ANALYSIS: MARENCO ADDS SWISS PRECISION TO HELICOPTER MARKET

News / Manufacturer

Martin Stucki, the boss of start-up **Marenco Swiss**helicopter, is not like other chief executives, but then the manufacturer is also markedly different than most others in the sector.

Stucki, an engineer, commercial rotorcraft pilot, and long-time **helicopter** enthusiast, arrives at our meeting in jeans, polo shirt and trainers, and sports a small earing in the lobe of one ear. There is nothing wrong with that, of course – and it is Friday when we meet in the company's Pfäffikon office, a converted cider factory – but his appearance gives a clue that things are done differently in this part of Switzerland.

Having been running a successful engineering consultancy since 2007 – Marenco Engineering – in 2009 he embarked on a mission to bring to market an all-new, high-performance single-engined rotorcraft.

In other circumstances this might have been a great way to rapidly achieve bankruptcy, but thanks to the backing of an unnamed Russian investor – widely reported to be banker Alexander Mamut – Marenco has moved relatively rapidly from drawing board to first flight of its SKYe SH09.

Sitting in the 2.5t (5,510lb) class, it faces competition from the three big Western manufacturers –

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Airbus Helicopters, AgustaWestland, and Bell Helicopter – who all offer the latest iterations of well-established platforms in the weight category: the H130, AW119Kx and 407GXP, respectively.

But that has not stopped Marenco taking on the establishment to offer a product that competes with, but in not directly equivalent to, any of them.

“It is a relatively nice part of the market, especially for a Swiss-based company,” he says. What he means by that is not that the Swiss market is especially keen on light singles – although there is a clearly defined national market for high-powered Alpine utility helicopters – more that Swiss industry is adept at delivering “high precision in relatively low volumes”, hence the nod to the watch-making industry with its tagline of “Swiss Movement”.

Stucki believes that through taking this approach Marenco can actually deliver what operators want, rather than perhaps what the industry thinks they need.

“If you look at helicopter as an engineer then you see some details that you might improve,” says Stucki. He makes no claims that his helicopter is revolutionary, but believes that some of its design features have led to a better overall product.

Take, for example, transporting a sling load. Conventionally, this has required a bubble cockpit window on the right-side of the aircraft and/or considerable contortion on the part of the pilot to peer out of that window to see the load’s position.

Marenco’s solution is simple: install a transparent panel between the two cockpit seats so the pilot can see straight down. And, conscious that not everyone will want to adapt to a new way of working, the cockpit floor now ends at the seat edge, which, coupled with a full-length window, allows a side view without needing to dislocate your neck.

There is a secondary benefit too: by removing the bubble window, the drag on both sides of the airframe is equalised, therefore there is no engine power wasted in countering it with the tail rotor.

Another cockpit tweak is the easily adjusted foot pedals – release a simple aluminium catch to allow a number of different settings. And, the co-pilot’s pedals and controls can be quickly removed, should the need arise, without having to subsequently fit a protective cover.

The SH09 comes in a standard six-seat layout – two pilots and four passengers – featuring adjustable seating front and rear, with rails installed for an additional passenger seat. A high-density, eight-person configuration is also possible, with seven passengers and a single pilot.

On the outside of the sleek, fully composite airframe there are further design tweaks to aid performance and capability. The low-profile tail boom is mounted high on the fuselage allowing access to the rear clamshell doors without having to crouch – helpful when loading a stretcher for emergency medical missions. Further aft is a shrouded tail rotor – Marenco calls its design the Maestro – which, with a 120cm (47in) diameter is larger than the 115cm version on the much heavier Airbus Helicopters H145. In addition, explains Stucki, the width of the shroud has been kept to a minimum, allowing an effect from the Maestro in forward flight akin to that of a pair of vertical fins; wind-tunnel tests allowed Marenco to ditch the small stabilisers seen on early designs of the SH09.

Power for the helicopter comes from Honeywell’s HTS-900-2 turboshaft. Originally designed for ill-fated Bell Arapaho for the US Army’s cancelled armed reconnaissance helicopter requirement, the compact engine produces 1,020shp (760kW) at maximum take-off power. Availability, fuel

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economy and performance were all key criteria for its selection, says Stucki, noting that although its power output it not that dissimilar from that of its rivals it “has a little bit of an advantage” with “some future potential, it is not already maxed out”.

It is worth noting, however, that the SH09 boasts more take-off power than all its most obvious rivals. In fact, only the Pratt & Whitney Canada PT6B on the AW119Kx comes close at 1,002shp, but that is fitted to a helicopter with maximum take-off weight some 200kg heavier.

That power is delivered via a five-blade composite main rotor, which at 11m diameter is larger than that of some rivals – with a lower tip speed, too. Stucki notes, with a certain satisfaction, that it is not vastly dissimilar, L-shaped blades aside, to the configuration recently unveiled on the Airbus Helicopters Bluecopter eco-demonstrator.

But the key to the SH09’s hoped-for success, says Stucki, will be its versatility. Customers in the 2.5t-class – and the Marenco tips the scales at 2,650kg MTOW – rarely have the security of much contracted work. Instead, operators “buy a helicopter and then look for work” and need to be willing to take on whatever comes their way.

First flight was achieved in October last year, with the first phase of testing coming to a planned halt in the first half of 2015. A second prototype is due to fly late this year or early next, he says. This will incorporate a number of changes including modifications to the bearingless rotor head and the layout of overhead switches in the cockpit. And a third flight-test article – planned to be closer to the eventual production standard – should follow in mid-2016, says Stucki.

Structures for the second flight-test prototype are already being built by its various subcontractors, and are due for delivery to its Mollis assembly facility in the coming months.

Its facility at Mollis, which sits in the mountains some 45min from Pfäffikon, is a former Swiss air force base and now a sleepy aerodrome run by the local commune. So far, Marenco has a solitary building on the site, although once production ramps up it could have as many as five.

To date, Marenco has taken in some 70 letters of intent for the helicopter – or around three years of production, with more still to be added. It plans to deliver 40 aircraft in the first two years, rising to a 100-per-year output within five.

Certification is possible in late 2016 “if it all goes well”, but is more likely in 2017, says Stucki, noting that it will have a clearer idea once prototype number two flies and “we go deeper into flight testing”.

However, when the programme was launched back in 2012, service entry was envisaged this year. Perhaps a sign of inexperienced Marenco biting off more than it could chew? Perhaps, admits Stucki, although he points out that it was not the development of the helicopter itself that slowed progress, but everything else around it.

“In some respects there were a thousand small items that we had to think about. We knew about the complexity of the helicopter – that’s not a problem – but we also had to develop the flight-test instrumentation and infrastructure like the gearbox test bench and the whirl tower, as well as the supply chain.

“It was perhaps more than we estimated. I’m extremely unhappy about every day or week of delay, but if you look back at what we have achieved then it’s not a bad track record,” he says.

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MARENCO - LOCATIONS

Marenco Swisshelicopter may bill itself as very much as Swiss affair, but aside from three facilities in the Alpine country, it has sites in Germany and South Africa.

It shares its headquarters and design office – housed within a converted cider factory that belonged to the Stucki family - with sister company Marenco Engineering.

By the end of the year it will employ 100 people at the site in Pfäffikon, nearZurich, but with its sister firm next door, it has additional engineering resources on tap.

Then there's the assembly line at Mollis airfield, plus an engineering test centre in the town itself.

In addition, it has an office dedicated to certification compliance in Munich, staffed by 14 former Airbus Helicopters' employees, with a total of 240 years of helicopter design experience between them. The link with Airbus does not end there, either, with Marenco having recently recruited Philippe Harache – one of the founding fathers of what was then Eurocopter – as its chairman.

Lastly it has a relationship with a small engineering consultancy in South Africa, which has performed wind tunnel tests and other evaluations.

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