

LIGHT Aviation

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SHAWTHING! EUROPA XS

IVAN SHAW, DESIGNER AND CREATOR
OF THE ORIGINAL EUROPA, TAKES TO
THE SKIES IN THE LATEST VERSION



**HENSHAW'S
CAPE RECORD
BROKEN!**

IT'S ONLY TAKEN 70
YEARS! SEE PAGE 44 FOR
THE EXCLUSIVE AND
EXTRAORDINARY STORY



**MORE POWER WITHOUT
CHANGING THE ENGINE**
BHP FOR NOTHING? NO, BUT LAA
MEMBER REVEALS AN EASIER WAY

**CROSSWINDS
AT A GLANCE**
A SIMPLE METHOD TO
WORK OUT THE WIND



SHAW ON THE EUROPA

Ivan Shaw designed the best-selling Europa twenty years ago and went on to create the Liberty XL2. Now the company is in the hands of a new owner and Ivan's back to fly one of the latest aircraft, a Europa XS tri-gear





PHOTOS Howard Boylan

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> FLIGHT TEST

'Once you get used to cruising at 130-140kt, it's difficult to go back to a more sedate 80-90kt'



Ivan's twin-engine VariEze - a 'mini Starship'.

> A FEW months ago I flew a Europa I was test flying into a local airfield. Upon landing a couple of pilots wandered over to enquire what type of aircraft it was and continued to ask all the usual questions, how fast, how far, etc.

I was a little surprised they knew so little about the type. With more than 1,000 sold into 30 countries worldwide I thought everyone in aviation knew about the Europa and its development over the years.

One of the pilots then said that in the eight years he had been flying he had never read a flight test report on the aircraft and wasn't familiar with what the aircraft was all about. It was then the penny dropped...

I realised it was now over 20 years since I started the design and that most of the aviation press had run their 'air tests' on the Europa at least ten years ago!

In the UK we train around 2,500-3,000 new pilots a year so it is little wonder there is a whole new generation of aviators unfamiliar with the type. Just think for a moment how our own Association has developed over the last 20 years!

All the greybeards who have been around aviation since Wilber and Orville were boys may like to move onto the next article about now, as I feel pretty sure they will have already heard much of what's coming up. But for the new generation of pilots who thought the 'Europa' was something to do with a common market directive, I'd like to explain what the aircraft was/is still all about. Bear with me as I delve back into history briefly.

A LITTLE HISTORY

Twenty years ago just about all the homebuilt designs came from the USA and these had become polarised into two main camps. First, there was the new 'composite revolution' types offering fast glass designs that blew the doors off, performance wise, their production certified cousins – the Cessnas and Pipers we had all learnt to fly in.

Burt Rutan led this revolution when he introduced the VariEze in 1976, a homebuilt aircraft that would do 200mph. This was followed by Glasair and Lancair designs.

At the other end of the spectrum was the 'fly for fun' Piper Cub lookalikes epitomised by the Kitfox design. These aircraft often had folding wings and could be operated out of any



Gull-wing doors make getting into and out of the Europa simple. Note big windows for great visibility.

farmers' field, 'the nine acres out back'.

Other designs like the metal Vans RV series offered all-round performance and were inexpensive to build.

I built and flew a Rutan VariEze in 1980/81 before modifying the design into a twin-engine 'mini Starship' (pictured above). What these aircraft did was spoil me in terms of speed and efficiency. Once you get used to cruising at 130-140kt it's difficult to go back to a more sedate 80-90kt typical of, say, Cessna 152s.

My wife Judith and I flew from Leeds-Bradford to Jersey in our VariEze one day, 300nm in two hours for a fuel burn of just eight gallons. Topping the tanks off, the Jersey fuel guy wouldn't believe we had flown in from Leeds. OK, we had the wind up our chuffer but you take the point.

The problem with the fast glass designs is they really need long hard runways to operate from, not a problem in the USA but more so here where much of our type of flying is done from grass fields or farm strips.

So here was the problem. I wanted the 'fast

glass' speed and efficiency but I also wanted to safely operate from short rough grass strips with STOL performance a la Piper Cub!

So I sat down one day and made out a 'wish list' or set of requirements for my ideal affordable aircraft:

- Two-place, comfortable side-by-side seating with enough baggage space for extended touring
- 120kt plus cruise speed
- 500nm range
- Economy. Fuel is expensive and will become even more so. At 100mph cruise, the Europa sips just 9 litres [2 gallons] per hour of unleaded petrol
- Rig/de-rig in less than five minutes for home storage to save on hangerage
- Ability to operate from unprepared grass strips all year round
- STOL performance
- Whisper quiet – I don't think that as a pilot I have the right to annoy people on the ground
- Excellent field of view from the cockpit for safety and pleasure



High wing loading gives the Europa stability and the ability to ride out bumps - good for a touring aircraft.



Test aircraft is a Europa XS tri-gear, built by owner Russell Spencer and is a beautifully finished aircraft. Undercarriage knocks 5kt off the cruise speed of the monowheel.



'In short, we had a modern sophisticated wing specially designed for the aircraft'



- High useful load within safe centre of gravity limits
- Excellent handling with control and stability that met certified requirements
- A strong airframe stressed to certified requirements
- Good looks.

When I looked at my list and compared it with all the then available aircraft, there wasn't one that would fulfil all my requirements. So, if that was what I wanted, then I would have to design and build it my own!

Oddly enough I only ever intended building one aircraft but as the design firmed up several friends said, "If you can achieve all that in one aircraft then I'll have one too!"

Europa Aviation was born!

THE BIG PROBLEM

An aircraft that is designed to be fast and super efficient in the cruise requires a high wing loading; 13 to 15lb per sq ft could be considered a minimum for aircraft with cruising speeds between 100-130kt. Any less and the ride in all but flat calm conditions becomes very uncomfortable. A super smooth airframe with either fully retractable or small faired-in wheels and tyres to keep drag to a minimum would also be required.



On the other hand an aircraft designed to give excellent rough field STOL performance needs to have large wheels and tyres to handle the bumps and a large wing, with a low wing loading, so that the aircraft can take off and land slowly in a short distance – like a Piper Cub. The problem with this is that once airborne the big wings and wheels produce so much drag that you cannot cruise quickly or efficiently.

Most aircraft designs fall somewhere in between and give an 'all round' performance but do not excel in any field!

So, how does the Europa excel in both rough, short field STOL performance and at the same time efficient high speed cruising?

Apart from a smooth composite airframe with a shape designed for low drag there were two major innovations on the original Europa, now called the 'Classic'.

One was the use of a single extra large tundra tyre main gear which comfortably handles most rough fields. A large 'footprint' and 'diameter' gives low rolling resistance on soft wet ground allowing the aircraft to accelerate quickly for take off. In flight the main wheel simply retracts into a large armrest between the pilot and passenger. Retractable landing gear usually brings with it a high cost in

'Once trimmed out, take your hands off the stick, sit back, relax and watch the countryside unfold'

money, weight and complexity – the enemies of the designer. Not so with the Europa. The main gear is a simple swinging arm and the whole retract mechanism weighs less than 1kg. Outriggers on the wings also retract with the gear/flap operation to give a super clean airframe for efficient operation.

WING DESIGN

The second area of innovation was the wing design. Any airliner must have a wing that is optimised in the cruise configuration but it must also meet certain field requirements. The result is a sophisticated wing with low drag in the clean cruise configuration while giving very high lift by using powerful flaps in the take-off and landing stages of flight. I'm sure we have all sat in wonder as we have seen the modern airliner wing 'unfold' in flight prior to landing!

I wanted to keep take-off and landing speeds

down to around 45kt whilst still maintaining a high wing loading and low drag in the cruise, so what my aircraft needed was a sophisticated wing.

Now it was about this time that my Acme book on aircraft design started to run out of ideas so I deployed that old adage, "if you don't know something, then find the man [or woman] who does".

I was fortunate to meet Don Dykins who had just retired as Technical Director of British Aerospace, after 40 years at the forefront of aerodynamics. Don had been Chief Aerodynamicist on the European Airbus wing design – at the time acclaimed as the most efficient in the world!

Don joined the Europa project to take care of the aerodynamics. After a close study of my requirements, he came to the conclusion that if we really wanted to push the wheel of progress forward then we would indeed need a sophisticated wing design and powerful controls to safely handle the slow approach and landing speeds.

Don designed a completely new natural laminar flow wing section that would have very low drag in the cruise but, when linked to a 70% span 30% chord slotted flap, would give high lift allowing slow take-off, approach ►►



and landing speeds.

In short, we had a modern sophisticated wing specially designed for the aircraft and its mission. The only thing left was to make it happen and I am pleased to say the aircraft has met or exceeded all my design goals! But more than that, the whole turned out to be far more than the sum of the parts. It has beautiful flying qualities – a real pilot's aeroplane!

Over the years we continually developed and improved the design. The 'Classic' was followed by the 'XS' model together with a tri-gear design for pilots who did not like the challenge of the monowheel taildragger. We also produced a set of motor-glider wings that could be fitted within minutes, giving the pilot the option of flying with either set, a sort of 'two for the price of one deal'.

By the year 2000 I was focusing on the design of the Liberty XL2, a FAR 23 certified production aircraft and 'Big Brother' to the Europa. We sold the Europa Aircraft company and it has had various owners since then, up to the present where it has been taken over by David Stanbridge. I believe David has all the qualities to drive the company forward once again.

He is an experienced aeronautical engineer, aircraft owner, pilot and business man and, just as important, is his enthusiasm to develop

'Powered by a 115hp Rotax 914 Turbo engine and CS prop, this is the Porsche of the range'

the Europa with the addition of an LSA model together with other developments. Watch this space as they say.

FLYING THE EUROPA

Just as the proof of the pudding is in the eating, the proof of the aeroplane is in the flying so I was delighted to be asked to fly a beautiful tri-gear XS model built by Russell Spencer.

Russell has made a beautiful job of both the build and the finish as the photos show. His labours have been rewarded with a fine aircraft.

Powered by a 115bhp Rotax 914 Turbo engine and Airmaster 332 electric constant-speed three-blade propeller, this is the Porsche of the range.

Centre stage on the panel is an MGL Odyssey EFIS. This advanced piece of kit gives the pilot all the information he requires from engine Ts

and Ps to flight instruments and navigation.

A 44-inch wide cockpit meant that David Stanbridge and I, both over six foot tall, were seated comfortably. I have flown other homebuilt designs that are so cramped you end up asking yourself, "Are we having fun yet"?

The Rotax fired up immediately and I couldn't help but think how all Rotax engines have improved over the last 20 years; they start better and appear to run more smoothly.

Taxying was straightforward with the gear doing a good job of smoothing out the bumps on the grass field. Once moving, steering can be carried out using rudder alone, the differential finger brakes only being required in tight corners.

Checks completed, it's time to go and we carried out a formation take-off with the Cessna 182 cameraship. We unstuck at about 50kt and quickly established a cruise climb at 90kt, bringing the power back to max continuous, flaps up and propeller to the climb setting.

Once levelled, it was time to formate on the cameraship. A low wing design is good for this aspect of flying and the light, well harmonised controls of the Europa made it easy to hold formation and move 'around the box'. The idea is to present the aircraft to the camera as we searched for the most interesting lit parts of

THE MAN BEHIND NEW EUROPA

Swift boss David Stanbridge talks to Dave Rawlings



What made you buy Europa?

I've been flying since I was 13 years old and became an Aeronautical Engineer. I went for all the job interviews when I graduated but didn't like what I was hearing so I disappeared into the oil and gas industry, popped out 20 years later and thought I'd go back into aviation.

I only stumbled into Europa by accident. It was quite bizarre. Back in 2004 when I was still working in Holland, I decided that I wanted to design and build my own composite side-by-side training aircraft. However, because of the day job it never worked out. But when I moved back to the UK that became my intention.

I was wandering around Wombledon Airfield in Yorkshire, looking for a manufacturing site for the Swift aircraft, and a gentleman who was showing me around mentioned that Europa were still around. I thought they had disappeared, so I popped round and one thing led to another.

What are your future plans?

We have an LSA wing in the pipeline, and there

are two wing options which we need to test.

The first has a full leading edge slat and the other is the same plan-form as the current one but made of carbon fibre and has vortex generators to keep the flying characteristics we need.

We also have a motogliders coming along which needs one more test for the LAA. There was a slight problem with the last test, but that has now been fixed and hopefully in two weeks we'll have it up and running again.

Are there any plans for a quick-build kit?

Yes, what we're doing at the moment is going through the whole design and seeing how much more we can do at the factory.

The fuselage currently comes in three parts - the lower half, upper half and cockpit module. What we want to do is get rid of the cockpit module and have it bonded into the lower half of the fuselage before we ship it out. We're looking at other changes throughout.

We're making a new factory demonstrator

now and within that aeroplane we're building in everything to make it a quicker build and using that as the 'first one' if you like.

We will then put it through to the LAA to see if it still complies with the 51% rule.

How is the current flow of spare and parts to owners and operators?

No problem whatsoever.

Any other developments at the moment, for Europa and Swift?

Well, we're looking to certify the aircraft with the CAA. Europa is now owned by Swift Technology Group and we're making that a technology driven company because that's where my background is.

We're developing things with renewable energy and also working with the oil and gas industry.

We want to be a bit more diverse just in case the aviation sector goes down a little bit. One of the goals we set ourselves was for a type-certificated Europa and in fact I sent the forms off the EASA yesterday for a tourer and motogliders.

SO WHAT IS SWIFT?

Swift Technology Group: set up to develop new aeronautical technologies. Swift is committed to basing these technologies in the UK.

Swift TG Solutions: an engineering consultancy company that provides CFD (Computational Fluid Dynamics), FEA (Finite Element Analysis) and 3D CAD (Computer Aided Design) capabilities. This company will hold a Part 21 Subpart G DOA.

Swift TG Energy: a new concept of wind turbine.

Swift Aircraft: incorporated in 2004 with the goal of designing and manufacturing a series of composite aerobatic training aircraft that can be used by flying training schools, the military for elementary flight training and also touring for the general aviation market.

Europa Aircraft: Kitplanes as per previous years with the addition of the motogliders. Swift is now embarking on certifying the Europa Tourer to

CS-VLA and the motogliders to CS-22.

Aviation and Marine Engineering: a design, engineering and manufacturing company specialising in composite structures.

Swift TG Maintenance: aircraft maintenance with Part M Subparts F and G.

TWF Solutions: marketing and design.

> FLIGHT TEST



“There is no sense of ‘feeling’ for the ground as you enter the final flare”

the sky on what was a dull afternoon.

Once the photo detail was completed, it was nice to simply set up a ‘no fuss’ 135kt cruise back to the field. The Europa’s positive stability profile means that once trimmed out, you can take your hands off the stick, sit back, relax and watch the countryside unfold. It’s a real ‘go places’ aircraft, and neither does it break the bank with its miserly fuel burn.

General handling was a delight and normal for type. All the stalls were straightforward, the positive longitudinal stability and the stick force per ‘g’ give the pilot a good initial ‘feel’ through the stick that he is approaching the stall. A warning horn was set up to sound



Handling of the Europa is ‘delightful’.

a 5kt margin before the stall followed by light airframe buffet just prior to it. All the stalls were progressive, gentle and benign, with no wing drop beyond a few degrees.

Approach and landing was straightforward, slowing down to the flap limit speed of 80kt then setting the propeller into the ‘fine’ take-off setting. Once trimmed out with full flaps and set on the approach at 60kt, the aircraft exhibits good stability easily maintaining its trimmed speed.

The field of view over the nose on this phase of flight as the aircraft hangs on the flaps, nose down, is also excellent and you can see exactly where you are going to touch down. There is no sense of ‘feeling’ for the ground as you enter the final flare. The tri-gear Europa is one of the easiest aircraft to take-off and land that you will ever fly.

SMALL PRICES TO PAY

The tri-gear XS gives away around five knots to the monowheel in the cruise, a couple of litres per hour in fuel burn and a slightly less useful load but these are small prices to pay for anyone unfamiliar with taildraggers or not needing the soft waterlogged winter grass field advantage of the monowheel.

Aviation has moved on over the last 20 years and we now have a plethora of really super looking aircraft powered by Rotax engines, mostly now coming from Eastern Europe. A recent visit to this year’s AERO Friedrichshafen show confirms that there are even more on the way!

However in terms of overall performance, utility and flying qualities, the total package, I have not yet flown an aircraft to equal the Europa! I can just hear you all saying, “He’s bound to say that”! All I can say in return is, “Put it to the test – go fly a Europa”.

IN THE COCKPIT

One of the best things about building your own aircraft is that you decide the equipment. Builder Russell Spencer opted for an MGL Avionics Odyssey electronic flight information system (EFIS) that dominates the panel. This aircraft has a 115hp Rotax 914 Turbo engine and three-blade constant-speed prop so plenty of performance. Cockpit is 44in wide and plenty big enough for two six-footers. Nice upholstery on Russell’s aeroplane!

ESSENTIAL INFORMATION: EUROPA XS

PERFORMANCE

Max cruise 166kt
Cruise @ 75% 135kt
Stall speed (flaps) 44kt
Take-off roll 152m
Landing roll 183m
Climb 1,300ft/min
Fuel burn @ 55% 15l/hr
Range @ 55% 576nm

DIMENSIONS

Wingspan 8.27m
Wing area 9.485sq m
Length 5.843m
Height 2.133m
Baggage 0.637sq m

WEIGHTS & LOADS

Empty 402kg
Useful load 214kg
MTOW 621.4kg
Max baggage 36kg
Design load factors +3.8/-1.9g
Fuel capacity 68ltr

POWER

100hp Rotax 912 ULS
or 115hp Rotax UL 914
Propeller according to builder

PRICE

Airframe kit from
£23,132 + VAT
Firewall forward kit
(separate from above
and depends on engine
choice) £3,233 + VAT
Engine & prop extra

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Ivan flying south along the East Coast in the Aircraft he designed 20 years ago.



The Spirit of Flying

Europa XS, not just a kit plane!

Coming soon– the certified Europa range



- **NEW! Europa Tourer CS-VLA**
- **NEW! Europa Motorglider CS-22**

To keep up to date with the latest news on Europa Aircraft, including the certified range, please register to receive our regular e-newsletter. Visit: www.europa-aircraft.co.uk/newsletter.php.

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