

The UK's AW159 variant, to be known in service as Wildcat, will satisfy the needs of both the British Army and the Royal Navy. Credit: AgustaWestland



# EVOLUTION OF THE SPECIES: AGUSTAWESTLAND EYES REGIONAL OPPORTUNITIES FOR AW159

Richard Scott/London

**H**aving recorded substantial international sales success with variants of its Lynx and Super Lynx shipborne helicopter over the past two decades, AgustaWestland is now gearing up the Asian regional marketing effort for the successor Future Lynx, latterly rebranded by the company as the AW159.

Originally developed to meet the needs of the UK's respective Battlefield Reconnaissance Helicopter (BRH) and Surface Combatant Maritime Rotorcraft (SCMR) programmes, the AW159 (to be known as Wildcat in UK military service) has been designed as a 6-tonne class multi-role rotorcraft equally adept in either land or maritime environments. A total of 62 aircraft have been ordered

by the UK Ministry of Defence, with 34 destined for the British Army and the remaining 28 for the Royal Navy.

Its antecedents are clearly rooted in a Lynx product line which has been, alongside BAE Systems' Hawk jet trainer, the outstanding export success of the UK aerospace industry over the past three decades. Conceived more than 35 years ago to meet requirements for an agile battlefield helicopter and versatile small ship rotorcraft, variants of the Lynx have given sterling service to the British Army and the Royal Navy, and continue to make an important contribution in current front line operations.

Over the same period, export variants of the Lynx have clocked up significant orders overseas markets, becoming the shipborne helicopter of choice for over

10 international navies. Indeed, it was in recognition of the specific needs of the international user community that AgustaWestland in 1996 decided to invest its own funds in the development of the export-oriented Super Lynx 300 featuring uprated engines and an advanced integrated avionics suite. Total sales of all Lynx variants had exceeded 420 as of early 2009.

### NEW BREED

The AW159 was conceived to meet the land-based and maritime needs of the UK armed forces well into the middle of the 21st century, building upon the dynamic and vehicle systems of the existing Lynx design, while capitalising on AgustaWestland's own investment in the uprated engines and integrated avionics of the Super Lynx 300 export variant. These improvements, allied to a new airframe structure, greater load-carrying capability and further avionics enhancements, have collectively crafted a new rotorcraft a full generation removed from the legacy Lynx.

The AW159 also marks a departure for AgustaWestland in that it has been designed throughout using the CATIA computer-aided design tool. While digital product design has previously been used by the company for selective re-engineering in the Super Lynx 300 programme, this marks a first from a 'whole aircraft' perspective. According to the company, the use of a high fidelity three-dimensional electronic product model, coupled with CATIA's clash detection mechanisms, means that 'fouls' are being resolved in the design stage rather than in manufacture.

Power for the AW159 comes from two CTS800-4N turboshaft engines, co-developed and collaboratively manufactured by Rolls-Royce and Honeywell under the LHTEC banner. Already in service aboard the Super Lynx 300 in four countries - to date, the type has accumulated over 25,000 hours powering Super Lynx 300 helicopters in service with Oman, Malaysia, Thailand and South Africa -- the proven pedigree of the CTS800-4N aboard the Lynx export variant has in effect 'de-risked' the powerplant for the UK.

Rated at 1,015kW (1,361shp), the CTS800-4N powerplant is central to

the improved payload, range and endurance offered by the AW159 over its forerunner. The aircraft will have an endurance of approximately three hours with standard fuel and 4 hours 30 minutes with auxiliary fuel.

AgustaWestland points out that the AW159 will, from the outset, have a built-in mass growth provision to allow incremental weight growth through life from an in-service maximum all-up mass (MAUM) of 5,790kg though to an out-of-service MAUM of 6,250kg. That is a significantly higher payload than the current Lynx, and can be achieved even in extreme "hot and high" conditions (up to 48°C). The uprated powerplant will also give much improved single-engine performance.

The main rotor gearbox is uprated to a maximum continuous power rating of 2,150 shp (vice 1,960 shp in the Super Lynx) and modified to incorporate involute output stage gears. The main rotor hub is qualified to 6,250 kg.

An all-new four-bladed tail rotor unit is being introduced to give improved yaw control at high weights. The revised one-piece blade design, which has a larger aerodynamic surface, has completed flight testing on AgustaWestland's own Super Lynx 300 demonstrator. The associated gearbox is modified accordingly to suit the new tail rotor assembly and in-line tail rotor servo configuration.

The AW159 has a new-design 12,000-hour fatigue life airframe assembled from monolithic machined aluminium structural parts. Instead of building up the structure from a large number of panels, angles, doublers, plates and rivets, high-definition computer-aided design and manufacture techniques are being used to machine large-scale structural assemblies from a solid aluminum alloy billet. The result is a much lower part count, lower weight and easier maintenance, with the additional benefit of much better repeatability in manufacture.

Another very noticeable change is a new low set symmetric tailplane incorporated into the airframe design to improve flying qualities. This is itself mated to a new fixed tail cone/pylon structure. Redesign of the rear fuselage has freed up additional space and offers easier access to avionic units, and similar



The Royal Malaysian Navy was the first customer for the Super Lynx 300 helicopter. The AW159 capitalises on AgustaWestland's own investment in the uprated engines and integrated avionics of the Super Lynx 300. Credit: AgustaWestland)





TI1, the first AW159 development aircraft, takes shape at AgustaWestland's Yeovil plant. Credit: Richard Scott/NAVPIX

work has been undertaken to increase nose volume and access.

Significant attention has been paid in the design to improving survivability in the event of a ditching or crash landing. An uprated common undercarriage, designed to meet the aircraft's increased weight, will offer better crashworthiness through strengthened attachments optimised for energy absorption. There is a new flotation system, and inside the cabin there will be crashworthy/armoured crew seating, crashworthy passenger seating, and a 'role fit' armoured floor.

### CORE AVIONICS

Thales UK is under contract to supply the central elements of the avionics management, communications and navigation systems for the UK's Wildcat variant, as well as taking responsibility for the integration of some commercial-off-the-shelf equipment within the navigation and communications sub-systems. The cockpit based on four 10 x 8in (255 x 200mm) multifunction colour displays, and a common mission system tactical processor (the latter being jointly developed by General Dynamics UK and AgustaWestland). The wider avionics fit includes integrated GPS/INS to provide accurate and reliable positional data to support both pilotage and mission sensors, secure communications, IFF and a combined health and usage monitoring system/cockpit voice and flight data recorder.

The UK's Wildcat variant will be fitted with L-3 Wescam's MX-15Di electro-optical/laser designator system (with sensors fitted in a nose-mounted turret). It will also feature a defensive aids suite – including a radar warning receiver, a laser warner, a missile approach warning system, upward/downward-firing countermeasures dispensers and a defensive aids system controller – sourced from Selex Galileo.

The naval SCMR variant will additionally be fitted with the Selex Galileo Seaspray 7400 active electronically scanned array radar. It will also receive a maritime tactical datalink and AIS.

Having successfully transitioned Preliminary and Interim Critical Design Reviews in January and October 2007, the AW159/Wildcat passed its Air Vehicle Critical Design Review in April 2008, and completed an Interim Phase Review last November. Trials Installation 1 (TI1), the first of three AW159/Wildcat development aircraft, is now in final assembly at AgustaWestland's Yeovil plant. It is currently on schedule to make its first flight in mid-November 2009 and will be used for basic air vehicle testing and flight envelope characterisation.

TI2 arrives on the assembly line in May 2009, and will be employed for avionic and mission system testing in support of both BRH and SCMR. TI3 will be a fully instrumented aircraft to support detailed evaluation of air vehicle performance. The three Trials Installation aircraft, which will be used to perform around 650 flight hours of development testing, will subsequently be re-worked to production standard.

The first production Wildcat is due on the assembly line in the second quarter of 2010. Production deliveries will commence in 2011, with aircraft entering operational service with the British Army in 2014 and the Royal Navy in 2015.

### REGIONAL MARKET

AgustaWestland is now beginning to explore opportunities for AW159 in the export arena, with the hope that the new incarnation of the Lynx line will have a sales life spanning perhaps 20 years.

The company, which is initially looking to capitalise on the existing naval Lynx customer base, claims that the 6-tonne AW159 has no direct competitor in its class, falling neatly between lightweight types, such as the AS565 Panther, and the larger NH90, S-70B/MH-60R and EC725 10-tonne class multi-mission helicopters.

Furthermore, just as the basic Lynx mission fit was adaptable to meet international user requirements, so AgustaWestland is looking at the potential needs of customers outside of the UK. So for example, while there is no active dipping sonar on the UK's Wildcat variant, the Thales lightweight FLASH Compact dipping sonar already offered for the Super Lynx 300 will also be an option to prospective AW159 customers.

Asia-Pacific has been fertile ground for the naval Lynx in years past, with sales recorded in the Republic of Korea, Malaysia and Thailand. Of these, South Korea is seen as probably the hottest prospect for the AW159, having a latent requirement for about a dozen additional shipborne helicopters (having only ordered 24 of the 36 Super Lynx originally planned). Any South Korean order would probably also involve a significant level of local industrial involvement.

Elsewhere, Indonesia, Malaysia, Thailand and New Zealand have also been identified as potential regional customers. AgustaWestland has maintained a dialogue on Lynx with Indonesia for several years (the Indonesian Navy's experience of small ship helicopter operations was with the venerable Westland Wasp) but this has so far not borne fruit. It is nonetheless noteworthy that Indonesia had official representation at the formal naming ceremony for the AW159 in April 2009.

Malaysia is already a Super Lynx 300 customer, but has future aspirations for a shipborne helicopter offering an organic ASW capability. New Zealand is a different case: it has found the Kaman SH-2G(NZ) Super Seasprite to be rugged and workmanlike, but finds itself with an orphan fleet of just five aircraft and no prospect of a common support/logistics train with Australia following the cancellation of the SH-2G(A) programme.

In the meantime, AgustaWestland acknowledges that there are some navies still considering the acquisition of additional Super Lynx 300 aircraft (as are already in service with the Royal Malaysian Navy and the Royal Thai Navy). Maintaining two parallel production lines does not make sense in the longer term, but the company suggests there is still a window of around 18 months for existing users to place any final follow-on orders ahead of production cut-off. ❖