SERIOUS INCIDENT

Aircraft Type and Registration:	Piper PA-34-200T Seneca II, G-IFLP	
No & Type of Engines:	2 Continental Motors Corp TSIO-360-EB piston engines	
Year of Manufacture:	1980 (Serial no: 34-8070029)	
Date & Time (UTC):	16 December 2018 at 1820 hrs	
Location:	Approx 30 miles west of Leeds	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	None	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	60 years	
Commander's Flying Experience:	1,500 hours (of which 90 were on type) Last 90 days - 60 hours Last 28 days - 30 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

G-IFLP encountered control difficulties due to airframe icing resulting in a descent below the cleared level. The pilot requested clearance to descend but was not able to convey the seriousness of the request whilst also manually flying the aircraft and operating the de-icing system. The controller did not detect the urgency of the situation and instructed the aircraft to maintain altitude. This resulted in a brief loss of separation with another aircraft.

History of the flight

The pilot was flying at night from Leeds Bradford Airport to Oxford Airport with one passenger. During the climb the aircraft was experiencing intermittent IMC. After reaching FL90 the pilot observed freezing rain and a rapid ice build-up on the windscreen and wings. The pilot reported that he then started to have difficulty controlling the aircraft, particularly in pitch. He switched on the aircraft de-icing system and requested descent. ATC advised him to maintain altitude due to other traffic. The pilot continued to use the aircraft's de-icing system to clear the ice whilst attempting to maintain altitude. He recalled advising ATC that he had control problems due to icing but descent clearance was not given. He also recalled that another pilot relayed a message that G-IFLP was having control difficulties. After approximately four minutes the de-icing system cleared the ice and the aircraft was able to continue its flight to Oxford without further incident.

Air traffic control report

After the incident, the air traffic service provider reviewed the radar and radio recordings and provided a report which is summarised in Table 1.

TIME	EVENT
18:19:00	An Airbus 319 was inbound to Manchester Airport maintaining FL80. G-IFLP was level at FL90. The Airbus was transferred to Manchester Approach Control. G-IFLP mode C was observed to fluctuate between FL90 – FL93
18:19:15	G-IFLP was instructed to route to the Manchester (MCT) VOR.
18:20:05	G-IFLP turned to the west away from MCT VOR.
18:20:24	G-IFLP was at FL88 and 5.5 nm away from the Airbus which was maintaining FL80.
18:20:37	G-IFLP was at FL86 and 4.8 nm away from the Airbus (minimum required separation 1,000 ft or 5 nm).
18:20:42	G-IFLP was at FL87 and 4.5 nm away from the Airbus.
18:20:44	A “fast and broken” transmission was heard from G-IFLP requesting descent and mentioning icing. The controller responded with “maintain FL90”. The controller contacted the Manchester Approach controller and advised them of G-IFLP descent. The Approach controller turned the Airbus to the right to re-establish lateral separation.
18:20:51	Separation was re-established with G-IFLP at FL90 and the Airbus descending through FL79.
18:21:08	The controller instructed G-IFLP to maintain FL90.
18:21:20	G-IFLP transmitted fast again but not as broken “losing control”. This appears to have been missed by the controller who instructed G-IFLP to “maintain at least FL80”
18:21:24	G-IFLP turned to the south-east now at FL86. The Airbus passed 3.6 nm behind at FL76.
18:21:48	An unknown pilot transmitted “sir he said he’s losing control”
18:21:51	G-IFLP returned to FL90 tracking to MCT VOR.
18:22:18	G-IFLP reported “stabilising”

Table 1

Timeline from radar and radio recordings

The radar recording showed the minimum recorded separation between the Airbus and G-IFLP was 4.5 nm and 600 ft. The minimum required separation is 5 nm or 1,000 ft. However, this can be reduced to 3 nm or 1,000 ft if both aircraft are with the same controller or if prior agreement is reached between two controllers (this did not occur in this case)[1].

Footnote

[1] The minimum separation standards and the conditions on their use are specified in Manual of Air Traffic Services Part 1 and the local Part 2.

Aircraft information

The Seneca II is an all metal aircraft with retractable landing gear, two turbocharged piston engines and seating for up to seven occupants. It is approved for IFR flight by day and night. G-IFLP was not fitted with an autopilot.

The aircraft is approved for flight in icing conditions. It is fitted with an ice protection system consisting of wing and empennage pneumatic boots, wing ice detection lights, electrothermal propeller deice pads and an electrically heated windshield panel. The pneumatic wing and empennage boots are installed on the leading edge of the wings, the vertical stabilizer and the horizontal stabilator. Once ice has accumulated on the wings, it may be cleared by pressing the SURFACE DE-ICE switch on the instrument panel. The boots are inflated for six seconds via an engine driven pressure pump. They work by fracturing ice that has built up over the boots. The Pilot's Operating Handbook (POH) recommends that 'boots should be cycled when ice has built to between ¼ and ½ inch thickness on the leading edge'. The system may not be able to shed light ice accumulations as the ice may not break when the boots inflate. Similarly, it may not work if ice has accumulated to the extent that the boots cannot break the ice or if ice forms whilst the boots are inflated causing the boots to cycle beneath the layer of ice.

The POH provides the following guidelines for operating in known icing conditions;

> *'The following guidelines should be observed:*
>
> *a) Flight into severe icing is prohibited.*
>
> *b) Moderate icing conditions above 10,000 ft should be avoided whenever possible; if moderate icing conditions are encountered above 10,000ft, a descent to a lower altitude should be initiated if practical.*
>
> *c) Operation in light icing is approved at all altitudes.'*

The following warning is contained in the limitations section;

> *'Severe icing may result from environmental conditions outside of those for which the airplane is certificated. Flight in freezing rain, freezing drizzle, or mixed icing conditions may result in ice build-up on protected surfaces exceeding the capability of the ice protection system, or may result in ice forming aft of the protected surfaces. This ice may not be shed using the ice protection systems and may seriously degrade the performance and controllability of the airplane.'*

Meteorology

The Met Office forecast for the date and time of the incident is shown in Figure 1. Moderate icing was forecast from between 4,000 ft and 5,000 ft to the upper limit of the chart (10,000 ft). Severe icing was forecast within isolated cumulonimbus cloud embedded within the occluded front.

Met Office forecasts will predict moderate icing in high humidity environments (ie in cloud, where the air temperature is between 0°C and -20°C) and severe icing within cumulonimbus, alto cumulus castellanus or nimbostratus clouds. However, this does not relate directly to the amount of ice accumulation an aircraft may experience in flight. Ice accumulation is dependent on aircraft type, length of time in the icing environment and the aircraft ice protection systems.

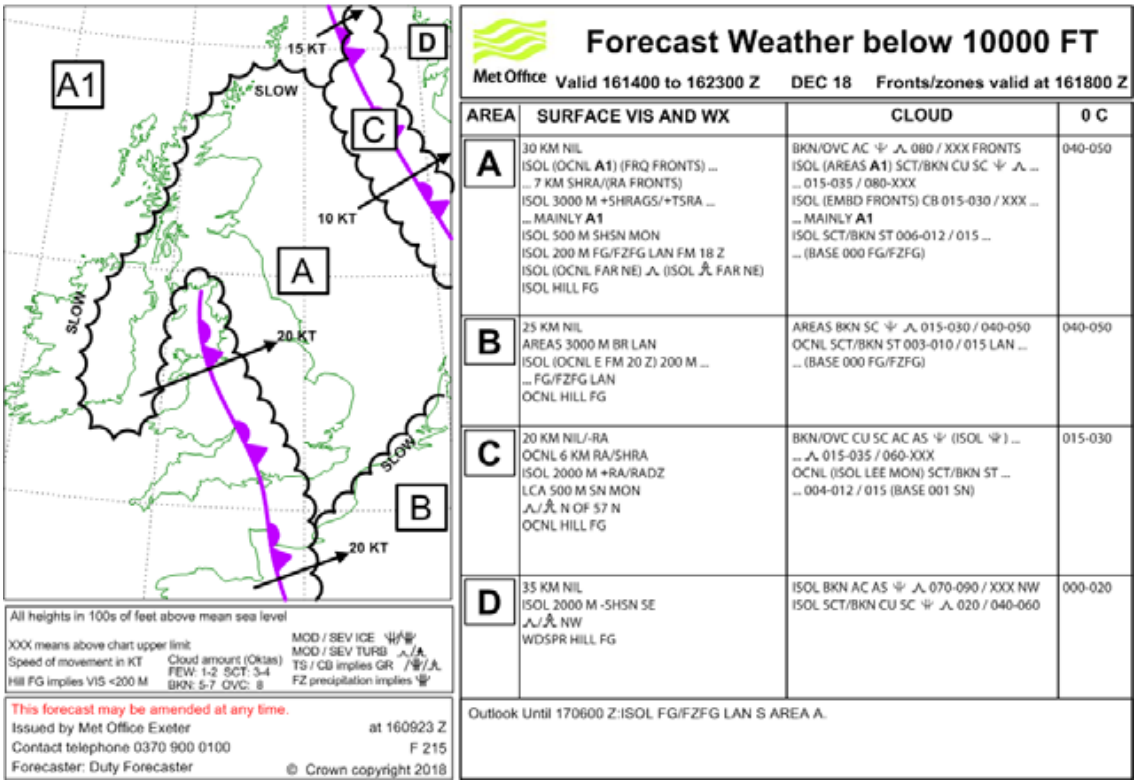

Figure 1

Met Office forecast for 16 December 2018

Personnel

The pilot held a commercial pilot's licence with a valid single-pilot multi-engine rating and instrument rating (MEP/IR rating). The pilot also held a flight instructor rating.

Analysis

G-IFLP descended below its cleared level due to control difficulties associated with ice accumulation on the airframe. Moderate icing was forecast on the planned route with severe icing forecast within embedded cumulonimbus cloud associated with the occluded front to the west. This descent resulted in a loss of separation with another aircraft.

The separation between the two aircraft reduced to a minimum of 4.5 nm and 600 ft. This would have been acceptable if both aircraft were being controlled by the same controller or if prior co-ordination had been agreed. However, as this had not occurred the minimum required separation was 5 nm or 1,000 ft.

The pilot reported that when the icing event occurred his focus was on controlling the aircraft using the maxim 'Aviate, Navigate, Communicate'. Flying the single-pilot aircraft, without an autopilot, in instrument conditions whilst operating the de-icing system left the pilot limited capacity to communicate with air traffic control. The pilot attempted to request descent but, was not able to convey to the controller the seriousness of situation. The controller did not detect the urgency in the request for descent and instructed the aircraft to maintain altitude. The controller contacted the approach controller, who was controlling the other aircraft, to advise of G-IFLP's descent, so they could re-establish separation. Another pilot on the frequency realised the problem and tried to assist by advising the controller that G-IFLP was "losing control". However, by this time the ice had cleared and the aircraft was able to resume FL90.

With the benefit of hindsight, the pilot thought he could have transmitted a PAN or MAYDAY call to ensure the controller was aware of the severity of the control difficulties. However, at the time, he was not sure how quickly the ice would clear and his primary focus was on flying the aircraft.

This incident highlights the hazard of icing conditions particularly to light aircraft. The CAA Safety Sense Leaflet – '*Winter Flying*'[2] provides guidance for flying in potential icing conditions.

Conclusion

The aircraft descended below its cleared level due to control difficulties caused by ice accumulation on the airframe. This resulted in a loss of separation with another aircraft.

Footnote

[2] http://publicapps.caa.co.uk/docs/33/20130121SSL03.pdf (assessed on 21 January 2019).