Aircraft Accident Report No: 1/2020

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**Report on the accident to
Piper PA-46-310P Malibu, N264DB
22 nm north-north-west of Guernsey
21 January 2019**

Registered Owner:	Southern Aircraft Consultancy Inc.
Operator:	Private owner[1]
Aircraft Type:	Piper PA-46-310P Malibu
Nationality:	United States of America
Registration:	N264DB
Place of Accident:	22 nm north-north-west of Guernsey
Date and Time:	21 January 2019 at 2016 hrs (all times in this report are UTC unless stated otherwise)

Summary

The Air Accidents Investigation Branch (AAIB) became aware on 21 January 2019 at 2122 hrs that the aircraft had gone missing at approximately 2016 hrs. The search for survivors, coordinated by the authorities in Guernsey, was called off at 1515 hrs on 24 January 2019.

The aircraft was lost in international waters and, in such circumstances, Annex 13 to the Convention on International Civil Aviation places a responsibility on the State of Registration of the aircraft, in this case the USA as represented by the National Transportation Safety Board (NTSB), to commence an investigation. However, the State of Registration may, by mutual agreement, delegate the investigation to another State. On 22 January 2019, in anticipation that an accident investigation would be required, the NTSB delegated responsibility for the investigation to the State of the Operator, in this case the UK as represented by the AAIB.

In exercise of his powers, the Chief Inspector of Air Accidents ordered an investigation to be carried out in accordance with the provisions of Regulation (EU) 996/2010 and the UK Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 2018. The sole objective of the investigation of an accident or incident under these Regulations is the prevention of accidents and incidents. It shall not be the purpose of such an investigation to apportion blame or liability.

Footnote

[1] Ownership through a UK Limited company.

In accordance with established international arrangements, both the NTSB, representing the State of Design and Manufacture of the aircraft, and the Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile (BEA) in France, which had been supporting search activities, appointed Accredited Representatives to the investigation. The Junta de Investigación de Accidentes de Aviación Civil (JIAAC) in Argentina, representing the State of Nationality of the passenger, appointed an Expert. The European Union Aviation Safety Agency (EASA) and UK Civil Aviation Authority (CAA) assisted the investigation, and the NTSB was assisted by Advisors from the aircraft and engine manufacturers.

Prior to this Final Report, the AAIB published Special Bulletins on 25 February 2019[2] and 14 August 2019[3].

The investigation established that the aircraft departed from Nantes Airport, France, at 1906 hrs on 21 January 2019 carrying a passenger on a commercial basis to Cardiff Airport in the UK. At 2016 hrs, probably while manoeuvring to avoid poor weather, the aircraft was lost from radar and struck the sea 22 nm north-north-west of Guernsey. Neither the pilot nor aircraft had the required licences or permissions to operate commercially.

The investigation identified the following causal factors:

1. The pilot lost control of the aircraft during a manually-flown turn, which was probably initiated to remain in or regain Visual Meteorological Conditions (VMC).
2. The aircraft subsequently suffered an in-flight break-up while manoeuvring at an airspeed significantly in excess of its design manoeuvring speed.
3. The pilot was probably affected by carbon monoxide (CO) poisoning.

The investigation identified the following contributory factors:

1. A loss of control was made more likely because the flight was not conducted in accordance with safety standards applicable to commercial operations. This manifested itself in the flight being operated under Visual Flight Rules (VFR) at night in poor weather conditions despite the pilot having no training in night flying and a lack of recent practice in instrument flying.
2. In-service inspections of exhaust systems do not eliminate the risk of CO poisoning.
3. There was no CO detector with an active warning in the aircraft which might have alerted the pilot to the presence of CO in time for him to take mitigating action.

Footnote

[2] https://assets.publishing.service.gov.uk/media/5c73c02bed915d4a3d3b2407/S1-2019_N264DB_Final.pdf [accessed February 2020]

[3] https://assets.publishing.service.gov.uk/media/5d53ea15e5274a42d19b6c2e/AAIB_S2-2019_N264DB.pdf [accessed February 2020]

Safety action was taken to: raise awareness of the risk associated with unlicensed charter flights; and improve the guidance given to personnel undertaking inspections of exhaust systems.

Five Safety Recommendations have been made in this report concerning: flight crew licensing records; the carriage of CO detectors; and additional in-service inspections of exhaust systems.

Conclusions

Findings

1. There was no evidence to suggest the pilot and passenger were not fit and healthy prior to the flight or that the pilot was not well-rested.

2. The pilot was operating on an FAA PPL issued on the basis of his existing EASA PPL and subject to the validity of its ratings.

3. The SEP rating on the pilot's EASA licence expired in November 2018 and he had no night rating, so he was not qualified to fly the aircraft at the time of the accident.

4. The pilot's PPL did not permit him to receive remuneration for flying, but he was to be paid a fee for the accident flight.

5. It is likely that the pilot felt some pressure to complete the return leg of the flight even though it would be at night and in poor weather.

6. The aircraft had valid Registration, Airworthiness and Release to Service Certificates, and the required scheduled maintenance had been completed.

7. The aircraft was operated in accordance with 14 CFR Part 91, *General Operating and Flight Rules,* and maintained in accordance with Part 43, *Maintenance, Preventive Maintenance, Rebuilding, and Alteration*.

8. The regulations under which the aircraft was operated and maintained permitted it to be used for private use only. No permission had been sought or granted which allowed the aircraft to be operated commercially.

9. The aircraft was not being operated in accordance with safety standards applicable to commercial operations.

10. The autopilot and flight director had been diagnosed as having an intermittent fault and should have been placarded as inoperative.

11. Just after 2012 hrs, a series of turns was flown over about 90 seconds, probably so that the aircraft would remain in, or regain VMC. During the

turns, the flightpath was unstable and inconsistent with normal cruise flight or with use of the autopilot.

12. At 2016 hrs, the aircraft began a turn to the right and began to descend. As it descended through approximately 2,700 ft amsl, the angle of bank was approximately 90° and the airspeed was approximately 235 KIAS.

13. The aircraft attitude and speed were so far from typical values encountered in normal operations they indicated that the autopilot was not engaged and control of the aircraft had been lost.

14. At approximately 2016:30 hrs, as the aircraft descended below 2,700 ft, there was an abrupt nose-up pitch input when the airspeed was at least 100 kt above V_A, the speed above which full or abrupt control movements are not permitted.

15. During the subsequent pull-up manoeuvre, aerodynamic loads exceeded design limits and caused the structural failure of the elevator and horizontal stabiliser, followed by the structural failure of both wings at the splice joints.

16. The last secondary radar contact with the aircraft was at 2016:34 hrs.

17. The aircraft struck the sea in an inverted, left wing low, nose-high attitude.

18. The impact with the sea was not survivable.

19. There was no evidence of fire.

20. While the possibility of aircraft icing could not be discounted, it is unlikely that icing was a factor in the accident.

21. It could not be determined what caused the reported ‘bang’ and mist on the previous flight, and whether it was a factor in this accident.

22. The faults with the stall warning, brakes and oil leak reported by the pilot at Nantes were not a factor in the accident.

23. At the time of the accident, the passenger’s blood had a very high level of COHb, and it was likely that the pilot was also affected to some extent by CO poisoning.

24. Although the level of COHb in the pilot’s blood could not be determined, it was likely that his ability to control the aircraft was impaired during the later stages of the flight, thereby significantly increasing the likelihood that control would be lost.

25. The abrupt pull-up of the aircraft just before it broke up required the control wheel to be pulled aft, and therefore the pilot probably retained some level of function at this time.

26. The most likely reason for CO to have entered the cabin was a failure of the part of the exhaust tailpipe containing the heater muff, which allowed exhaust gas to mix with the ram air and enter the cabin through the cabin conditioning system.

27. The exhaust system, including the heater muff was visually inspected during the Annual maintenance 11 flying hours before the accident. In a different accident, a muffler has been known to fail six flying hours after inspection.

28. A pressure test of the heater muff was not carried out during the previous two Annual maintenance inspections. Under 14 CFR Part 91, the 100-hour / Annual maintenance schedule did not call for such a test to be carried out.

29. The 100-hour / Annual maintenance schedule did not directly reference the engine manufacturer's guidance on how to examine the exhaust system.

30. In-service inspections of exhaust systems do not eliminate the risk of CO poisoning.

31. There is no requirement for CO detectors to be carried on piston engine aircraft, although regulators advise pilots to do so.

Causal factors

1. The pilot lost control of the aircraft during a manually-flown turn, which was probably initiated to remain in or regain VMC.

2. The aircraft subsequently suffered an in-flight break-up while manoeuvring at an airspeed significantly in excess of its design manoeuvring speed.

3. The pilot was probably affected by CO poisoning.

Contributory factors

1. A loss of control was made more likely because the flight was not conducted in accordance with safety standards applicable to commercial operations. This manifested itself in the flight being operated under VFR at night in poor weather conditions despite the pilot having no training in night flying and a lack of recent practice in instrument flying.

2. In-service inspections of exhaust systems do not eliminate the risk of CO poisoning.

3. There was no CO detector with an active warning in the aircraft which might have alerted the pilot to the presence of CO in time for him to take mitigating action.

Safety Recommendations and Action

Safety Recommendations

The following Safety Recommendations are made in this report:

Safety Recommendation 2020-005

It is recommended that the Civil Aviation Authority ensure that the system in place to meet the requirements of EASA Part ARA.GEN.220 is effective in maintaining accurate and up-to-date records related to personnel licences, certificates and ratings.

Safety Recommendation 2020-006

It is recommended that the Federal Aviation Administration require piston engine aircraft which may have a risk of carbon monoxide poisoning to have a CO detector with an active warning to alert pilots to the presence of elevated levels of carbon monoxide.

Safety Recommendation 2020-007

It is recommended that the European Union Aviation Safety Agency require piston engine aircraft which may have a risk of carbon monoxide poisoning to have a CO detector with an active warning to alert pilots to the presence of elevated levels of carbon monoxide.

Safety Recommendation 2020-008

It is recommended that the Civil Aviation Authority require piston engine aircraft which may have a risk of carbon monoxide poisoning to have a CO detector with an active warning to alert pilots to the presence of elevated levels of carbon monoxide.

Safety Recommendation 2020-009

It is recommended that Piper Aircraft Inc. ensure that the 100-hour / Annual maintenance schedule for the PA-46 variants references the engine manufacturer's guidance, where available, on inspecting and testing the exhaust system.

Safety Action

Following this accident, the following safety action was taken:

Safety action taken by the CAA

The CAA developed a campaign to raise awareness of unlicensed charters, including publishing a Leaflet, *Legal to Fly,* to inform passengers about flying safely in light aircraft and business jets.

Safety action taken by the engine manufacturer

The engine manufacturer stated that it would:

1. Work with Original Equipment Manufacturers to determine the best way to convey the importance of thorough exhaust system inspections.

2. Review its maintenance and overhaul manuals to determine whether additional elaboration would increase the chance of a qualified mechanic finding a potentially unairworthy condition. It undertook to complete this review in order to have any amplifications implemented in the next FAA approved version of its Standard Practice Manual (M-0).

AIRCRAFT ACCIDENT REPORT CORRECTION

Prior to publication the following information was found to be incorrect.

AAR 1/2020, page 61 refers:

In paragraph 1.18.1.10, 4th bullet point, the date that EASA SIB 2020-01 was issued is incorrect and should have said 27 January 2020. The sentence now reads:

> On 27 January 2020, EASA issued SIB 2020-01, Carbon Monoxide (CO) Risk in Small Aeroplanes and Helicopters[71].

AAR 1/2020, page 62 refers:

In the last sentence in paragraph1.18.1.10, 4th bullet point, there is a typo in that GEM should read GEN. The sentence now reads:

> *Annex II, ARO.GEN.135C'[72].*

In footnote 72, 'Part 21' is missing from the reference. The footnote now reads:

> 72 For a definition of 'unsafe condition', see AMC 21a.3B(b) to Part 21 in EASA ED Decision 20013/1/RM. Available: https://www.easa.europa.eu/sites/default/files/dfu/decision_ED_2003_01_RM.pdf [accessed February 2020]