the personnel providing the service. While being different entities in terms of statute, the Approach units managing the FIS and FICs theoretically provide the same flight information service to pilots.

Furthermore, on the day of the accident, the Paris FIC position was not manned by two agents as is usually the case in the summer.

The investigation showed that:

- the level of training of FIC agents can be inadequate, notably in terms of the use of the English language and the identification of and assistance to VFR flights in difficulty;
- the flight information service is not continuously available in certain airspaces in France and the choices of the DSNA show a trend towards a reduction in this service42;
- the FIS and FIC agents were unable to detect the difficulties encountered by the pilot.

Seventeen occurrences were recorded by the BEA between 2010 and 2020 on the subject of assistance to VFR pilots in poor weather conditions. These occurrences represent 30 fatalities.

It frequently occurs that pilots neither report their difficulties nor clearly ask for help. Indications of the difficulty encountered are generally present prior to the occurrence such as successive requests to change route or flight altitude or even flight rules. These signs could be picked up by the air traffic agents with whom the pilot is in radio contact. For this, the agents must be suitably trained to recognise them and respond to them in an adequate manner.

This proactive attitude is not standardised in the DSNA.

[42] Problem also identified in the safety investigation into the collision between the Robin DR400 registered F-BXEU and the Alpi Aviation Pioneer 300 identified 37AHH on 10 October 2020 at Loches (Indre-et-Loire).

The anticipation of the arrival of 59DUJ could also have been improved by:

- the Lille FIS coordinating with the Paris FIC before transferring the flight;
- the automatic printout of parts of the filed VFR flight plan at the time of the planned transits through airspaces managed by the FIS or FIC;
- the Paris FIC agent having a better understanding of the flight altitude of 59DUJ.

If the Lille controller had better taken into account the cloud related difficulties reported by the pilot of 59DUJ and communicated these problems to the Paris FIC, the Paris FIC agent might have had better situational awareness. The Paris FIC agents and the Lille controllers do not have at their disposal, information regarding the en-route meteorological conditions likely to hinder VFR flights except for the Aspoc system at Lille which only concerns cloud cells.

When the flight information centres are warned of a difficult situation encountered by a pilot, they are likely to implement the appropriate resources to assist the VFR pilot which can extend to clearing him to enter a class A area after coordination with the competent control services. However, the investigation showed that the FIC are not trained to recognise such situations if the pilot does not report them.

Consequently, the BEA recommends that:

- ***whereas the flight information service is an important component of VFR flight safety;***
- ***whereas good coordination between units would mean better anticipation and therefore better management of aircraft by the agents providing the flight information service;***
- ***whereas a good level of use of radiotelephony in English is necessary for agents providing the flight information service;***
- ***whereas agents providing the flight information service are not sufficiently trained to assist and recognise VFR flights in difficulty;***
- ***whereas FIC agents have no information available to them regarding en-route meteorological conditions likely to hinder VFR flights;***
- ***whereas the 17 accidents between 2010 and 2020 in which the air navigation services with which the pilots were in contact were unable to detect difficult situations or provide proactive and appropriate assistance;***
- ***whereas the safety recommendations and lessons issued by the BEA in the safety reports concerning the accidents involving F-GPIT, F-HEHM, F-BXEU and 37AHH on the quality and availability of the flight information service;***

  the DSNA review the organisation of the flight information service, the positioning of this service in relation to all the air services provided by the DSNA and the training of the agents providing this service in French airspace, paying particular attention to the following subjects:
  - ***coordination between the centres and the automatic display of active VFR flight plans so that the agents can sufficiently anticipate the arrival of VFR flights,***
  - ***assignment of staff to the positions according to the volume of VFR traffic,***

- *training and skill levels required to provide flight information,*
- *specific training in detecting and assisting VFR flights in difficulty, even if no distress message has been sent or the pilot has not verbalised his difficulties,*
- *equipment so that staff are aware in real time, of the meteorological situation en route and of large-scale meteorological conditions likely to prevent VFR flights from continuing their navigation.*

[Recommendation FRAN-2023-022].

The BEA investigations are conducted with the sole objective of improving aviation safety and are not intended to apportion blame or liabilities.

APPENDICES

Appendix 1: Meteorological file exchanged between the pilot and passenger before departure.

skeyes Opmet Data

BELGIUM AND LUXEMBOURG

FIR : EBBU

METAR

```
METAR EBAW 190550Z 24005KT 210V270 CAVOK 17/12 Q1015 NOSIG=
SPECI EBBE 190552Z 22009KT 9999 FEW220 15/12 Q1015 BLU BLU=
METAR EBBL 190525Z 21005KT 9999 FEW180 16/12 Q1015 BLU BLU=
METAR EBBR 190550Z 24006KT CAVOK 16/12 Q1015 NOSIG=
METAR EBCI 190550Z 21008KT CAVOK 14/11 Q1016 NOSIG=
METAR EBCV 190525Z AUTO 18005KT 9999 NCD 14/12 Q1015 BLU=
SPECI EBFN 190533Z 21007KT 9999 FEW010 SCT250 14/13 Q1014 BLU BLU=
METAR EBFS 190525Z 21010KT 9999 FEW250 13/11 Q1016 BLU BLU=
METAR EBLG 190550Z 20006KT 160V230 CAVOK 15/11 Q1015 NOSIG=
METAR EBOS 190550Z 22007KT 9999 FEW020 14/13 Q1014 NOSIG=
METAR EBSP 190550Z AUTO 25004KT 210V270 CAVOK 14/11 Q1016=
METAR EBSH 190550Z AUTO 24003KT 200V280 CAVOK 12/10 Q1016=
METAR ELLX 190550Z 25004KT CAVOK 13/10 Q1017 NOSIG=
```

TAF FC

```
TAF EBAW 190510Z 1906/1915 22007KT 9999 FEW025 PROB30 TEMPO
   1913/1915 4000 SHRA=
TAF EBBE 190541Z 1907/1916 23008KT 9999 SCT025 BECMG 1914/1916
   29010KT SCT035 PROB30 TEMPO 1914/1916 23010G20KT 6000 -SHRA
   SCT020TCU=
TAF EBBL 190541Z 1907/1916 2405KT 9999 FEW030 SCT180 TEMPO 1911/1916
   21010KT 5000 -SHRA FEW015 BKN030TCU PROB30 TEMPO 1911/1916
   21015KT 3000 SHRA SCT010 BKN030TCU=
TAF EBCV 190541Z 1907/1916 20008KT 9999 FEW060 SCT220 BECMG
   1908/1910 22012KT SCT030 SCT120 TEMPO 1909/1916 22015G25KT 4000
   -SHRA SHRA SCT020TCU BKN025 BY EBWM=
TAF EBFN 190541Z 1907/1916 22007KT 9999 FEW005 SCT045 TEMPO
   1909/1916 6000 -SHRA SCT020 PROB30 TEMPO 1911/1915 3000 -TSRA
   BKN013CB BECMG 1912/1914 25009KT BY EBWM=
TAF EBFS 190541Z 1907/1916 21008KT 9999 FEW030 PROB40 TEMPO
   1909/1912 6000 -SHRA SCT020TCU SCT025 BECMG 1910/1912 24008KT
   TEMPO 1912/1916 4000 SHRA FEW010 SCT025TCU BKN030 PROB40 TEMPO
   1912/1916 VRB10G20KT 3000 SHRA TSRA SCT008 BKN020CB=
EBSP not provided
EBSH not provided
```

TAF FT

```
TAF EBBR 190510Z 1906/2012 23008KT 9999 FEW025 PROB30 TEMPO
   1913/1919 4000 SHRA=
TAF EBCI 190510Z 1906/2012 23008KT 9999 FEW025 PROB30 TEMPO
   1913/1919 4000 SHRA=
```

TAF EBLG 190510Z 1906/2012 23008KT 9999 FEW025 PROB30 TEMPO
1913/1919 4000 SHRA TSRA=
TAF EBOS 190510Z 1906/2012 20007KT 9999 SCT025 BECMG 1910/1912
26012KT=
EBSP not provided
EBSH not provided
TAF ELLX 191500Z 1906/2012 23008KT CAVOK TEMPO 1910/2001 SCT030TCU
PROB30 TEMPO 1911/1921 4500 SHRA FEW025CB BECMG 2006/2009
29004KT=

SIGMET
NIL

GAMET
EBBU GAMET VALID 190600/191200 EBBR-
EBBU BRUSSELS FIR BLW FL100
SECN I
SFC VIS (5KM or less): 06/07 WEST OF E00330 3000-5000M BR
SIG CLD: 06/07 WEST OF E00330 BKN 800/1500FT AGL
10/12 ISOL TCU 2500/ABV10000FT AGL

SECN II
PSYS: 06. WEAK TO TEMPORARILY MODERATE SW'LY FLOW
BETWEEN A LOW (1008HPA) CENTERED NEAR
IRELAND AND A RIDGE EXTENDING FROM HIGH
(1020HPA) CENTERED OVER SOUTHWEST OF FRANCE.
ADVECTION OF UNSTABLE MARITIME AIR.
SFC WIND (30KT or less): 190-240/06-10KT
COASTAL AREA 210-260/08-12KT
WIND/T: 1000FT 230/12KT PS15
2000FT 230/15KT PS13
5000FT 230/15KT PS07
10000FT 220/20KT MS02
SFC VIS (above 5KM): 8-10KM
CLD: FEW TO SCT CU SC 2500/8000FT AGL
FZLVL: 8500FT AGL
HIGH GROUNDS 7000FT AGL
MNM QNH: 1013HPA
OTLK: FM 12 TL 18 Z
SIG CLD: ISOL CB 2500/ABV10000FT AGL
SIGWX: 15/18 ARDENNES ISOL TS=

AIRMET
NIL

FRANCE

FIR : LFBB

METAR
METAR LFBD 190530Z AUTO 00000KT CAVOK 12/12 Q1020 NOSIG=

TAF FT

TAF LFBD 190500Z 1906/2012 VRB02KT CAVOK TX24/2012Z TN11/2005Z BECMG
1910/1912 25005KT BECMG 1914/1916 29010KT CAVOK BECMG 1921/1923
VRB02KT PROB40 TEMPO 2000/2006 3000 MIFG=

SIGMET

NIL

GAMET

NIL

AIRMET

NIL

FIR : LFFF

METAR

METAR LFOT 190530Z AUTO 19004KT 9999 OVC047 13/12 Q1018 NOSIG=
METAR LFPG 190530Z AUTO 23006KT 9999 FEW018 14/12 Q1017 NOSIG=
METAR LFPO 190530Z AUTO 23006KT CAVOK 14/12 Q1017 NOSIG=
METAR LFQQ 190530Z AUTO 21008KT 9999 SCT006 13/12 Q1015 BECMG OVC007=

TAF FC

LFOT NIL

TAF FT

TAF LFOT 190500Z 1906/2006 21005KT CAVOK TEMPO 1910/1917 -SHRA
SCT030TCU=
TAF LFPG 190500Z 1906/2012 23007KT 9999 FEW010 TX22/2012Z TN12/2004Z
PROB40 TEMPO 1911/1921 27015G25KT 4000 -SHRA SCT030TCU PROB30
2003/2006 4000 BR=
TAF LFPO 190500Z 1906/2012 22006KT CAVOK TEMPO 1913/1921 -SHRA
SCT030TCU=
TAF LFQQ 190500Z 1906/2012 23005KT 9999 BKN010 BECMG 1907/1909
BKN025 TEMPO 1911/1915 4000 SHRA BKN020CB PROB30 TEMPO 1912/1915
2000 TSRA=

SIGMET

NIL

GAMET

NIL

AIRMET

NIL

FIR : LFEE

METAR

METAR LFSE 190530Z AUTO 25004KT 9999 SCT047/// BKN058/// BKN088///
///CU 24/13 Q1018 BECMG FEW040 BKN060=

TAF FT

TAF LFSB 190500Z 1906/2006 26005KT 9999 FEW040 BKN060 TEMPO
1909/1918 4000 SHRA FEW030CB PROB30 TEMPO 1912/1918 2000 TSRA
SCT030CB=

SIGMET

NIL

GAMET

NIL

AIRMET

NIL

Appendix 2: Transcription of radio exchanges between 59DUJ and the air traffic control services

Caution

The transcription below shows what was understood during the analysis of the ATC recordings concerning this event. This transcription only gives the exchanges that took place between the pilot and passenger of 59DUJ and the control centres with which they were in contact.

The reader's attention is drawn to the fact that the recording and the transcription of an ATC recording only partially reflects the events. Consequently, extreme prudence must be exercised when interpreting such a document.

Glossary

[xxx]	Message from: **[Lille-TWR]**.
F-JDMB	Radio call sign of the microlight registered 59DUJ
*	Unintelligible words
(*)	Unintelligible groups of words or phrases

UTC	Message from	Comments
08:32:13	**Start of audio recording**	
08:32:18	**[F-JDMB]**: Lille Information Foxtrot Juliet Delta Mike Bravo	Pilot's voice
08:32:26	**[Lille-Info]**: Fox Juliet Delta Mike Bravo bonjour pass your message	
08:32:30	**[F-JDMB]**: Foxtrot Juliet Delta Mike Bravo just departed Courtrai Echo Bravo Kilo Tango for Blois Le Breuil Lima Foxtrot Oscar Quebec according flight plan we are now across the F_I_R boundary, euh tree thousand five hundred feet, squawking two thousand	
08:32:52	**[Lille-Info]**: Fox Mike Bravo copied squawk six one zero zero Q_N_H one zero one six and transit approved at three thousand five hundred feet	
08:33:01	**[F-JDMB]**: Six one zero zero one transit approved three thousand five hundred (thanks)	5240RPM
08:34:39	**[F-JDMB]**: Lille Foxtrot Juliet Delta Mike Bravo again request climb to flight level six five due to * cloud	
08:34:48	**[Lille-Info]**: Mike Bravo that's copied (not) approved flight level six five report steady	
08:34:54	**[F-JDMB]**: Climbing to six five Foxtrot Mike Bravo merci	
08:40:40	**[F-JDMB]**: Lille Foxtrot Juliet Delta Mike Bravo again request climb to Flight Level seven five	5050RPM
08:40:47	**[Lille-Info]**: That's approved Mike Bravo climb flight level seven five	
08:40:50	**[F-JDMB]**: Seven five thank you Foxtrot Mike Bravo	
08:42:02	**[F-JDMB]**: Foxtrot Mike Bravo reaching and maintaining flight level seven five on the Q_N_H one zero one six	5100RPM
08:42:10	**[Lille-Info]**: Thank you Mike Bravo	
08:54:23	**[F-JDMB]**: Lille Foxtrot Mike Bravo request climb to flight level eight zero due cloud	5080RPM
08:54:34	**[Lille-Info]**: Euh Mike Bravo confirm flight level eight zero ?	
08:54:37	**[F-JDMB]**: Eight zero if possible	5080RPM
08:54:39	**[Lille-Info]**: No problem flight level eight zero MikeBravo	
08:54:42	**[F-JDMB]**: Thank you eight zero	5080RPM
09:11:42	**[Lille-Info]**: Fox Juliet Delta Mike Bravo squawk seven thousand contact Paris Information one two five decimal seven, bye bye.	
09:11:50	**[F-JDMB]**: Contacting Paris Info one two five decimal seven hum ... and recycling seven thousand	Passenger's voice
09:12:22	**[F-JDMB]:** * information hum ... Fox Juliet Euh ... Delta Mike Bravo	Passenger's voice/speaking with a lot of hesitation
09:12:33	**[Paris-Info]**: Foxtrot Juliet Delta Mike Bravo Paris Information good afternoon, go ahead	
09:12:37	**[F-JDMB]**: I'm just released by Lille Info Hum ... hum ... squawking euh seven thousand ... Euh eight thousand feet ... re ... request traffic information	
09:12:54	**[Paris-Info]**: Foxtrot Mike Bravo airfield departure and airfield destination please	
09:13:03	**[F-JDMB]**: Foxtrot Juliet Delta Mike Bravo departure Echo Bravo Kilo Tango destination is Blois Lebreuil Fox Oscar Quebec according flight * an altitude to eight thousand feet on the Q_N_H one zero one three	Pilot's voice
09:13:19	**[Paris-Info]**: Copied Foxtrot Juliet Delta Mike Bravo squawking seven zero one	

UTC	Message from	Comments
	two	
09:13:24	**[F-JDMB]**: Seven zero one two, Fox Mike Bravo	
09:16:31	**[Paris-Info]**: Foxtrot Juliet Delta Mike Bravo Paris Information	
09:16:35	**[F-JDMB]**: Foxtrot Juliet Delta Mike Bravo Go ahead	5090RPM
09:16:39	**[Paris-Info]**: Foxtrot Mike Bravo you confirm squawking seven zero one two	
09:16:45	**[F-JDMB]**: Seven zero one two, Fox Mike Bravo	
09:16:48	**[Paris-Info]**: Okay with your altitude no radar identify	
09:16:56	[**F-JDMB]:** Seven seven zero * seven zero one two now coming, Foxtrot Mike Bravo	5030RPM
09:17:03	**[Paris-Info]**: Copied in sight with your altitude it's very difficult have a radar identify	
09:17:14	**[F-JDMB]**: Altitude of the Foxtrot Mike Bravo is now eight thousand one hundred feet on the Q_N_H one zero one three	5200RPM
09:17:27	**[Paris-Info]**: Fox Juliet Delta Mike Bravo ...	
09:17:32	**[Paris-Info]**: In sight ahead of you flight level area maximum six five, turn on your right now please	
09:17:42	**[F-JDMB]**: Euh okay we will descent ...	5030RPM
09:17:45	**[Paris-Info]**: No descent turn on your right now you are on the class area Paris	
09:17:51	**[F-JDMB]**: Okay thank you will do	
09:17:59	**[Paris-Info]**: Foxtrot Juliet Delta turn on your right now	
09:18:17	**[Paris-Info]**: Foxtrot Juliet Delta Mike Bravo Paris Information	
09:18:21	**[F-JDMB]**: Foxtrot Juliet Delta Mike Bravo	
09:18:24	**[Paris-Info]**: You are on the area prohibited for you. Flight level maximum six five	
09:18:30	**[Paris-Info]**: Turn on your right now please	
09:18:32	**[F-JDMB]**: Yeah now descending	
09:18:33	**[Paris-Info]**: No descending, turn on right now	
09:18:37	**[F-JDMB]**: Turning right Fox Mike Bravo	
09:19:37	**[Paris-Info]**: Fox Mike Bravo Paris	
09:19:40	**[F-JDMB]**: Fox Mike Bravo we are descending now seven thousand, descending to maximum six five	No engine element
09:19:46	**[Paris-Info]**: Copied I suggest you take magnetic route two eight zero ... two eight zero	
09:20:11	**[F-JDMB]**: *	Something said in a foreign language then radio transmission continued with nothing said - no engine element perceived in the spectrum
09:20:13	**[F-JDMB]**: …	Radio transmission with nothing said - no engine

UTC	Message from	Comments
		element perceived in the spectrum
09:20:23	**[F-JDMB]**: …	Radio transmission with nothing said - no engine element perceived in the spectrum
09:20:29	**[F-JDMB]**: …	Radio transmission with nothing said - no engine element perceived in the spectrum
09:20:33	**[Paris-Info]**: Fox Mike Bravo with your altitude you can take your route	
09:20:42	**[F-JDMB]**: …	Radio transmission with nothing said - no engine element perceived in the spectrum
09:20:45	**[Paris-Info]:** Fox Mike Delta Paris	
09:20:50	**[F-JDMB]**: *	Radio transmission with nothing said finishing with a few words that are cut off - no engine element perceived in the spectrum
09:20:57	**[Paris-Info]**: Fox Juliet Delta Mike Bravo Paris Information	
From 09:21:01 to 09:21:11	<u>Note</u> In this ten second period the pilot twice indicated - in response to the controller's questions - that they were falling.	No engine element can be perceived in the background noise of the com-munications from F-JDMB.
09:22:32	**[Paris-Info]**: Fox Juliet Mike Bravo Paris	

UTC	Message from	Comments
09:22:36	**[Paris-Info]**: Fox Juliet Delta Mike Bravo Paris	
09:59:59	**End of audio recording**	

Appendix 3: Previous occurrences concerning assistance to VFR flights

Occurrences identified between 2010 and 2020 in which better detection of difficulties and assistance to the pilot from the air navigation services concerning the weather en route could possibly have had an influence on the course of the flight

Date of occurrence	Occurrence	Place	Link to BEA report	Insufficient information exchanged about the meteorological situation whether on the initiative of the pilot or the ground agent	Number of fatal injuries
18 April 2019	Accident to the Socata TB20 registered **F-GDNF**	Dominica	https://bea.aero/en/investigation-reports/notified-events/detail/accident-to-the-socata-tb20-registered-f-gdnf-on-18-04-2019-near-douglas-charles-ad-island-of-dominica-investigation-delegated-to-bea-by-the-authorities-of-dominica/	X	1
10 December 2018	Accident to the SR22 GTS registered **F-HUGE**	Beaubery (Saône-et-Loire)	https://bea.aero/en/investigation-reports/notified-events/detail/accident-to-the-cirrus-sr22-registered-f-huge-on-10-12-2018-at-beaubery/		3
05 September 2016	Accident to the Robinson R22 Beta registered **G-SPEE**	Origny-le-Sec (Aube)	https://bea.aero/en/investigation-reports/notified-events/detail/accident-to-the-robinson-r22-registered-g-spee-occured-on-05-09-2016-at-origny-le-sec//	X	1
01 April 2016	Accident to the Robin HR100-210D registered **HB-EUM**	In the vicinity of Sondernach (Haut-Rhin)	https://bea.aero/en/investigation-reports/notified-events/detail/accident-to-the-robin-hr100-registered-hb-eum-occured-on-04-01-2016-at-sondernach-68/	X	1
25 February 2016	Accident to the Extra 200 registered **F-GPIT**	Saint-Héand (Loire)	https://bea.aero/en/investigation-reports/notified-events/detail/accident-to-the-extra-200-registered-f-gpit-on-25-02-2016-at-saint-heand-loire/		1
06 December 2015	Accident to the PA28 registered **F-GFLZ**	Peypin d'Aigues (Vaucluse)	https://bea.aero/en/investigation-reports/notified-events/detail/accident-to-the-piper-pa28-registered-f-gflz-occured-on-06-12-2015-at-peypin-daigues-84/	X	1

Date of occurrence	Occurrence	Place	Link to BEA report	Insufficient information exchanged about the meteorological situation whether on the initiative of the pilot or the ground agent	Number of fatal injuries
04 December 2015	Accident to the Robin DR400-120 registered **F-GAHG**	La Bresse (Vosges)	https://bea.aero/en/investigation-reports/notified-events/detail/accident-to-a-robin-dr400-140-registered-f-gahg-occured-on-04-12-2015-at-la-bresse-88/	X	2
01 July 2015	Accident to the PA28 registered **F-HEHM**	Treilles (Aude)	https://bea.aero/en/investigation-reports/notified-events/detail/accident-to-the-piper-pa28-registered-f-hehm-on-01-07-2015-at-treilles-aude/	X	1
19 December 2014	Accident to the PA28-181 registered **F-OGHZ**	North of Grand'Rivière (Martinique)	https://bea.aero/en/investigation-reports/notified-events/detail/accident-to-the-pa28-181-registered-f-oghz-occured-on-12-19-2014-at-grandriviere-972/	X	2
22 November 2014	Accident to the Socata Gardan GY80 registered **F-BNYN**	Pardailhan (Hérault)	https://bea.aero/en/investigation-reports/notified-events/detail/collision-avec-le-relief-par-conditions-meteorologiques-defavorables-incendie/		2
12 July 2014	Accident to the Piper PA28R-201T registered **N717ND**	Urtaca (Haute-Corse)	https://bea.aero/en/investigation-reports/notified-events/detail/accident-to-a-piper-pa28r-201t-registered-n717nd-on-07-12-2014-at-urtaca-2b/	X	3
12 September 2013	Accident to the Socata TB200 registered **F-HTEF**	La Tour d'Auvergne (Puy-de-Dôme)	https://bea.aero/en/investigation-reports/notified-events/detail/vol-en-conditions-meteorologiques-defavorables-collision-avec-le-relief-en-croisiere-incendie/	X	2
20 July 2012	Accident to the Dyn'Aéro MCR 01 Sportster registered **F-PSLX**	Fresselines (Corrèze)	https://bea.aero/en/investigation-reports/notified-events/detail/perte-de-controle-rupture-en-vol/	X	1
29 June 2012	Accident to the Jabiru UL 450 identified **G-SIMP**	Pierre-Buffière (Haute-Vienne)	https://bea.aero/en/investigation-reports/notified-events/detail/rupture-en-vol-collision-avec-le-sol/	X	3
17 June 2011	Accident to the Piper PA39 Twin Comanche registered **G-AYZE**	Peille (Alpes-Maritimes)	https://bea.aero/les-enquetes/evenements-notifies/detail/collision-avec-le-relief-en-croisiere-par-conditions-meteorologiques-defavorables/	X	2

Date of occurrence	Occurrence	Place	Link to BEA report	Insufficient information exchanged about the meteorological situation whether on the initiative of the pilot or the ground agent	Number of fatal injuries
03 October 2010	Accident to the Jodel DR1050 registered **F-BKBZ**	Lauroux (Hérault)	https://bea.aero/en/investigation-reports/notified-events/detail/entree-en-conditions-de-vol-aux-instruments-collision-avec-le-relief/	X	4
07 March 2010	Accident to the PA32R registered **HB-PQZ**	Arbin (Savoie)	https://bea.aero/en/investigation-reports/notified-events/detail/collision-avec-le-relief-en-conditions-de-vol-aux-instruments/		

TOTAL: 17 occurrences with an "assistance to VFR flights" aspect, 30 deaths