ACCIDENT

Aircraft Type and Registration:	Pulsar, G-LUED
No & Type of Engines:	1 Rotax 582 piston engine
Year of Manufacture:	1996 (Serial no: PFA 202-12122)
Date & Time (UTC):	31 August 2018 at 1800 hrs
Location:	Sturgate Airfield, Lincolnshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - 1 (Minor) Passengers - None
Nature of Damage:	Broken canopy, nose and propeller
Commander's Licence:	Private Pilot's Licence
Commander's Age:	76 years
Commander's Flying Experience:	475 hours (of which 375 were on type) Last 90 days - 4 hours Last 28 days - 2 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and further AAIB enquiries

Synopsis

After landing at Sturgate Airfield, G-LUED overran the runway and crossed a bare patch of earth before its mainwheels dropped into a ditch. The aircraft then flipped over and came to rest inverted heading back towards the runway. The occupants of a passing car helped the pilot and his passenger vacate the aircraft.

History of flight

As he took off, the pilot assessed that the weather was fair, with a 5 kt breeze from the south west. On checking the windsock before landing, he judged that the wind was more southerly in direction, but still suitable for a landing on the westerly runway. The pilot did not report the actual threshold speed achieved but stated that the aircraft failed to decelerate as anticipated after it touched down at the start of Runway 27. The aircraft overran the 820 m landing distance available and crossed an un-prepared surface before its mainwheels dropped into a ditch. The aircraft then nosed over, coming to rest inverted heading approximately 100°M with its tail adjacent to a public road bounding the airfield. The pilot considered that the wind had swung round towards the south east during his approach and he believed that an unexpected tailwind was the cause of the runway overrun.

Figure 1

G-LUED inverted after the accident (image ©Lincolnshire Police)

Other information

G-LUED's approach and landing was witnessed by a second pilot who had recently landed and was standing to the south of the main runway. He judged that the touchdown point was significantly inset into the runway (Figure 2) and he heard G-LUED's engine note rise as if the pilot was attempting an aborted-landing go-around. He did not see the aircraft enter the ditch but ran over to it as soon as he realised there had been an accident. On arriving at the scene, he found two passers-by, who had been driving on Common Lane, helping the occupants of G-LUED.

Figure 2

Overview of Sturgate Airfield

The witness noted that there was no evidence of the aircraft's tailwheel having been on the ground during the overrun. This was corroborated by photographic evidence[1] which showed distinct witness marks from the aircraft's mainwheels leading from the runway, but revealed no evidence of a tailwheel track.

The accident pilot stated that he did not attempt to abort the landing. He expressed the belief that once on the ground he was committed to stopping because the two-stroke engine would not accelerate sufficiently quickly for a successful go-around.

Aircraft information

The Pulsar is a two-seat, low-wing, amateur-built aircraft with fixed undercarriage in either the tailwheel or tricycle configuration. G-LUED was a tailwheel variant powered by a Rotax 582, two-stroke engine. After prolonged periods at low power, such as in descents, two-stroke engines can be prone to spark plug fouling. When discussing such descents, the Pulsar 582 Operating Handbook (POH) recommends that pilots:

> *'Clear the engine* [by increasing RPM to prove the engine and burn off deposits] *every few minutes during descents to make sure you still have it.'*

Being a light, low drag aircraft, the Pulsar gains speed easily on final approach, but it is difficult to reduce it. A senior Light Aircraft Association (LAA) engineer and pilot who had test-flown this type of aircraft reported that they handle well on landing but can be prone to floating in ground effect at threshold speeds higher than the 65 to 70 mph recommended in the POH[2]. To increase drag and help with glidepath control, the trailing edge wing flaps can be lowered. Evidence from Figure 3 indicates that G-LUED's flaps were in the landing position when the it overran the runway.

In relation to engine performance, the LAA pilot stated that, if the engine is "cleared" prior to landing to ensure there is no spark plug fouling or carburettor icing, there is no reason why it could not reasonably be relied upon to perform a go-around from ground level.

The aircraft kit manufacturer had ceased trading and it was not possible to obtain definitive figures for the landing distance required in the conditions prevailing at the time of the accident. The AAIB report into a previous Pulsar accident[3] stated:

> *'The landing ground roll was estimated by* [the design] *organisation to be approximately 800 ft (243 m), but the conditions in which this could be achieved were not stated.'*

Footnote

1 This photograph was made available to the investigation, but the copyright holder's permission for publication was withheld.
2 60 mph is recommended for short-field landings.
3 G-BULM, 17 April 2207, (https://www.gov.uk/aaib-reports/pulsar-g-bulm-17-april-2007) accessed 18 October 2018.

Figure 3

G-LUED inverted with trailing edge flaps extended (image ©Lincolnshire Police)

CAA Safety Sense Leaflet 01, *Good Airmanship Guide*

In Safety Sense Leaflet 01 (Version E)[4], the CAA reinforces the point that a good landing is a result of a good approach and that pilots should be prepared to go-around when circumstances dictate it. They specifically recommend that pilots should:

> *'Go-around if not solidly 'on'* [the ground] *in the first third of the runway, or the first quarter if the runway is wet grass.'*

Analysis

Even considering the possibility of a small tailwind component, it appeared likely that, with a nominal landing ground run of 243 m, the aircraft should have been able to stop within the 820 m landing distance available. The lack of tailwheel witness marks in the overrun area indicated that aircraft was travelling fast enough for the tail to be flying when it left the prepared surface[5]. On balance, the evidence suggested that the aircraft touched down further along the runway than the pilot estimated, as observed by the witness standing south of the runway.

It was not possible to determine the exact cause, but it is possible that wind effects, coupled with a tendency for the aircraft to float in ground effect, contributed to a deep landing and consequential overrun.

The pilot's lack of confidence in the accelerative capability of the engine may explain why he did not believe that he had sufficient time to go around in the circumstances at the time.

Footnote

4 http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=1156 accessed 3 Dec 2018.

5 The investigation did not establish the minimum airspeed at which it was possible to hold the tailwheel off the ground.

Conclusion

This accident occurred because the aircraft was not stopped in the landing distance available. Light, slippery aircraft pose an energy management challenge and their pilots need to be alert to the threat of deep landings.