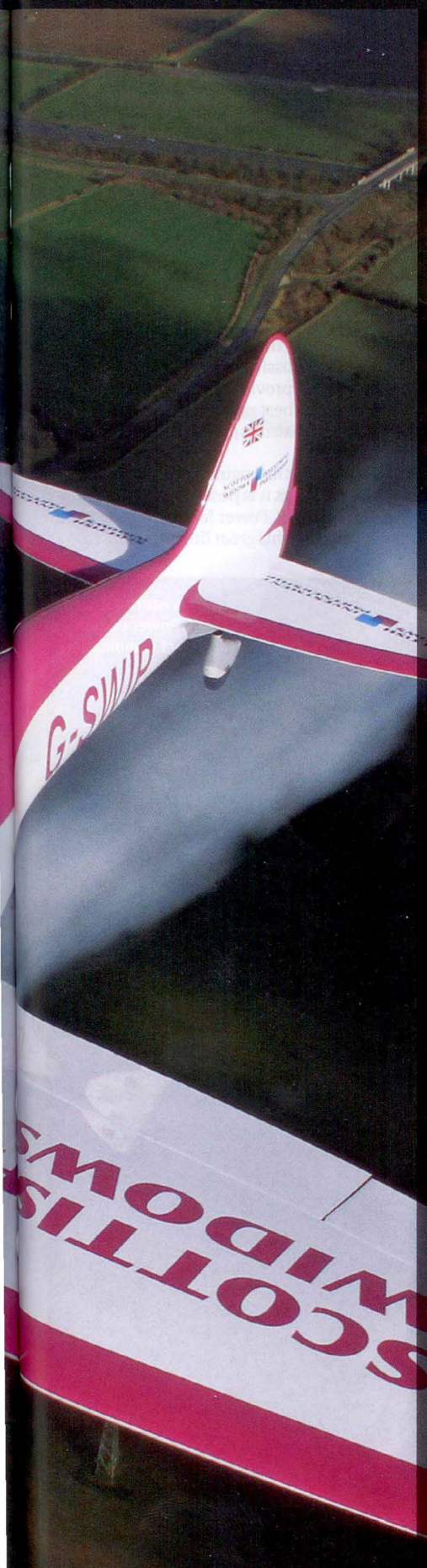
TheTwister duo in its new Scottish Widows livery



UL POWER IN TWISTER

Pete Wells explains why he chose UL Power's UL260 ISA engine – the company's first ever aerobatic engine – for his second Twister, after 1,000 hours with a Jabiru 2200

The Twister was always years ahead of its time, so much so that when it first came along there really wasn't an engine available to do it justice.

I built one anyway, convinced from the start that it would make a superb aerobatic display mount, and managed to operate the Jabiru 2200 for over 1,000 hours by noting intervals of failure of components and imposing 50 hours less life to those items. I was averaging about 360 hours per year; giving say a rotor arm a life of 150 hours meant I had to change it about every six months (someone doing 20 hours a year would do well to change on a calendar period). By using the red pages at the back of the engine logbook as a reminder, I ended up with almost 100% reliability and never missed an airshow. But to achieve this, I was working every week on the engine!

What I wanted was the rugged reliability of the American heavy metal (Lycoming and Continental), but with a lot better power-to-weight ratio and aerobatic oil and fuel – a tall order. I also wanted something which required minimal work to keep it reliable. The American engines are very robust in construction and rev relatively slowly at around 2,700rpm. In contrast, what I needed by definition was a lightweight, high-revving unit; a similar comparison would be to compare an old American V8 with a Formula 1 race engine.

As I had found with the Jabiru, getting as much performance out of a relatively small engine as a large one often comes at the expense of its reliability, and it's something that requires constant work. I was also horrified to find that the ignition system on the Jabiru contained parts from a 1980 Datsun, and in this day and age that's technologically from the dark ages. There seemed no chance of the engine being developed in the way we required, i.e. fuel-injected with an aerobatic inverted oil system. The company was so difficult to communicate with that we were very much on our own when we encountered any problems, and Jabiru showed little or no interest in any of the things we discovered and rectified.

OPTIONS

I started looking at various options but did not like any of them. The popular Rotax 912 is heavy, water-cooled and has two carbs to go wrong instead of one. It was ruled out for weight and complexity reasons. I was considering adding another two problematic cylinders to the Jabiru and trying the six-cylinder version, which would have meant even more of the components that failed at regular intervals.

It depressed me that small engines were so limited and technologically lacking. Then, by chance, I saw UL Power's UL260i engine at a microlight fair at Popham. It instantly struck me as being much more robust and a lot better designed and built than the opposition. Its representative was knowledgeable and keen to hear what I needed. In technology terms, with its FADEC system, it was almost at the opposite end of the spectrum from what I was operating. But I did have a few concerns about some of its features.

1 The engine control unit (ECU) is like that of a modern car. It does everything to ensure the engine works in whatever situation you are in as efficiently as it can. I worried that if this went wrong you would be up the creek without a paddle.

2 An electrically-powered ignition system means that if the wrong wire fails, the engine stops, i.e. fail is off, unlike most aircraft where fail means on. No power, no engine. (I now know it has many safety features making it probably as safe as a conventional engine.)

3 I had heard rumours that the PFA (as we were then) insisted on having a two-battery alternative power source; weight-wise that would kill this engine option.

4 If I agreed to buy one, would UL Power do as promised and build me an aerobatic version?

5 Would UL Power disappear and leave me high and dry with no support or engine parts?

Of these issues the most important was not requiring two batteries. I put forward a good argument why this should not be required and Francis Donaldson agreed that for a single-seat aerobatic aeroplane it was likely to cause more problems than it solved, so agreed to a normal, single-battery electrical system.

> UL POWER IN TWISTER

NEW BUILD

I went ahead and built a second Twister, modifying it to take the slightly heavier engine and moving the battery aft to keep the C of G in roughly the same place as the original. I carried out load tests on the mount and filled in lots of paperwork.

Rumours of the UL engine being no better than the Jabiru 2200 proved unfounded when we finally flew one against the other. Once early teething problems had been solved, my plan to use the Jabiru-powered aeroplane for airshows and the new one for testing for at least a year was abandoned after six months as it became obvious that the UL260i was vastly superior to and more reliable than the Jab 2200. I even used the UL-powered plane for airshows in Scandinavia, which entailed a lot of overwater flying.

The ECU has so far never given any problems. I have a spare but have never used it and the single power supply and electronic ignitions have worked faultlessly, even when very wet!

UL Power has also been as good as its word and supplied me with its first ever aerobatic engine, the UL260 ISA, which we were immediately impressed with. A very telling fact was that when we started practising for the Twister Duo late in 2009, no one wanted to fly the Jabiru-engined aeroplane once they had flown both. As formation leader I ended up flying it as it gave the Number Two the extra power to formate on me, but it grated that the other guys were in the better aeroplane. I could not wait to get two UL-engined aeroplanes.

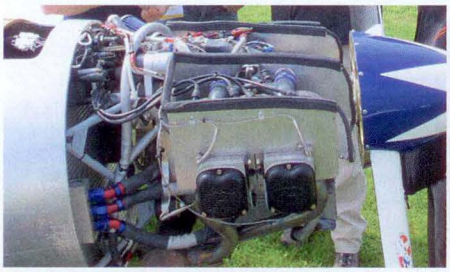
This was achieved by mid March 2010 and almost instantly we were approached by a Turkish event organiser who wanted an air display act in Turkmenistan (which borders Afghanistan). We had about one month to test the second aeroplane and get the clearances but it would be one hell of a first show for the new team, so Guy and I shared the mountain of preparation and decided to take the booking.

I think that trip was the ultimate test of this engine, involving about 70 hours of flying over some of the most inhospitable terrain on the planet. Due to the fact we were doing 400-mile legs with nowhere to land in-between, we knew we would probably encounter some bad weather. We were not disappointed; we flew for hours in driving rain at or below 600ft over the sea, and at other times climbed to over 15,000ft to clear terrain. We did legs in formation in terrible visibility to stay together and Guy and I came away from the trip with great admiration for this amazing little engine. It never missed a beat.

Pilots are always complaining that the technology we use is archaic and yet they are very reluctant to try anything new. The result is that new technology like the UL 260 ISA will always elude them – unless someone else takes the bull by the horns and shows them what they are missing.

UL Power has provided light aviation with one of the best new powerplants for decades, and it also supports its products and customers.

I now consider its engine to be as close to a baby Lycoming as it is possible to get and am very grateful to UL Power for keeping its word and developing this great little engine.



The installation of the aerobatic UL260 ISA is extremely neat and tidy

Testing the engine mount for side-loading

Twister Duo pilots Guy Westgate (left) and Pete Wells (right), with the UL260 engine designer, Lionel D'Hondt