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INVESTIGATION REPORT

Accident to the PIPER - PA28 - 161 registered F-OGKO

on 16 February 2020
near Dominica (Caribbean Island)

Time	Around 18:45[1]
Operator	Aéroclub Les Ailes Guadeloupéennes
Type of flight	Cross country
Persons on board	Pilot and three passengers
Consequences and damage	Persons on board fatally injured, aeroplane destroyed

This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in June 2021. As accurate as the translation may be, the original text in French is the work of reference.

[1] Except where otherwise indicated, times in this report are local. Dominica and Guadeloupe are in the same time zone.

Collision with the surface of the water shortly after take-off at night

In accordance with Annex 13 to the Convention on International Civil Aviation, Dominica, as state of occurrence and member of the Eastern Caribbean Civil Aviation Authority (ECCAA), opened a safety investigation, set up an investigation committee and notified the BEA.

On 19 February 2020, the investigation committee delegated the safety investigation to the BEA. The investigation was carried out with the participation of representatives from the ECCAA investigation committee who had appointed an accredited representative. The report was sent to the accredited representative for an official consultation.

1 - HISTORY OF THE FLIGHT

Note: The following information is principally based on statements, radio communication recordings and radar data.

The flight took place within the framework of a day-long tourist excursion, organised by the flying club, to the island of Dominica. Sixteen people including members of the flying club's Executive Committee were on the excursion, divided between four aeroplanes. The pilots took off from runway 12 at Pointe-à-Pitre - Le Raizet airport (Guadeloupe) bound for Douglas-Charles airport in Dominica one hour later than initially scheduled. The pilot of F-OGKO, accompanied by three passengers, took off last at around 09:00 and landed at around 09:30. Upon arrival, the participants completed the administrative forms required to enter Dominica and then left the airport at around 10:30 to begin their tour. The return flight was scheduled to take place in daylight but due to an accumulation of delays throughout the day, the passengers arrived back at Douglas-Charles airport at dusk.

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The four aeroplanes took off for Pointe-à-Pitre at night from runway 09. The pilot of F-OGKO took off in 3rd position at 18:43. After the take-off, the tower controller at Douglas-Charles airport asked the pilot to call back at 1,500 ft[2]. The pilot read back the instruction in a vague and hesitant manner.

[2] The exchanges between the controller and pilots were in English.

A few minutes later, having received no responses from the pilot after calling him over the radio frequency a number of times, the controller asked the approach control unit at Pointe-à-Pitre airport if they had the aeroplane on the frequency. The controller stated that they did not have the aeroplane on the frequency or on the radar.

The recording of the radar track showed that the aeroplane reached an altitude of around 750 ft. It stopped several seconds later, at 18:46 when the aeroplane was at an altitude of around 550 ft[3], to the north-east and 1.6 NM from the threshold of runway 27 at Douglas-Charles airport.

[3] Altitude corresponding to the lower detection limit of the secondary radar at Pointe-à-Pitre airport.

Following an alert from a witness who alleged having seen an aeroplane fall into the bay, search and rescue operations were jointly started by the French and Dominican authorities.

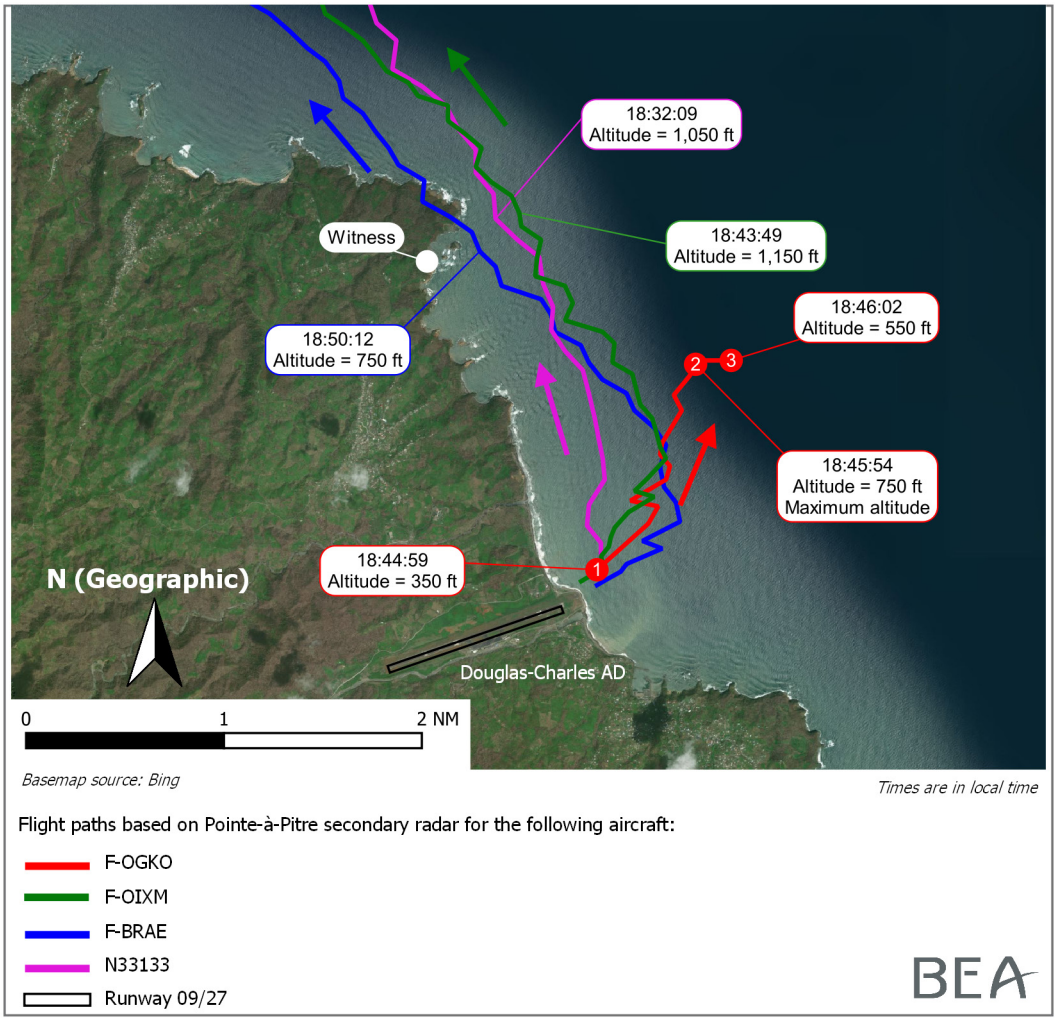


Figure 1: Accident flight path

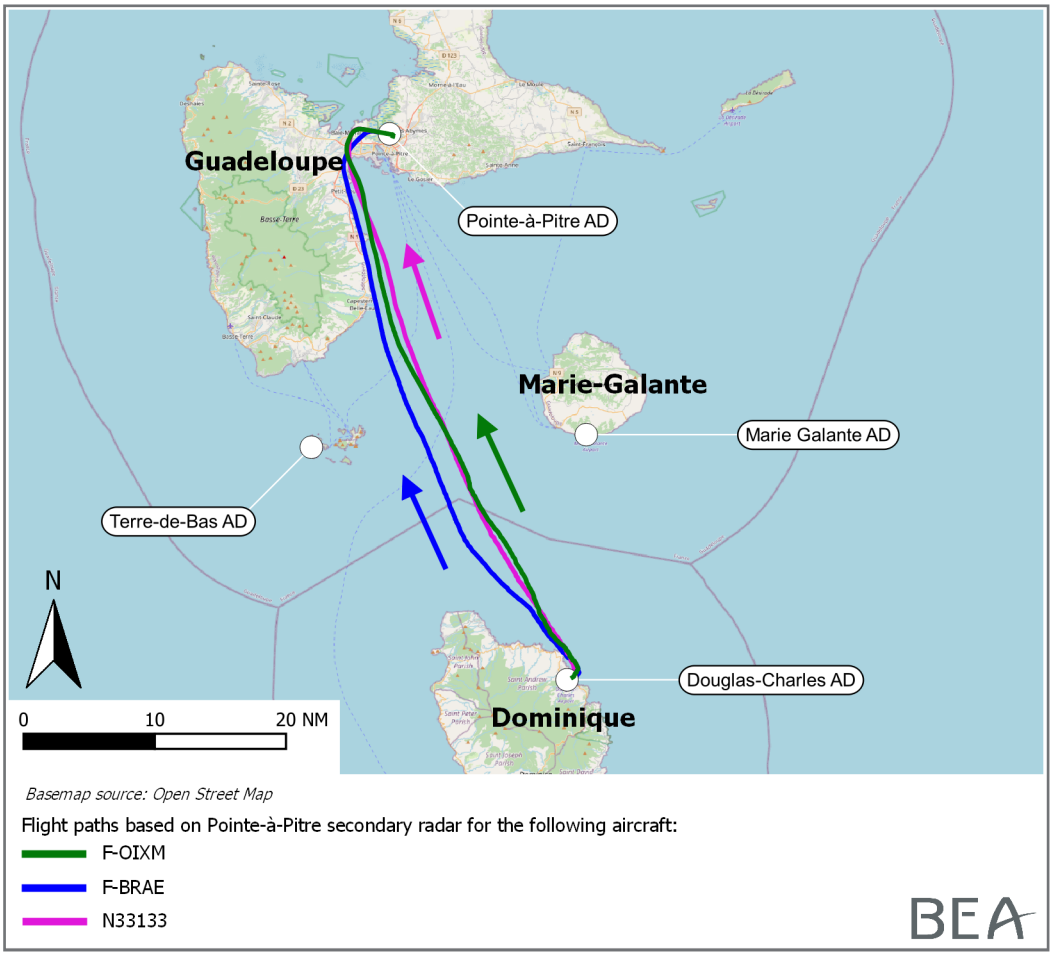


Figure 2: Flight path of the other three aeroplanes

2 - ADDITIONAL INFORMATION

2.1 Site and wreckage information

According to the recorded radar data, the aeroplane crashed into the sea, less than 2 NM from the coast. In the supposed zone of the accident, the sea is approximately 40 metres deep. Three helicopters, two from the Pointe-à-Pitre civil defence and one from the French Navy, a C26 from Barbados, and six boats were deployed to conduct a visual search. The search was suspended on 18 February at around 14:00 having been unable to locate the wreckage or the bodies of the victims. Subsequent searches were undertaken, funded by one of the victim's families. These searches were also unsuccessful.

In the days that followed, debris from inside the aeroplane and personal belongings of the occupants were found floating a few kilometres off the coast. Personal belongings also washed up below a house located on top of a cliff on the north side of the airport. The occupant of this house, at home at the time of the accident, reported having heard a loud, steady and constant noise which suddenly stopped. He thought that the noise was at a height similar to that of his house. He stated that he did not usually hear aeroplanes taking off in the direction of Guadeloupe as these aeroplanes are at a distance and high up.

Lastly, fishermen found pieces of debris from the structure of an aircraft floating on the surface of the sea a few days after the accident. There was no information about their location. The analysis of the photographs of the parts showed them to be the main right landing gear and a section of the main spar of the wing of a PA28 151-161. The examination of these parts provided no information as to why the accident had occurred.

2.2 Aerodrome information

Douglas-Charles airport is located on the east coast of the island. It is open for public air traffic and the air traffic control service is available between 06:00 and 22:00. It has a paved runway 09/27, measuring 1,758 m long and 45 m wide. The airport is equipped with lighting comprising runway end and threshold lights, runway edge lights and taxiway edge lights.

The threshold of runway 27 is located 150 m from the coast. Aeroplanes that take off from runway 09 at Douglas-Charles airport fly directly over the sea. At night, with good visibility, the first light references are the lights of Marie-Galante island (16 NM to the north) which only appear on the right after a left turn towards Pointe-à-Pitre. Pilots who use the airport frequently say that, by day, the airport presents no particular difficulties but requires good night flight experience due to the lack of external visual references immediately after take-off.

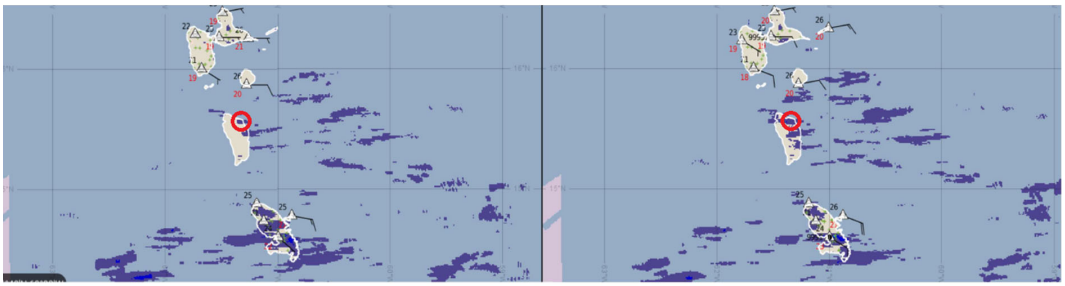
2.3 Meteorological information

On Dominica on the day of the accident, the sun set at 18:08[(4)].

The occupants of the other aeroplanes in the group stated that during their take-off, it had been a dark night with no moon and no visual references once over the sea.

The information provided by Météo-France indicated, between 17:00 and 19:00, moderate trade winds and passing light showers associated with low clouds.

The satellite images from the Le Moule radar between 18:30 and 19:00 confirmed the presence of rain on Dominica and notably around Douglas-Charles airport.



Source: Météo-France

Figure 3: Satellite images from the Le Moule radar at 18:30 (on left) and 19:00 (on right)

(4) In France (French supplement to implementing regulation (EU) No 923/2012 SERA (Standardised European Rules of the Air)), it is accepted that at latitudes of between 0° and 30°, the aeronautical night starts 15 minutes after sunset. See § 2.7.1 for the regulations in force in Dominica.

The information from the automatic weather station at Douglas-Charles airport, provided by Météo-France and the airport meteorological service, indicated:

Time	17:00	18:00	19:00	20:00
Wind direction	110.0°	130.0°	120.0°	120.0°
Wind force	11 kt	6 kt	10 G 22 kt	7 kt
Cloud cover	SCT016	SCT016	SCT016	BKN015
	BKN040	SCT038	BKN038	BKN038
QNH	1015 hPa	1015 hPa	1016 hPa	1016 hPa
Visibility	>10 km	>10 km	>10 km	>10 km
T	26°C	25°C	Not indicated	25°C
Td	22°C	21°C	Not indicated	22°C

Figure 4: Douglas Charles weather station data

The 18:00 and 19:00 meteorological reports from Douglas-Charles airport also indicated rain nearby, notably to the east of the airport.

Recordings taken from the airport surveillance cameras were viewed and showed light rain at the airport at the time F-OGKO took off. A pilot on the ground at the airport confirmed that there had been a squall at the airport when the aeroplane took off. This squall, which he qualified as "normal", had lasted around 15 minutes. He said it had been a very dark night and that it was cloudy with the first clouds appearing at an estimated altitude of 1,700 ft during his take-off at around 20:00.

2.4 Aircraft information

According to the information available in the aeroplane's maintenance documents, the engine was removed in June 2019 for overhaul. An annual inspection of the aeroplane was carried out on 15 January 2020 following installation of the overhauled engine. An instructor from the flying club, accompanied by the mechanic responsible for the servicing of the aeroplane at the flying club, performed two check flights, lasting 10 to 20 minutes, on 14 February. No anomaly, except for a problem concerning the aeroplane's transponder, was identified.

The spectral analysis of the ATC communications between the pilot of F-OGKO and the air traffic controller at Charles-Douglas airport revealed no technical anomaly linked to the engine and to its components that may have contributed to the accident.

2.5 Pilot information

Two of the four persons on board the aeroplane held a Private Pilot Licence - Aeroplane (PPL(A)). According to witnesses, these two persons were sat in the front two seats. It was not possible to determine who was sat in the left seat and was flying at the time of the accident.

An instructor at the flying club, who did not take part in the excursion, explained that, in his opinion, neither of the two pilots were experienced enough to perform the flight, by night or by day.

The flying experience of the pilots was determined based on individual records saved by the flying club on the pilot log software.

2.5.1 Pilot 1

The first pilot held a PPL(A) issued in 2012 along with an SEP rating valid until 31 May 2021 and a night rating obtained in 2014. He had logged approximately 90 flight hours at the time of the accident, mostly in the PA28. He had not flown in 2018, had logged eight flight hours in 2019 including six hours in instruction, and less than two flight hours in instruction in 2020 (29 January). His last flight on F-OGKO was in May 2019. He had not carried out a night flight since 2014. The pilot was treasurer of the flying club. Information from statements indicated that during the outbound flight to Dominica, this pilot had been pilot-in-command and communicated with the controllers on the frequency. During the return flight, it was this same pilot who communicated on the frequency with the air traffic controllers.

2.5.2 Pilot 2

The second pilot held a PPL(A) issued in 2016 along with a SEP rating valid up to 31 March 2020. He did not have a night rating or English language endorsement. He had logged approximately 90 flight hours. He had not flown between March 2018 and January 2020. In 2020, he had made four flights under instruction (two cross-country flights in January and two local flights in February).

The instructor of the pilot's last two flights stated that the pilot did not yet have a level sufficient to be signed off to fly the club's aeroplanes. It had been agreed with the pilot that more instruction flights were necessary.

2.6 Organisation and history of the club excursion

2.6.1 Excursion organisation

According to the statements obtained and the documents provided by the club, it was initially planned that the excursion would be to Barbados (state of Antigua and Barbuda) on 19 January, with a stop-over at Antigua for the administrative formalities. The programme covering the logistical aspects of the excursion was sent by e-mail to all the club members at the end of December. Due to two of the aeroplanes not being available, the excursion was postponed to 16 February. On 13 February, the president and vice-president of the club (the excursion organisers) organised a briefing. The assignment of pilots to each plane was proposed and validated during this briefing. This assignment was complied with on the day of the excursion.

The weather forecasts were such that the organisers proposed the day before the excursion, to change the destination to Dominica. This was done by telephone message to the various participants. The participants accepted the proposal. The group was to meet at the flying club at 07:30.

Neither the chief pilot nor another club instructor took part in the organisation and performance of the excursion. The club's internal regulations did not require this.

2.6.2 Experience of pilots of other aeroplanes

The club president was the pilot flying in the first aeroplane to take off, on both the outbound and return flight. He held a PPL(A) issued in 2000 along with a night rating. He had logged more than 2,200 flight hours and flown regularly at night. He was accompanied by three passengers including the vice-president of the flying club, who also held a PPL(A) and had logged around 200 flight hours. The latter had no recent experience of night flight.

The pilot of the second aeroplane to take off from Douglas-Charles airport held a PPL(A) issued in 2015 and had logged around 150 flight hours including one hour at night performed the previous year. His passengers were not pilots.

The last aeroplane was flown by a pilot who held an Airline Transport Pilot Licence (ATPL(A)). He was accompanied by a pilot (pilot flying on the outbound flight) who held a PPL(A) issued in 2016 along with a night rating. The latter had logged around 400 flight hours, his last night flight dated back to 2017.

2.6.3 History of the excursion

The excursion participants specified that they had taken off from Pointe-à-Pitre airport one hour behind schedule due to a delay with the crew of F-OGKO. After landing at Charles-Douglas airport, the administrative and logistic formalities took longer than planned. The participants then boarded two minibuses driven by local drivers. Two stops were made on the journey that then took them to the start of a hiking trail.

Three participants, including one of the excursion organisers, decided not to go on the hike and to wait for the group. While they were waiting, at the start of the afternoon, they discussed the delay incurred and the probability of having to make the return flight at night. Concerned that the remainder of the group had still not arrived back from the hike, they also discussed the possibility of staying overnight on the island. They decided not to have lunch at the restaurant as initially planned in order not to lose more time. One of the minibus drivers, feeling that he was in an awkward position as the booking had already been made at the restaurant, suggested collecting their meals as a takeaway and informed the restaurant of this. When the rest of the group returned, they boarded the minibuses and headed for the restaurant. When they arrived at the restaurant, they had to wait for their meals which were still being prepared. They then ate in the minibuses on the return journey to the airport. Some of the participants described the situation as stressful due to the delay incurred and the excessive speed on the road. In the bus that was carrying the F-OGKO pilots, the night flight was discussed and did not appear to worry the pilots. The pilot who did not have a night rating had seemed confident and self-assured, stating that he held a night rating.

The crews indicated that the night flight had not been the subject of a briefing or been co-prepared prior to flight. Each crew individually performed their pre-flight inspection using electric lights prior to taking off in succession.

2.7 Night VFR

2.7.1 Night VFR on Dominica

The ECCAA regulations stipulate that night VFR flight is not authorised on the territory of its member states: *"A person shall not conduct a flight in accordance with VFR during the period of darkness between half an hour after sunset and half an hour before sunrise."* (Civil Aviation Regulation 8.6.2.4(b)). According to the information gathered from the ECCAA, this prohibition is explained by the geographical situation of the airports, often in coastal areas, making take-off at night difficult due to the absence of external visual references. It is also due to insufficient search and rescue resources available on the islands to conduct sea searches at night

The airport manager and the air traffic control services at Douglas-Charles airport stated that night departures in accordance with VFR from the airport can be authorised in the event of pilot necessity and after coordination between the approach control service, the destination airport and the Douglas-Charles air traffic control service.

2.7.2 Flight plan

The pilots of F-OGKO had filed a flight plan by telephone with the AIS regional office at Pointe-à-Pitre the morning of the accident, for the outbound flight from Guadeloupe and for the return flight from Dominica. The outbound flight was initially scheduled to take off at 07:30 and the return flight to take off at 17:30. In the afternoon, the pilots of the four aeroplanes updated their return flight plan delaying the take-off time to 18:00. The AIS regional office then sent the flight plans to the Douglas-Charles tower. The Douglas-Charles airport controllers explained that when a flight plan is received, the flight is considered to be approved. The controller proceeded to coordinate the take-off of the four aeroplanes with the approach controller at Pointe-à-Pitre airport.

2.7.3 Minimum meteorological conditions

Regulation (EU) No 923/2012[(5)] (SERA) laying down the common rules of the air and operational provisions regarding services and procedures in air navigation specifies the VMC visibility and distance from cloud minima for night VFR.

The following minima are applicable for class G at an altitude of 900 m (3,050 ft) AMSL and below:

- ❒ minimum flight visibility: 5 km;
- ❒ distance from clouds: clear of cloud and with the surface in sight;
- ❒ minimum ceiling: 450 m (1,500 ft).

To facilitate the fulfilment of the conditions required to fly in accordance with the night visual flight rules by virtue of the SERA regulations and its national supplements, the DGAC recommends making sure, before departure, that the height of the cloud base is at least 1,500 ft above the planned cruise level, and that there is no precipitation or storm.

[(5)] Applicable to aircraft registered in France on foreign territories except when its provisions contradict the rules set forth by the State. Version in force on the day of the accident.

2.7.4 Specificities of night VFR flight

At the time of the accident to F-OGKO, the night was dark, indeed very dark[6] due to:

- The absence of the moon (on Dominica on 16 February, the moon set at around midday).
- Cloud cover that limited starlight.
- Beyond the confines of the airport, the absence of lighting to the east (direction of take-off towards the sea).

In some cases (night without a visible moon or when the sky is overcast), even if the minimum meteorological conditions are met, just the external visual references may be insufficient. This may give rise to sensory illusions which modify the pilot's perception of the position and attitude of his aeroplane[7]. The instrument references then become the primary means of controlling the aeroplane's attitudes. This method of flying cannot be improvised. It needs to be learnt in a thorough manner and requires regular training in the blind flight technique.

[6] In January 2020, the accident to the Mooney 20J registered F-OIAT occurred on a pitch-dark night, with no external visual references, during a local night flight at Lifou.

[7] The issue of sensory illusions has been the subject of numerous DGAC studies which can be consulted on its website under the Human Factors heading.

2.7.5 Night rating

Regulation (EU) No 1178/2011[8] (Aircrew) laying down technical requirements and administrative procedures related to civil aviation aircrew, and its AMC1 paragraph FCL.210 PPL(A), describe the basic instrument flight training that a PPL(A) applicant must receive. In compliance with this regulation, holders of the PPL(A)[9] who wish to obtain a night rating must take a training course that includes (FCL.810):

- "*(i) Theoretical knowledge instruction;*
- *At least 5 hours of flight time in the appropriate aircraft category at night, including at least 3 hours of dual instruction, including at least 1 hour of cross-country navigation with at least one dual cross-country flight of at least 50 km (27 NM) and 5 solo take-offs and 5 solo full-stop landings.*"

The only conditions concerning recent experience of night flight apply to the carrying of passengers: FCL.060 stipulates that pilots may only carry passengers at night if they have "*carried out in the preceding 90 days at least 1 take-off, approach and landing at night as a pilot flying in an aircraft of the same type or class or […] holds an IR.*"

[8] Version in force on the day of the accident.

[9] Applies to holders of a LAPL (A) subject to them having taken the basic instrument training required within the framework of PPL (A) training.

2.7.6 Flying club practices

The flying club's chief instructor pilot stated that all pilots with a night rating who have not flown at night for more than six months must carry out a night flight with an instructor.

He specified that night flight is not usually performed by the flying club outside of the French Antilles due to the prohibition of night VFR flights on many neighbouring islands and the difficulties that night flying causes for pilots. Furthermore, usually, any night flight undertaken for the first time from or into an airport is accompanied by an instructor.

These practices are not officially specified in the flying club's documents.

3 - CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation. They are not intended to apportion blame or liability.

Scenario

During a club excursion with four aeroplanes departing from Guadeloupe bound for the island of Dominica, the group gradually fell more and more behind schedule as it did not have proper control of the day's programme.

Insufficient organisation of the excursion combined with the 'group effect' led to the crews returning to Guadeloupe under night VFR despite several of the pilots not having the recent experience required to fly in these conditions. This choice was the result of a consensus reached in a situation governed by strong time pressure that had not really been anticipated. The efforts of the members of the group to reach this consensus (sticking to the planned programme, consideration of personal constraints, desire not to let the restaurant owner down) may have overridden their motivation to objectively assess the risks of the situation for the entire group and alternative solutions (for example foregoing some of the planned programme or arranging to stay on the island overnight). As they were responsible for the delayed take-off at the start of the day, the pilots on board F-OGKO could have found it all the more difficult to envisage going against the group's decision.

The night was dark, the sky was cloudy and it was raining when F-OGKO took off.

The investigation was not able to determine who was flying the aeroplane. However, the limited flight experience, and notably the lack of recent night flight experience of both pilots probably did not enable them to manage the difficulty represented by a take-off on a dark night towards the sea.

After take-off, the instant change from lit runway to total darkness over the sea, most probably deprived the pilot flying of external visual references and probably caused him to experience spatial disorientation.

Contributing factors

The following factors may have contributed to the accumulation of delays throughout the day and the decision to take off at night:

- Insufficient organisation of the excursion, marked, notably by a change in destination the day before and by there being no involvement of an instructor.
- Logistical constraints that could result from the cancellation of the return flight.
- The 'group effect' that may have encouraged the pilots of F-OGKO to follow the other pilots despite their very limited night flight experience.

The following factor may have contributed to the collision with the sea surface:

- The limited experience of both pilots sitting in the front seats of the aeroplane, in particular in night flight, which probably led to spatial disorientation.

Safety lessons

This accident highlights the possible influence of a group on making a decision and potentially, on taking the associated risks.

Furthermore, when faced with contradictory thoughts regarding a decision that may seem difficult to make, there may be a tendency to downplay the negative aspects of the chosen solution and to give too much value to the disadvantages associated with alternative solutions. In other words, the risk taking may be subconsciously underestimated.

These factors highlight the importance of the organisation of club excursions. The involvement of at least one instructor should enable any risks specific to the flights envisaged, as well as any risks associated with collective functioning (the 'group effect') to be identified. The taking into account of these risks might lead to the flight experience of the pilots being better considered, to renouncement criteria being defined from the outset and to associated logistical means[10] being envisaged.

The FFA plans to publish an information sheet[11] addressed to flying club managers regarding safety in the scope of group excursions. An information sheet[12] on the same subject and addressed to pilots will also be issued in the near future by the FFA training commission and prevention and safety commission.

[10] The FFA "pilot" licence includes an insurance with, notably in the event of adverse meteorological conditions, the option for the pilot and passengers to claim repatriation or accommodation costs.

[11] https://www.ffa-aero.fr/FR/frm_Lic_FP.awp

[12] https://www.ffa-aero.fr/FR/frm_Lic_RP.awp