

# RotorHub



VOLUME 15 NUMBER 6 DEC 2021/JAN 2022

[WWW.ROTORHUB.COM](http://WWW.ROTORHUB.COM)

## Single all the way

Leonardo's AW09



**ROBINSON'S  
LEADING LIGHTS**

Kurt Robinson interview

**ALL-SEEING  
EYES**

EO/IR systems

**CLEAR AND  
PRESENT DATA**

Cockpit technology



# SINGLE ALL

Kopter expects the AW09 to enter service in 2023, nine years after its first flight. (Photo: Thomas Frevillier)



# THE WAY

Kopter set out to bring the latest helicopter technology to the light-single market with its SH09 programme, and now, with Leonardo's weight behind it, the renamed AW09 seems certain to create some significant waves in the coming years. **Michael Doran** finds out why.

**C**ar manufacturers, especially successful German ones, like to cover the market by having a model for every type of driver, gradually shifting the latest technologies down the line from the most expensive to the lower priced models.

Leonardo seems to be doing something similar with the new AW09 by bringing the best of the technology we expect to see in larger twin-engine aircraft down to the previously neglected light-single segment that is hankering for something new.

So, while the five-bladed AW09 is setting new benchmarks in terms of performance, safety and connectedness, the breakthrough is more about taking the best technologies available today and making them available to a much larger market, rather than revolutionary new surprises.

Leonardo acquired the Kopter Group and its SH09 programme in 2020, and in 2021 it rebranded the aircraft as the AW09, which will continue to be developed by Kopter in Switzerland with the contribution of joint Leonardo-Kopter teams.

While the aircraft first flew in 2014, the development effort has gathered pace in recent years, and in October an EASA test flight team flew several times on the third prototype to assess the helicopter's progress as it moves towards certification. The certification will be assessed on prototypes four and five, and Kopter expects that the aircraft will enter service in 2023.

*RotorHub* has taken the opportunity to talk with two of the key people driving the AW09 project forward, although both are

very quick to stress that the programme is very much a team effort that relies on the hard work of many Kopter and Leonardo employees. Paolo Bedoschi is Kopter's AW09 programme manager and Michele Riccobono is its chief technology officer. The pair both worked for Leonardo earlier in their careers.

## Ahead of the competition

Bedoschi explains what the new helicopter will bring to the market. "The AW09 is taking the technology in terms of composite materials, avionics and safety over to the single-engine market, and it will have a lot of competitive advantages compared to the current aircraft. We are not reinventing the wheel; we are consolidating the technologies seen on the twin-engine types but on a light-single helicopter."

He points out that there has been no new single-engine helicopter for decades, and while the AW09 will be competing in the light-single market, it will be setting totally new standards that have not been matched before.

The specification and performance data for the aircraft backs up that claim. Compared to the Airbus H130 and Bell 407, for instance, the AW09 will be faster and have greater range, more endurance and a significantly larger cabin volume.

For the statistically minded, the three-tonne-class AW09 can cruise at 260 km/h, has a maximum range of 800 km and can fly for up to five hours. It can fit a pilot and up to eight passengers into a flat-floor

cabin volume of 6.5 m<sup>3</sup>. The aircraft's turbine engine is Honeywell's HTS900, which incorporates the latest technology, such as a modern dual FADEC, has no time life limit and reduces fuel consumption.

According to Bedoschi, regulators are looking for helicopter OEMs to improve safety in the light-single market, which may be driven by the higher than average fatality rate of emergency medical service (EMS) helicopters in the US. Among the safety features of the AW09 are its lightweight composite crashworthy structure, three-cell crash-proof fuel system, bird-strike-resistant transparencies, crashworthy seats, and dual-redundant electrical and hydraulic systems. ▶



Kopter's Paolo Bedoschi says the AW09 will be setting totally new standards in the light-single helicopter market. (Photo: Kopter)





The design of the AW09 continues to evolve, with recent testing revealing reshaped upper cowlings that improve the aircraft's aerodynamics. (Photo: Thomas Frevillier)

## LEADING-EDGE PROTECTION

As is typically the case with aircraft development efforts, the AW09 programme has drawn on the expertise of a variety of industry partners. One company that has been involved in the project since its early days is Fichtner & Schicht, a family-owned engineering firm located in Schlangen, North Rhine-Westphalia, Germany.

Fichtner & Schicht has been serving the aviation sector for more than four decades. The company's areas of expertise include the electroforming of erosion protection sheaths for rotor blades and other parts, as well as model and tool making. These capabilities have earned it an impressive reputation around the world.

In 2010, Fichtner & Schicht started working with Marenco Swisshelicopter, Kopter's name prior to its rebranding in 2018, on rotor blade development for the new aircraft. The German company's particular focus was on developing the best possible protection against erosion.

Since then, it has equipped the blades of all of the SH09/AW09 prototypes with erosion protection, and it will be working with Leonardo to do the same for production models of the aircraft in due course.

Bedoschi says that enlarging the cabin size was part of the original concept and is one of the reasons the AW09 will be popular for a range of missions, including with operators who want the option to switch between missions as required.

"The flexibility of the cabin will enable performance in every market segment, but the entry into service will be more aggressive for certain missions, like passenger transport, utility services and then EMS," he indicates. Kopter notes that the AW09's cabin, rear clamshell doors and sliding side doors make it ideal for loading, treating and unloading a stretchered patient on an EMS mission.

### Global interest

In addition to the roles mentioned by Bedoschi, Kopter expects the new helicopter to find a home in operations such as search and rescue, aerial law enforcement and sightseeing.

"The single-engine market in the US has a huge volume, and IFR capability is a big opportunity for us, but already the launch customers that we have are pretty well distributed all over the world," he says. "We will reach EASA certification first and then Asia, Australia and the rest of the world, and the US, where the market plays a significant role, especially for the single."

Based on his experience developing helicopters, the first thing that Michele Riccobono looks for is keeping the helicopter as stable as possible, without the aid of an autopilot. He explains to *RotorHub*

that, unlike a fixed-wing aircraft, a helicopter is inherently unstable and has to be maintained in the air by the pilot.

"Most modern helicopters have an autopilot or stabilisation system to help the pilot, and although the AW09 will have an optional autopilot, it is designed to be inherently stable on its own," Riccobono says. "This is something we assessed with the Leonardo test pilot and, most recently, with the EASA test pilot, who flew the aircraft for the first time and was immediately at ease with the aircraft."

"The innovation concept with the AW09 is really in the sense that we are introducing in the light-single segment technologies that are normally already available in the large- and middle-twin segment. It's bringing to the light-single community those technologies and operational advantages that are already available on the market."

One of those technologies is IFR capability, which is common in many new medium and heavy helicopters, but not in the single-engine market, where it's only on the Leonardo AW119 and the Bell 407, Riccobono notes.

"The aircraft in its baseline configuration is IFR-ready, meaning it satisfies all the



Michele Riccobono, chief technology officer at Kopter, believes that the AW09's IFR capability will be a big selling point. (Photo: Kopter)



Flight testing has mostly been taking place at Kopter's facility in Mollis, Switzerland. (Photo: Thomas Frevillier)

safety requirements, protection against lightning and electromagnetic interference, and system redundancies that are required for IFR certification," he says.

"In order to make it fully IFR-capable, you need to add a third attitude sensor and a four-axis digital autopilot. So any aircraft delivered can be converted into IFR configuration without having to undergo a major factory retrofit."

The avionics suite on the AW09 is the Garmin G3000H, which is IFR-compatible and forms part of the baseline configuration.

"It's an option already there which can be enabled via a configuration file, as well as the synthetic vision and the TAWS, depending on what the customer wants," Riccobono explains.

"The cockpit instruments are primary in enabling the capability for IFR flight because they need to provide a level of integrity for the information, as you are relying on the instruments. They need to provide the level of robustness against electromagnetic interference in case of direct or indirect lightning strike, so the

avionics suite is really making up a great portion of the IFR capability."

Having IFR capability on a light-single helicopter will be a major breakthrough and selling point in the US, influenced by the number of accidents that have occurred when single-engine VFR aircraft have continued into instrument meteorological conditions without an IFR system, Riccobono says. However, with regulation getting in the way of single-engine IFR operations in Europe, the attraction may not be as great there, as not all customers need an autopilot for their missions, and it adds extra weight and cost to the aircraft.

**Strong support**

"We would like to set a new reference in this market, both in terms of performance and piloting, along with setting new standards in terms of safety," he states. "There are so many features that we are really pushing that are available on larger helicopters but missing in this segment."

With the AW09 part of the Leonardo range, owners of the new aircraft will

**KEEPING THE AW09 ON TRACK**

The AW09 is equipped with the Garmin G3000H VFR/IFR-capable integrated flight deck, which features high-resolution screens that can act as either the primary flight display or a multifunction display and centralised touchscreen controls that give fingertip access to systems with fewer movements and keystrokes.

Voice-control technology enables certain functions, such as radio selection, to be activated by spoken commands, and a split-screen capability allows two separate page views to be shown on each screen at the same time, meaning the two displays can effectively be turned into four when desired.

Selectable displays include moving maps, charts, approach plates, traffic, weather, TAWS

alerts, FLIR views and inputs from live streaming video sources.

Pilots can upload pre-prepared flight plans into the G3000H system to simplify pre-flight processes. Garmin's Helicopter Synthetic Vision Technology (HSVT) can put a 3D virtual landscape on one of the displays with terrain, wires, obstacles and airport information clearly identified. The

flightpath is indicated by a marker on the HSVT display that shows the calculated effect of variables such as attitude, airspeed and wind vectors on the aircraft's trajectory.

The system has five-colour TAWS alerting that provides a forward-looking avoidance capability with voice alerts which are graded to indicate the

approaching threat level, while there is also support for ADS-B Out and In functions.

The G3000H gives pilots a clear picture of the aircraft's horizontal and vertical flight situation. When operating in VFR conditions, it can provide advisory vertical approach guidance based on a published glidepath angle or a 3° approach glideslope from the runway threshold, while considering terrain and obstacle clearance.



The third prototype was fitted with Garmin's G3000H avionics suite towards the end of 2020. (Photo: Kopter)





**Kopter test pilots preparing for a flight.**  
(Photo: Thomas Frevillier)



The third prototype during flight testing in Mollis in mid-2021. (Photo: Kurt Kolb)

benefit greatly from the extensive repair, service and training network that Leonardo has around the world. Kopter already has a site in Lafayette, Louisiana, which it leased prior to the Leonardo takeover with the intention of making it an assembly, maintenance and service facility to exploit the opportunities in the US market.

It's clear that Leonardo wants to ensure the AW09 is a complementary part of its aircraft family, in terms of the latest generation technology, capabilities and services across the group. The AW09 will be a connected aircraft, giving it the capability to use digital services, starting with

predictive logistics, which is anticipating the need for spare parts, and ultimately evolving to predictive maintenance, a fast-growing part of fixed-wing aviation. "This is on-condition maintenance where the aircraft tells you when it needs to go in for service, rather than going in for scheduled maintenance, but it is something for the future," notes Riccobono.

For Kopter, being part of the Leonardo family means it has access to resources in manufacturing, supply chain, distribution, maintenance and customer services which will significantly benefit the growth of the AW09 programme.

"Kopter was a start-up, and now we have transitioned into a fully fledged helicopter manufacturer," says Paolo Bedoschi. "With the acquisition by Leonardo last year, we reach the point where the AW09 programme is on track not only to develop a helicopter, but also to enter into service with the right level of support for the end user.

"We have the opportunity to, from a blank sheet, design, develop, certify and introduce to the market a new product they have been needing for decades," he adds. "It's not reinventing the wheel, but these technologies will give customers advantages in terms of cost, maintenance and safety, so it's a unique opportunity that we have."

**Leading the way**

With its acquisition of Kopter, Leonardo was looking to expand its presence in the single-engine market, and it wants its Swiss subsidiary to be a centre of competence for light helicopters and an incubator of new technologies for vertical flight. This makes Kopter an integral part of the parent company's 'Be Tomorrow 2030' strategic plan, which aims to position Leonardo as the leader of the civil rotorcraft market and modern air mobility.

"We are not just looking at the AW09. It's a step towards the future we are already looking into, which is hybridisation, so it's a really long-term journey," explains Bedoschi. "The development of the AW09 will project us into the future of vertical flight, for which our strategy is to go for hybridisation first." ■

MANUFACTURING AT THE HIGHEST LEVEL OF QUALITY IS THE HALLMARK OF ALL OUR SERVICES FOR THE AVIATION INDUSTRY.



Are you looking for tools or parts manufactured by electroforming?

Get in touch with us and challenge our team! What can we do for you?

[www.fi-sch.de](http://www.fi-sch.de)