



Accident to the ROBIN DR400-180 “REGENT”
registered **F-GIKS**
on Thursday 12 October 2023
off the coast of Propriano

Time	Around 17:40 ¹
Operator	Aéroclub d'Antibes
Type of flight	Cross-country
Persons on board	Pilot and three passengers
Consequences and damage	Occupants fatally injured, aeroplane destroyed
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.	

**Engine failure during climb after take-off, loss of control,
collision with the surface of the sea**

1 HISTORY OF THE FLIGHT

Note: The following information is principally based on statements and recordings from the security cameras at Cannes-Mandelieu airport and Propriano aerodrome.

The pilot, accompanied by his partner and another couple², took off at approximately 09:45 from Cannes-Mandelieu airport (Alpes-Maritimes) bound for Propriano aerodrome under a VFR flight plan. He landed there at approximately 11:15. The occupants went to the beach and returned to the aerodrome at 17:00 to undertake the return flight bound for Cannes-Mandelieu.

The video recordings showed the pilot taking off from runway 27 at 17:38, then turning north at the beach (see **Figure 1**). At 17:39:21, i.e. 16 s after the turn, a dark smoke release appeared behind the aeroplane. While the aeroplane was in the area of Cap Lauros, several witnesses heard variations in engine speed. The aeroplane's attitude did not seem stable on the roll axis.

After passing Cap Lauros, at 17:39:42, the aeroplane turned right a second time and headed, according to witnesses, towards the interior of Propriano bay. The aeroplane appeared unstable in roll. According to statements, it was flying in an S-shaped pattern, zigzagging or making alternating turns, as if it were trying to level the wings. About 5 s after the turn, when it was over the sea at an estimated height of less than 200 m according to two witnesses, the aeroplane slightly climbed and then pitched nose down.

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

² The pilot's partner was in the left rear seat, the wife in the couple was in the right front seat and her husband was in the right rear seat.

Witnesses then saw it enter a spin before colliding with the surface of the sea. No witnesses saw the smoke release or anything detaching from the aeroplane in flight.

2 ADDITIONAL INFORMATION

2.1 Analysis of the images from the security cameras

Analysis of the images from the cameras installed at Cannes-Mandelieu airport showed that on departure in the morning:

- the pilot carried out a reduced exterior walk-around inspection of the aeroplane: he checked the engine oil level and drained the three fuel tanks;
- he then made two attempts to start the engine and taxied to the fuel pump to refuel;
- he most likely performed a magneto switch-off test before stopping the engine at the fuel pump;
- he refuelled the three tanks (see paragraph 2.7.2), then he made four attempts to start the engine;
- he taxied to the parking area where he switched off the engine to take the passengers on board;
- he made three more attempts to start the engine, once the passengers were on board;
- he carried out the engine tests at the holding point, before lining up and taking off.

Analysis of the images from the cameras installed at Propriano aerodrome showed the following:

- the four occupants returned to the aeroplane at approximately 17:28;
- the pilot removed the covers from the pitot tube and from the two side static ports. It seems that no other external inspection was carried out as part of a dedicated walk-by visual inspection;
- he started the engine at 17:35:43 after four attempts. He taxied to the runway 13 s later, with the flaps extended in the take-off position;
- he did not stop at the holding point, backtracked the runway to the threshold turnaround bay of runway 27, made a U-turn and then immediately carried out a rolling take-off. However, the investigation was unable to establish whether the pilot had time to carry out engine tests as well as the pre-take-off briefing while taxiing;
- he took off at 17:38:34, i.e. less than 3 min after the engine start-up;
- from 17:39:21, after the first turn, a smoke release was observed behind the aeroplane.

Numerous discussions took place with the manufacturer to check whether the symptoms observed during the accident flight (engine difficult to start, smoke release in flight) could be related to the observations made on the engine. The facts gathered did not allow a particular scenario to be identified.

The camera images made it possible to reconstruct the approximate horizontal path of the aeroplane after take-off (see **Figure 1**). It could be noted that between the two turns, the average ground speed increased, without it being possible to determine its exact value. The loss of control occurred slightly to the south-west of the position where the wreckage was found, and the aeroplane fell almost vertically to this position (the fall was practically vertical a few seconds after the second right turn). Variations in the lighting on the aeroplane suggest a wing rotation. However, the image resolution was not high enough and did not enable its attitude and rotary axis to be accurately determined.



Figure 1: reconstruction of aeroplane's path

2.2 Site and wreckage

The wreckage was found approximately 1,300 m north of the runway. The wreckage was lying 8 m deep underwater. It was complete and not dispersed (see **Figure 2**).

It was salvaged and its examination showed that, at the time of the collision with the surface of the sea, the aeroplane had a left bank angle with a nose-down attitude, and the flaps were in the take-off position. The flight control linkages were continuous. The trim was in the neutral position. The propeller showed no evidence that the engine was transmitting torque when the aeroplane collided with the surface of the sea.



Figure 2: aerial view of the wreckage position (Source: Gendarmerie)

Examination of the instrument panel showed that the magneto switch was in the “BOTH” position and that the carburettor heat control was pushed in and locked (inactive). The auxiliary electric pump switch was found in the “OFF” position, although this does not necessarily reflect its position before the impact. The auxiliary pump was tested and found to be operating normally.

Due to the damage resulting from the accident, the operation of the mechanical pump could not be checked. One of the inner diaphragms was found torn, but it is likely that this damage was the result of the accident.

It was not possible to determine the positions of the mixture control and of the fuel selector prior to the impact with the surface of the sea. Nevertheless, tests carried out on another DR400-180 ruled out the hypothesis of the aeroplane taking-off with the fuel selector in the “OFF” position: the engine would have shut down much sooner.

The tanks were found burst open, however, several statements from those first on the scene indicated that there was a substantial amount of fuel in at least one of the tanks prior to the impact with the surface of the sea.

Examination of the engine and the exhaust system did not find any element likely to explain the accident. The carburettor could not be tested due to its damage.

No evidence of a mid-air collision with an object (such as a drone or bird) was observed, either on the debris or inside the engine.

Several personal electronic devices (tablet, phones, Internet-connected devices) were retrieved. However, these devices did not provide any information regarding the flight.

No evidence of fire or overheating were observed on the engine or on the wreckage, in particular inside the cockpit.

Examination of the wreckage revealed a high-energy impact with the surface of the water. The conditions left no possibility for the occupants to survive the accident.

2.3 Medical and pathological information

The blood analyses showed no signs of combustion smoke inhalation, nor did they detect any toxic, medication, narcotic or volatile molecules (in particular those that could have altered behaviour or vigilance).

2.4 Meteorological information

The meteorological conditions estimated by Météo-France at the time of the accident were as follows: 270° wind of 6 kt to 8 kt, no turbulence, no clouds (clear sky), temperature 23°C, dew point temperature 16.5°C.

Images from the security cameras at Propriano aerodrome showed a surface headwind of less than 5 kt between take-off and the time of the accident.

Based on the data from the WITEM France chart at 15:00 UTC for FL050, the return flight between Propriano and Cannes was estimated to last approximately 1 h and 10 min. In these conditions, with a take-off at 17:38 from Propriano, the aeroplane was expected to join the Cannes airport circuit at around 18:50.

On the day of the accident, the time of sunset at Cannes was 18:53, and the start of the aeronautical night was 19:23. A night arrival at Cannes-Mandelieu airport was possible until 20:00, which was the time at which the air traffic control services and the airport closed.

2.5 Pilot information

The 40-year-old pilot held a Commercial Pilot Licence - Aeroplanes (CPL(A)) issued in April 2022, as well as a restricted Flight Instructor - Aeroplane rating (FI(A)) issued on 7 July 2023. He had completed Commercial Pilot Licence (CPL) practical training with Multi-Engine Piston rating (MEP) and Single-Engine Instrument Rating (IR/SE) from June 2021 to March 2022, as well as UPRT³ training in May 2022, and then Multi-Crew Cooperation (MCC) training in July 2022.

According to his first logbook, he held a private pilot licence issued in June 2020 and a night Visual Flight Rules (VFR) rating issued on 20 August 2020.

According to his logbooks and data from the flying club, the pilot had logged around 750 flight hours, approximately 30 hours of which on type. In the three months prior to the accident, he had logged 21 flight hours on F-GIKS.

The pilot was flying with a couple he had met during a previous flight organised via a flight-sharing platform. The accident flight was not organised via such a platform.

³ Upset Prevention Recovery Training.

2.6 Statements

2.6.1 Witnesses near the accident site

Depending on their respective positions and the distance from the aeroplane, some witnesses on the ground no longer heard the engine before the second turn, while others no longer heard it during or just after this turn.

A pilot who was near the fuel pump at Propriano aerodrome explained that the engine spluttered on the first attempt to start it. Once started, the engine operated correctly. This pilot indicated that, at a height of between 400 and 500 ft approximately, the aeroplane turned sharply 90° to the right (see **Figure 1**, point **3**), instead of taking a heading of 290° towards the SA reporting point of the Ajaccio CTR, as all aeroplanes heading back to the mainland normally do. This witness added that the aeroplane flew level at a height of between 500 and 600 ft for more than 30s, with speed, and that it suddenly went down nose first and fell into a right spin.

While he was climbing through an altitude of 1,000 ft, north of the aerodrome, opposite the facilities, as part of a parachute drop flight, the pilot of the drop aeroplane talked over the radio to the pilot of F-GIKS, who had not yet started rolling. The latter asked him how long it would be before he dropped the parachutes, as he wanted to leave. The pilot of the drop aeroplane answered that he needed another 5 to 6 min, to which the pilot of F-GIKS replied that this was fine with him. On passing overhead the runway, the pilot of the drop aeroplane lost sight of the aerodrome. A few moments later, he heard the pilot of F-GIKS say that they were leaving and wish a nice day, without providing any indication regarding his flight plan. He explained that he heard no other messages from the pilot of F-GIKS over the aerodrome's A/A frequency.

2.6.2 Other witnesses

All the people who flew F-GIKS the day before reported that the engine started on the first attempt and was operating normally.

The president of the flying club explained that the standard practice consisted in taking off using the rear tank, then switching to the wing tanks after consuming half of its fuel.

A passenger, who took a flight lasting 50 min with the pilot onboard F-GIKS the day before, explained that the pilot told him that he usually took off on the fullest tank - i.e. the main tank for this flight - which he also used for landing on that day.

2.7 Aeroplane information

2.7.1 Aeroplane's maintenance history

The aeroplane was equipped with a Lycoming O-360-A3A engine installed on 7 June 2023, which was previously used on another aeroplane. At the time of its installation, the engine had logged 1,131 flight hours since its last overhaul⁴. On the day of the accident, it had logged an additional 182 flight hours. The last scheduled (100-hour) inspection had been carried out on 4 October 2023. Since then, it had flown almost every day, for a total of 11 flight hours, without any anomaly being reported.

⁴ The time between overhauls (TBO) specified by the engine manufacturer is 2,000 hours.

A study of the maintenance documentation made available to the BEA did not reveal any particular problems with the aeroplane or the engine that could explain a possible technical failure during the accident flight.

2.7.2 Estimated amount of fuel in the tanks

The aeroplane was equipped with two wing tanks, each with a capacity of 40 l, and a main tank, with a capacity of 110 l (the last 10 l of which could not be consumed in climb). Before leaving Cannes, the pilot added 71 l of fuel. Based on the statement from the instructor who last flew the aeroplane the day before, on the average fuel consumption of 40 l/hour declared by the flying club's training manager⁵, and on the entries in the logbook, there should have been between 110 and 129 l of fuel remaining at the time of the accident. However, it was not possible to determine how the fuel was distributed in the tanks.

2.7.3 Aeroplane's Flight Manual data

The manual recommends warming up the engine at approximately 1,200 rpm if necessary before take-off, checking the magnetos at 1,800 rpm⁶ and switching off at around 1,000 rpm.

The weight and balance were within the limits defined by the manufacturer.

The stall speed with the flaps in the take-off position is 99 km/h (indicated airspeed) with no bank angle, 106 km/h with a 30° bank angle, and 140 km/h with a 60° bank angle. The stall warning triggers 10 to 15 km/h before reaching the stall speed.

The aeroplane's maximum lift-to-drag ratio is 9.3 at 150 km/h with the flaps retracted.

The "Engine failure in flight" emergency procedure contained in the F-GIKS checklist indicated that if the altitude seemed sufficient to attempt an engine start, the following had to be done:

- *Adopt best gliding speed, with the flaps retracted.*
- *Open the fuel selector.*
- *Switch the electric pump on and the mixture to full rich.*
- *Move the throttle lever forward to ¼ of its travel.*
- *Set the magneto switches to L+R (Both).*
- *If the propeller is stopped, operate the starter.*

If the engine still does not start, prepare for a forced landing off-airfield, on a suitable field.

3 CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation.

Scenario

A few seconds after the engine start-up, which occurred following three unsuccessful attempts, the pilot taxied to the threshold of runway 27 at Propriano aerodrome and took off.

⁵ The Flight Manual data indicates an average consumption of 39 l/h at 75% cruise speed.

⁶ The F-GIKS checklist indicated to perform the engine tests at 2,000 rpm.

After crossing the opposite runway threshold, he turned sharply right, flying over the beach bordering the aerodrome.

Shortly after the turn, when the aeroplane was over the beach, a smoke release behind it suggests that the pilot experienced a failure that may have led to a partial loss of engine power. It is likely that the pilot then decided to make an adapted circuit to return to land. The statements gathered suggests that the engine's operating condition probably deteriorated up to the total loss of engine power.

In front of Propriano bay, the pilot initiated a second turn during which he lost control of the aeroplane. The statements gathered suggest that the aeroplane stalled asymmetrically. The height of the aeroplane at the time did not enable the pilot to avoid collision with the surface of the sea.

Examinations of the wreckage and maintenance documentation did not find any element that could explain the reason for the loss of power reported by the witnesses. However, the difficulties in starting the engine and the smoke release in flight observed in the video recording from one of the security cameras suggest a possible link with a carburettor problem.

Safety lessons

Pre-take-off checks and briefing

The investigation showed that the pilot did not stop at the holding point to carry out the pre-take-off checks. However, given his ratings and experience, it is possible that he carried them out while taxiing.

There are standard actions to be carried out before departure. Some of these can help to prevent reductions in engine power at take-off or to mitigate their consequences. The checklists to be completed prior to take-off contain a number of items that are important to prevent the threat posed by a reduction in engine power at take-off. In particular, the engine tests, which are generally carried out at intermediate power, may detect an anomaly that could worsen during take-off.

Moreover, the take-off briefing covers the actions to be taken under normal conditions and those to be taken if a failure occurs during take-off. The information listed during the take-off briefing is stored in the short-term memory. This memory directly and rapidly provides the pilot with the information necessary for immediate action.

Forced landing or ditching after an engine failure

An engine failure is generally indicated by warning signs such as a reduction in power, abnormal vibrations or noise or an oil pressure drop and/or temperature increase. Regular monitoring of the engine parameters aims at allowing the pilot to detect the fault and decide to abort the flight in time. The pilot must be aware that the situation may deteriorate at any time and provide for an action plan.

If the situation deteriorates and an engine failure occurs in flight, the pilot must, despite the startle effect and stress, quickly decide on an action plan: If the pilot is flying over water and the aeroplane's gliding distance does not enable it to reach an area clear of obstacles for a forced landing, it is preferable to consider making a forced ditching. Maintaining the appropriate airspeed for the chosen bank angles will enable the pilot to maintain a safety margin in relation to the stall angle-of-attack and to keep control of the aeroplane during these manoeuvres.

The BEA conducted a study entitled "[Reduction in engine power at take-off](#)" and covering the period 2015-2019. Thirty-one events were considered as part of this study. All 12 fatal accidents in the sample were the result of a loss of control in flight. In total, 14 cases led to a loss of control in flight. At least 11 of these occurred during a significant heading change or even during an attempted turn-around.

Unlike the losses of control in flight, neither the four cases of collision with obstacles without loss of control, nor the two cases of a controlled landing on water led to fatal injuries.

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