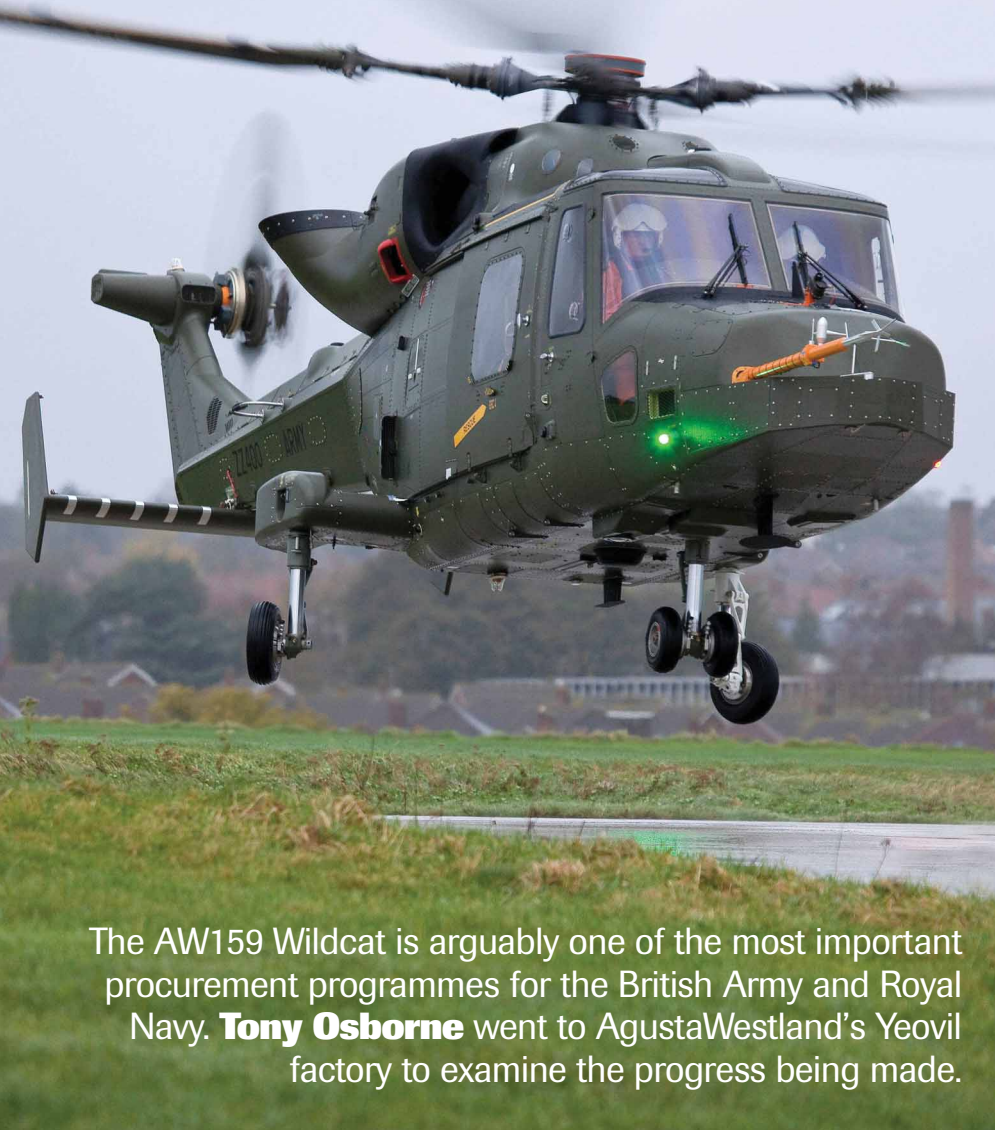


Lynx to the future



The AW159 Wildcat is arguably one of the most important procurement programmes for the British Army and Royal Navy. **Tony Osborne** went to AgustaWestland's Yeovil factory to examine the progress being made.

It might only have a few flight hours on the clock, but the new Lynx Wildcat is already making a big impression on pilots who have flown it.

Test flying on the AW159, as it is known by manufacturer AgustaWestland, is being conducted by a combined test team (CTT) of company pilots and crews from Boscombe Down's MoD Rotary Wing Test and Evaluation Squadron (RWTES), as well as a small cadre of personnel from a specially set-up RN unit, 700W Naval Air Squadron (NAS) and the British Army. This joint approach aims to smooth the type's entry into service and prevent the duplication of flying hours which has delayed previous aircraft programmes.

So far, test flying has concentrated on the first prototype – TI-01 – which took to the air in November 2009. Following that first flight by AgustaWestland chief test pilot Donald Maclaine, crews have steadily built up 37 hours in the air, examining the Wildcat's vibration and stress levels and establishing its basic performance parameters. Test crews have already taken the Wildcat to 150kts, and slightly faster in the dive.

However, at the time of writing, the aircraft was due to have its production-standard tail rotor fitted. This will allow TI-01 to begin a new series of flights allowing pilots to push the flight envelope and discover what the Wildcat can really do.

PILOT'S VIEW

Former Army Air Corps (AAC) Lynx veteran Mark Burnand is the AW159 project pilot for AgustaWestland and now has more hours in its right-hand seat than any other aviator. 'A Lynx pilot would feel reasonably at home in the Wildcat and they would probably like a few of the features as well,' he said.

'The main improvement they will see is that there is a lot more power, and you have a lot more authority over that power, and this gives you more capability. Flying with the [Rolls-Royce] Gems in the old Lynx, you had to be careful to manage the power in some configurations, but the T800 [engine] and its FADEC allows safer aggressive manoeuvring.'

Installation of the Light Helicopter Turbine Engine Company's (LHTEC, a joint venture between Rolls-Royce and Honeywell) T800 engine has required a new transmission able to cope with the extra power, while the greater

Test pilots say the Wildcat, seen here in flight over the West Country, will share many performance characteristics of the Lynx but with the benefits of improved performance from its T800 engines. (Photo: AgustaWestland)



‘The T800 engine and its FADEC allows safer aggressive manoeuvring.’

mass of the AW159 necessitated a new tail rotor able to deal with heavier weights and offer future growth potential. The aircraft retains the main rotor blades used on the Super Lynx.

The new engine is already proving itself on the Lynx. AgustaWestland is contracted to convert all 22 British Army Lynx AH9s currently in service to AH9A standard under an urgent operational requirement (UOR), re-engining them with the T800 to allow them to operate during the hottest days of the Afghan summer.

Since the contract was signed in December 2008, 12 aircraft have been upgraded and four are stationed with 672 Squadron AAC at Camp Bastion, operating all year round.

AgustaWestland said that feedback suggests the aircraft are highly praised for their reliability and power. That project is one of around 60 UOR contracts which have been completed by the company on UK helicopter fleets in recent years.

Returning to the AW159, early flight testing took place at a relatively slow pace, and was frustrated by the Icelandic volcanic ash cloud, which affected operations over much of Europe in April and May this year.

However, the coming months should see test flying begin to ramp up. As well as TI-01 returning to the skies, the second Wildcat, TI-02 – displayed in the static at the Farnborough Airshow – should also make its first flight at the end of August, and will be the first to be fitted with a full avionics suite and elements of the mission system, allowing pilots to get to grips with the integrated capabilities of an operational aircraft.

It will also be fitted with the definitive production tail configuration. TI-01 had been flying with an interim tailplane, initially carrying out testing without the endplate fins shown on numerous artists’ impressions of the Wildcat. A final arrangement for the rear stabiliser has not been decided on, but one option includes the fitment of smaller endplates.

The third and final prototype Wildcat, TI-03, should fly in late September and will have a full mission system. It will also test the naval elements of the programme, including the radar, and be used for weapons trials.

COLD SOAK

Later parts of the test programme will see the aircraft deployed overseas on hot weather trials (probably in Arizona), while cold weather tests are likely to take place in northern Canada. However, most testing will be in the UK and its territorial waters to ensure the Wildcat is ready for the rigours of shipboard life with the Fleet Air Arm.

The MoD has ordered 62 Wildcats. Of these, 34 will go to the army and 28 to the RN. Once in service, the Wildcat will replace the Lynx Mk 3s →



The cockpit layout of the Wildcat. The cursor control device is missing from the left-hand side of the centre console. (Photo: AgustaWestland)



The British Army has gained experience of the T800 engine on the upgraded Lynx AH9A. This example recently took part in the Exercise Pashtun Eagle MRX on Salisbury Plain. (Photo: author)

and 8s of the RN and the AH7s flown by the AAC. The previously mentioned AH9As are likely to remain in service for several years after 2018 alongside the Wildcat, although this has not yet been confirmed.

Both army and navy have already formed transition organisations with aircrews and engineers who are working to smooth the type's entry into service – 700W NAS is the RN's, while the AAC has a unit with no squadron designation. The latter service will receive its first aircraft in January 2012.

'The squadron task is learn how to fight the Wildcat by making optimum use of the aircraft's new sensors such as the Seaspray 7400 radar, the MX-15 EO device, the ESM and defensive aids suite, the new tactical system and the aircraft's new weapons – the FASGW heavy and light missile systems that will give the aircraft some very accurate and potent teeth,' explained 700W's commanding officer, Lt Cdr Rob Dowdell.

Although the Wildcat looks similar to the Lynx and will have comparable performance

characteristics, it is a far more capable beast. The new design is expected to greatly reduce maintenance requirements when compared to old Lynx airframes, which have mostly seen over 30 years service.

David Hillcoat, AgustaWestland's head of Lynx and programme manager for the AW159, explained: 'We have worked closely with the Lynx IPT to give them a better, more reliable product. In these offices we have people from the MoD working with us on the design process'

FRESH DESIGN

He said one of the key areas the team had examined was maintenance: 'On the Lynx, all the LRUs are in a rear avionics compartment, which can only be accessed by one person at any one time. This limited the amount of work that could be done, so we were asked if we could make the LRUs accessible from the side of the aircraft and we have'

The AW159 is assembled on a specially built production line at the Yeovil site, where



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'With CATIA, everyone is working from the same design sheet.'

each aircraft is 'pulsed' through eight stages. Significant use has been made of large monolithic components, most noticeably in the tail boom, which has resulted in a reduction in the man-hours required to build each example. Design was simplified through the use of the Dassault-devised CATIA software system.

'This is the single biggest improvement,' said Hillcoat. 'With CATIA, everyone is working from the same design sheet, limiting any issues that crop up before they get to the production stage.'

However, it is avionics that really sets the Wildcat apart from a Lynx. Stepping aboard an AW159, the crew will be confronted by four large 10x8in MFDs, compatible with NVGs and fully configurable to display a range of information from flight data and basic instrumentation to moving maps and footage from the MX-15Di EO/IR turret fitted on the nose of the aircraft.

OFF THE SHELF

The cockpit is a huge improvement on the electro-mechanical layouts found on earlier AAC and RN Lynx models. It is also an advance over the interior fit on recently delivered export Super Lynx Mk 300s, which feature much smaller 4x6in displays.

In fact, the Wildcat's cockpit will become familiar to UK Merlin crews when they begin flying the MCSP (Merlin Capability Sustainment Programme) version of that aircraft, which is due to make its first flight in October. Work on this upgrade is being carried out by Lockheed Martin and AgustaWestland.

The avionics suite has been extensively tested on a specially built rig at Yeovil, while a simulator has allowed crews to get some hands-on experience.

At the time of *Defence Helicopter's* visit, engineers were working on System Release 3

and were in the process of integrating control of the EO/IR turret into the system and the search radar which will equip the naval version. Staff have already incorporated the defensive aids suite, a spin-off of the Selex Galileo HIDAS system fitted to the AAC's Apaches.

An ESM capability has also been added, as has an automatic identification system, a tracker for identifying surface vessels. Also on- is a Saturn radio lifted from the Mk 8 navy Lynx while the aircraft

management system was developed by Thales and AgustaWestland.

'Although we have benefited from many off-the-shelf systems, it's been a big challenge integrating all these together, but this is what sets this aircraft apart from the Lynx,' explained Steve Bartlett, avionics technical team lead on the AW159.

Future work will see the team integrating the new FASGW (Heavy) anti-shiping missile and its carrier. Like the Sea Skua it is replacing, →



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From green to grey. The current plan is to paint every Wildcat in this two-tone scheme, seen here on TI-02 at Farnborough. (Photo: AgustaWestland)

FASGW (Heavy) is radar-guided and designed to deal with corvette-sized vessels.

A second weapon, the Thales Light Multi-role Missile (LMM), fills the FASGW (Light) requirement, and will be laser-guided from a designator fitted to the MX-15 turret.

Both weapons present their own unique challenges – FASGW (Heavy) drops from its launcher into the air below the helicopter before its rocket motor ignites, while the LMM launches from a canister straight at the target in the same way as the Sea Skua.

HANDS ON

The avionics team is also doing some preparatory work ahead of an MoD decision on its future data link standard. Jayne Vaughan, mission systems design lead on the AW159, said: 'We are waiting on the decision from the MoD whether they will adopt either Link 16 or Link 22, so we have incorporated some of the language the two data links share in preparation for that decision.'

The aircraft will already be linked to UK battlefield forces through the airborne Bowman radio, while Link 16/22 will deliver information from coalition assets such as airborne surveillance platforms.

Operating the mission systems will mainly be the responsibility of the crewman in the left-hand seat. He will have the option of controlling them via traditional push-buttons around the screens or by using a trackball system.

Although unexcitingly called the 'cursor control device', the controller fitted on the left-hand side of the centre console allows the operator to reach down and operate the systems with their right hand. It represents the first use of such a device in a military helicopter

and will add functionality over what is available from the buttons around the edge of the MFDs.

Dowdell, who has worked with the Wildcat avionics technical team, explained some of the thinking behind the system: 'It may sound trivial, but crewmen can suffer from bad backs and using the cursor control device means they are not having to lean into the cockpit and use the bezel buttons on the MFD. The idea is to have their right hand on the cursor control device and the left hand on the control column for the MX-15, and with push buttons on the cursor control, they should be able to access information much quicker than before.'

As flight testing progresses, eyes are looking to service entry and beyond, and work is going on to develop WIST – Wildcat Integrated Support and Training.

AgustaWestland hopes to build on its experience of integrated servicing on the Sea King, Merlin and Apache by offering an all-encompassing solution for the Wildcat. That



This rear view shows the distinctive exhausts fitted to the Wildcat. (Photo: AgustaWestland)

work is made even simpler by the likely basing of all Wildcats at RNAS Yeovilton, be they army or navy, and servicing them in the same facility. 'It will be an integrated solution,' said Hillcoat, 'in terms of maintenance we are looking to build on a Sea King IOS type arrangement.'

Servicing would be more efficient as every one of the 62 aircraft will have the same specification – even down to the colour scheme – and although navy aircraft differ from their army counterparts in carrying a radar and weaponry, all Wildcats will have the capability and wiring looms for this equipment to be fitted.

'A Wildcat could go into depth maintenance as a navy aircraft but could come out the other end as an army aircraft,' explained Hillcoat, 'That's exactly how the MoD wants it.'

Work on the training solution for the aircraft is already well under way. AgustaWestland is planning a comprehensive infrastructure at Yeovilton, including an academy which will feature two full-motion simulators and a single flight training device.

STRATEGIC PLANS

The decision on who will build the simulators is due imminently, as the systems have to be ready for use from January 2013. Discussions are continuing as to whether instruction will be carried out by civilian or military personnel.

The two transition units are already working on the documentation for Wildcat conversion courses. 700W believes it will take around four months to convert existing Lynx pilots to the AW159 and around a year to train ab-initio pilots. The infrastructure for this will be available in 2016, allowing the first new crews to come on stream in 2017.

If all goes to plan – pending outcome of the ongoing Strategic Defence and Security Review (SDSR) – the introduction of the Wildcat and the changing infrastructure at Yeovilton will mark the beginning of an interesting time for UK naval aviation. The Future Helicopter Strategy announced by the last government envisages the handing over of the RAF's Merlin Mk 3 force to the Commando Helicopter Force, allowing the retirement of the 'Junglie' Sea Kings as the RAF goes 'all-Chinook'.

While we are told nothing is safe from the SDSR, it seems the Wildcat is likely to be playing an important role on the battlefield and at sea in the years to come. **DH**