Extreme efficiency

FLIGHT TEST | Swiss Excellence Airplanes Risen

Able to achieve a record-setting 174kt on 100hp, stalling at just 30kt and providing space for two, the Swiss Excellence Risen is far from the norm, in terms of design, performance and even price.

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"The Risen is a reminder that, sometimes, aircraft can be quite different"

Main Even when flying in the upper speed range, the large V-tail ensures excellent directional stability. Above: The Risen's cabin has plenty of space for two people. Left: The main gear retracts fully into the fuselage. The carbon fibre spars have a glass fibre core, while the hydraulic disc brakes and wheels are supplied by Beringer. Below: The baggage area behind the leather-clad seats holds 30 kg. Bottom: The engine is tightly packaged, while the propeller, with its centre pitch at the root, was developed in-house.

South of Perugia and Frascati, in Italy, the mountain rise to over 2,000 m, behind which the Risen microlight disappeared a few moments ago. Suddenly, there's a sound coming from the approach to Risi, and there it is! The unusual shape approaches head-on, at terrific speed - a central dot with four radiating lines, two of which project at an unusual angle. The whole gets louder, amplified by the sounds of a whistling propeller and an engine... just like a new, fabulous!

The Risen flies past at high speed, a few feet above the runway, to pull up steeply at the other end. But what the devil was it? Looking away for a moment and then back again, one can scarcely believe that it's the same aircraft.

A moment ago, the high-speed fly-by saw it like a machine at the National Championship Air Races. Now, on approach to land with everything out, huge Fowler flaps and gear down, the Risen looks for all the world like it's just hanging in the sky from a heavy-lift helicopter. The last thing that would come to mind is a microlight with a stall speed of 35 knots and top speed of 174 knots.

Yes, that last number is real, FIA record-confirmed, not just a hoped-for number in a brochure. Oh, 100 knots, only Formula One race aircraft go faster, but they've got a somewhat higher stall speed and no room for a passenger.

When you first set eyes on the Risen, your aviation senses are left a little unsure, like there's something amiss. Most new aircraft bear more than a passing resemblance to something that's gone before, unless your surname is Rutan. However, the Risen is a reminder that, sometimes, aircraft can be quite different.

Examine this machine a little closer and it becomes clear that the differences in this unique design are mainly down to the wide-front fuselage, with its subsonic-style side-by-side seating. That's very reminiscent of Stemme motor-glider or the Caproni Calidormi canopies, tapering quite sharply at the cockpit,落 the fuselage, which ends in a V-tail. However, unlike the motor-glider, the Risen's nose is a little wider, an unavoidable compromise considering that it must house a Rotax 912B. Any V-tail seems a bit unusual but in a clever solution to reduce drag, with two surfaces achieving what normally requires three. Designers Alberto Porto has stated, "There's nothing new on this aircraft", which, given its appearance, comes as something of a surprise. But his insight: the V-tail has been seen before, as has a carbon fibre structure on a hard plastic core, retractable gear on legs which retract into the fuselage, a trapezoidal wing planform, and a cockpit canopy blended with the fuselage. Okay, that last one might be unusual in a powered aircraft. As on the record-breaking Aeroplane
World Speed Record

On 16 December 2015, Alberto Porto with Sae Delta Moretti broke the World Speed Record for Ultralights to 333.824mph over a 15 km course at Ozzano dell'Emilia in Italy. Their Risan was powered by a standard 100hp Rotax 912S.

The duo broke the previous world record of 285.786mph, which was set in 2012 by the Slovakian twin-seat Shark. The latter had broken the record of 274.786mph, set in 2005 by the Czech VL-5. The Risan's speed record was recognised by the FIA in the Lower Ultralight Class (SAL2P: three-axis controls, landplane, piston engine, two persons on board), also the absolute world record in the Upper Class I. For this achievement, in October 2016 the FIA awarded Alberto Porto the De La Valsay Medal.

Like a dingbat

So, let’s climb into the cockpit. But hang on. Normally, the step hangs from the fuselage behind the trailing-edge. Says Alberto, “Our world-record preparation with the aeroplane involved removing the external step. We just haven’t refitted it yet!” So we hop up on to the leading-edge of the wing and climb in. The seats are red leather while the console and panels have carbon surfaces. There are three large Dymon SkyView EFIS units plus individual controls for the Dymon radio and intercom. The cockpit has an elegant simplicity to it. The memory foam-sprung seats aren’t adjustable, nor are the rudder pedals. I am 1.84m tall and the ergonomics are okay for me, though my knees touch the instrument panel. Alberto says that the instrument panel height can be set for individual customers.

Start-up is traditional-Rotax 912, and we wait for the oil to come up to temperature. Taxying is easy and the Beringer brakes are positive units to use. We line up on RW20 and we’re off! We have a V-tail and a casting nosewheel – so will I need differential braking in a crosswind until we’ve got some speed? Today, there’s no wind so the jury’s out. I’d been told by other pilots who’d flown the Risan that the V-tail doesn’t provide enough aerodynamic outer authority at low speeds to some brake was required.

The rate of climb is simply mind-blowing for an ultralight man – at our best climb speed of 150 knots we’re going up like a dingbat at nearly 1,500ft/minute! Unfortunately, the climb fun is soon curtailed by the Italian rule limiting ultralights to a maximum of 1,000ft agl. We level out but leave the throttle at max, the engine continuing to wind its way to 5,200 rpm. South of the airfield, the ground rises to 2,244ft and the altimeter indicates 4,000.

As the numbers on the Dymon begin to steady, I look at the speed, which barely wavers at 165kts. That's the
“Even at Vne, the Risen tracks straight as an arrow without the slightest sign of a wobble”

Above Everything out!
The Risen's powerful Fowler flaps bring the stall speed below 35kt. When clean, it can exceed 170kt - an enormous speed range equivalent to a TAS of 177kt - it’s the fastest I’ve ever experienced in a machine this light in weight.

Pulling the power back to a comfortable cruise setting of 5,000 rpm and 26 inches manifold pressure still gives an indicated 160kt. Alberto suggests coming even further back on the power, so I reduce the throttle to 10in and engine to 4,000rpm, and we still have an indicated 97kt! This is where that magical word ‘efficiency’ really comes into play – the fuel-flow meter indicates a remarkable six litres per hour.

But there’s more. If we were to suffer the indignity of an engine failure, we could still mix it with quite a few ultralight sailplanes. By that I don’t mean in sink, because we still have a glide ratio of 23:1. Later, Alberto admits that his first love is soaring, no engine.

Not above 1,000ft
With the rule about not exceeding 1,000ft agl, I’m not keen on flying stalls at low altitude. The acoustic stall-warning triggers with the aeroplane clean at 95kph, and with flaps fully down at 80. Is that a gimmick? Or maybe it’s necessary because the regulations the aircraft was built to meet require that, in a three-axis microlight, the pilot be given a warning of an impending stall. If the aircraft itself does not give the pilot a warning – such as a buffet or similar – then the regulations allow for a stall-warning device.

In any case, as we approach the stall, the bleeper intervals become progressively short, but we don’t fall out of the sky. Even so, we don’t take the speed down to the lower limit. By contrast, at the upper end, push the stick forward and allow the Risen to accelerate and it does so quickly. As the 188kt Vne approaches, a voice calls, “Speed! Speed!” A steep turn at cruise speed records 2.8g on the EFIS with no loss in height. I’m not a keen aerobatics fan, so it feels a lot more. The Risen’s carbon structure is designed for +5.5/-3.5g, enough of performance numbers, what’s it like to fly?

The comfort and seating position are reminiscent of the four-seat Pipistrel Pantera, the cockpit of which is only two centimetres wider. But the Risen offers a better view from the cockpit, because the shallow instrument panel doesn’t obstruct the view and there’s no central windscreen divider.

So what about the V-tail? In flight, you can forget it completely. Even at Vne, the Risen tracks straight as an arrow without the slightest sign of a wobble. In a turn, there’s absolutely no difference in its handling to that of aircraft with a conventional empennage. The control forces are pleasant – there’s no stiffening at higher speeds, nor do they become unpleasantly sensitive. Likewise, full reversal of a 45° left/right turn is no problem. After I measure a left turn of 1.3 seconds at cruise speed, I ask Alberto to do the same, giving it everything he can in the other direction. My head swings left and right, and I’m unable to stopwatch the time. “Is that what you meant?” he asks.

However, during our approach to land I detect something that really bothers me. We reduce speed to 85kt and set the first stage of flap – below 70kt the undercarriage can be lowered and full flaps set. But on final, at 65-70kt, it’s necessary to keep pulling on the stick because the nose-up trim range is insufficient. Alberto says this is intentional.

“You can trim properly down to 150kph,” he explains, “but we wanted a wide buffer speed range so that you cannot trim yourself into a stall.”

If a customer wishes, this could be altered. Okay, it’s better this way than the other, as flying around at top speed with the nose trimmed fully down (yes, there are aircraft like that), wouldn’t just act as a brake, but it’d also be dangerous if there were to be a servo tab failure. The current trim control is unacceptable, it turns left/right for nose down/nose up, and is to be replaced by a push-button on the control column. Likewise, the provisional side-mounted canopy lock will go.

What’s in a name?
Talking of changes, the company name and product are a little confusing. To claim for oneself the status of ‘Excellence’ before the product is even on the market is