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DEFENCE HELICOPTER

End of the road

Kiowa Warrior retirement confirmed

COLLECTIVE ACTION

Sweden country focus

DELAYED IMPACT

Missile development

SOUTHERN DISCOMFORT

Latin America report

DEFENCE HELICOPTER

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Front cover: Homeward bound. The Pentagon has confirmed that Kiowa Warrior will be axed. (Photo: US DoD)

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- Night vision systems
- Self-protection suites
- Future heavy lift

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The axe has fallen,
so what direction will industry take?

SO IT IS INDEED THE END OF AN ERA. The anticipated changes to the US Army's structure following the agreement over the defence budget – as discussed on this page in the previous issue – have now been confirmed by Pentagon chiefs.

As expected, plans were confirmed to retire the army's Bell OH-58 Kiowa Warrior scout and TH-67 Creek training helicopters, and the service will use the Boeing AH-64 to 'temporarily' fulfil the scout role, with the National Guard's Apaches transferring over to the regular army.

We look more closely at what the changes mean for how the army approaches the armed aerial scout mission and the wider development of the scout/light attack helicopter market in the feature on pp8-10.

However, the decision does have wider ramifications, not least for Bell Helicopter, which has had aircraft in the army's fleet since 1948 when the company's pioneering Model 47 was ordered under the H-13 designation.

Bell remains outwardly bullish about its prospects in the military helicopter market, and points to various opportunities to extend production of both its V-22 and AH/UH-1 production lines.

The company clearly sees growth in its civil helicopter business as one way of offsetting the reduction in military funding, and Bell has reinvigorated its commercial portfolio with the introduction of the Model 525 and 505 in the last couple of years.

UNSTABLE POSITION

However, with US military funding scheduled to decline, the company does find itself in an arguably less stable position and its response to this is illustrative of the future direction of the helicopter industry.

Speaking during the Heli-Expo exhibition recently, Bell CEO John Garrison admitted to me that there is the danger of a gap in production in the 2020s when current military programmes will have wound down but before the onset of the Future Vertical Lift (FVL) replacement effort.

Production of the Bell-Boeing V-22 tiltrotor already hit its peak in 2013 with 41 aircraft delivered, and this will drop to 36 in 2014 and 21 the following year. In June 2013, the Pentagon signed the MYP II contract for another five years of Osprey production, which covers 99 aircraft and options for 23 additional examples – one of which has already been exercised.

OSPREY OPPORTUNITIES

In extending V-22 production further, Garrison sees three strong opportunities, including FMS deals – Japan's stated interest in acquiring 17 V-22s has been 'accurately reported', while Israel's requested purchase of six tiltrotors could be extended to as many as 12 aircraft – and the USN's outstanding requirement for 48 aircraft for the carrier onboard delivery mission.

'The third opportunity is AFSOC [Air Force Special Operations Command] looking at the mix of their fleet for search and rescue, and the AFSOC mission, and that analysis is under way, which could lead to incremental CV sales. And completing the programme of record for the V-22 for the US Marine Corps is another 22 aircraft,' Garrison explained.

'So we believe there is opportunity and we have to convert those opportunities to carry us from 2020 to 2025. Then in that 2025 period, we are investing heavily in the third-generation tiltrotor with the V-280 and we believe we will be able to adapt some of that technology into a mid-life upgrade for the V-22 at that time.'

With the age of some of the earlier Ospreys approaching 20 years by that point, factoring in a likely mid-life upgrade is a logical step and will help plug any gap before the onset of V-280 production under FVL – providing Bell emerges successful, of course.

Less convincing are Bell's chances of extending production of the UH-1Y and AH-1Z through international sales. While the company is targeting various markets with both aircraft, few solid opportunities have emerged and the AH-1Z lost out to the Apache in South Korea's attack helicopter competition in 2013.

Boeing and Sikorsky are also the beneficiaries of multi-year rotorcraft contracts from the Pentagon, so Bell's position is far from unique. When considering Bell's options in the military sphere, one thing is clear however – the FVL programme is the only game in town when it comes to future production.

As currently envisaged, the Pentagon is planning to pick one winner for the $100 billion-odd effort to replace 2,000 to 4,000 medium helicopters some time around 2030.

In competing against the Boeing/Sikorsky team for FVL production, Bell is already facing a huge hurdle as it is taking on the two 'incumbents', and company officials will now be hopeful that the downgrade of its relationship with the army through the loss of Kiowa Warrior is not the harbinger of things to come.

Tony Skinner, Editor

Turkey finally signs Black Hawk contract


Photo: US DoD

AFTER ALMOST THREE YEARS of protracted contract negotiations, Sikorsky has at last come to an agreement with Turkey for the production of 109 Black Hawk helicopters.

The company was first announced as the winner of the Turkish Utility Helicopter Program (TUHP) in April 2011, but the complex nature of the package, which will see Turkish Aerospace Industries (TAI) gradually worked up as a full manufacturer of the Black Hawk, has delayed a final agreement.

At Heli-Expo 2014 in Anaheim, Sikorsky president Mick Maurer confirmed that the deal had been signed and would give the company a second source of production for the S-70i.

He said the complex nature of the programme went well beyond normal offset requirements, and would allow Turkish industry to develop the capability to produce nearly every part of the helicopter.

While Sikorsky had originally stated it would commit to buying Turkish-produced S-70i helicopters on a 'one-for-one' basis for export, Maurer said this was no longer the nature of the company's commitment, and it would instead work with TAI to promote the Turkish variant to new markets.

Maurer denied that setting up production of the Black Hawk in Turkey would adversely affect the number of S-70i aircraft being built in Poland, nor would it harm the company's chances of meeting the latter country's standing requirement for new utility helicopters.

However, earlier plans to jointly develop a new light twin helicopter with TAI have been placed on the back burner, possibly as a result of the difficulty of finalising the Black Hawk contract.

In 2011, the two companies outlined a project that would see TAI take the lead on design, flight testing and production of the new aircraft, with Sikorsky assuming a supporting role, and the type would then be jointly marketed, sold and supported around the world.

Turkey's determination to get the most for its domestic defence industry under the Black Hawk deal appears to have led to Sikorsky's decision to place joint development of a new aircraft in the 'too hard' basket.

By Tony Skinner, Anaheim

MD Helicopters unveils MD 530G armed scout

MD HELICOPTERS (MDHI) UNVEILED its new MD 530G, the latest model in a line of scout/light attack helicopters, at Heli-Expo in Anaheim in February.

Speaking to journalists at the show, MDHI CEO Lynn Tilton said the 530G builds on the 530F by adding higher gross take-off weight capacity, modern weapons control and a wide selection of weapons configurations.

Tilton explained that the MD 530G was built specifically for the parapublic market, which dictated the price point the company had set for the airframe.

'The MD 530G is built as an armed aircraft, so there is no green pricing, you only have baseline pricing. We're looking at $4-5 million armed, depending on what you put on the aircraft. So you should be able to own a multifaceted weapon system for under $5 million,' she said.

According to Tilton, completion of the new aircraft is projected for Q2 2014, with the first delivery taking place during Q3.


Photo: MDHI

MDHI claims cruise speeds for the MD 530G in excess of 130kts, and says the new variant is designed for agile deployment alongside any rotary-wing unit, such as UH-60 Black Hawk assault forces.

In addition, the MD 530G features capacity landing gear that supports a 3,750kg maximum take-off weight, allowing the operator to harness increased useful load for additional range, endurance and weapons carriage.

Addressing questions on the impact of the US government's decision to indefinitely postpone the Armed Aerial Scout programme, Tilton said MDHI remained largely unaffected, as the company's main market was in foreign military sales.

'There is no single-engined scout that can do the mission [the US government] wants today,' she explained.

Meanwhile, the company is hinting at a new completely redesigned single-engine airframe, to be revealed some time in 2015.

'I'd love to build an armed aerial scout capable of carrying 5,500lb [2,500kg], with a range of 200 miles [320km]. To achieve this we're going need to utilise lighter materials, electric power and hybrid technologies. Hopefully we will see a mock-up next year, we will see,' added Tilton.

By Jonathan Tringham, Anaheim

Industry readies for Malaysian attack helicopter requirement

Photo: Airbus Helicopters

THE RISE IN INSURGENT ACTIVITY in Malaysia has highlighted the country's lack of offensive helicopter capabilities, to which Western industry is ready to respond should an RfP be released.

The Malaysian Defence Forces (MDF) have no attack helicopter in their inventories, relying instead on fighter jets. In light of terrorist attacks taking place all over the country, the government is understood to have expressed a wish to acquire such a rotary-wing platform.

During the 2014 Singapore Airshow, Airbus Helicopters, Bell Helicopter and Boeing all expressed interest in the expected tender and continue to watch closely for an RfP.

'The requirement is still being shaped,' Mike Burke, director of attack helicopter programmes business development at Boeing, told *Defence Helicopter*.

The commander of the MDF flew in the company's AH-6i on 12 February, Burke noted.

'We're trying to show the capability of the aircraft,' he continued. 'The number of aircraft required and the timeline for acquiring them has not yet been decided, although they have concluded that they have a need for this. With the insurgency… they didn't have an attack helicopter to respond with.'

Boeing would offer the AH-6i for the Malaysian requirement, and Burke said the type is optimised for the reconnaissance and light attack mission, as well as having a stand-off capability of some 3-5km. Its big brother, the AH-64 Apache, has seen regional sales in Japan, Singapore and South Korea, while India and Indonesia are also in the process of acquiring them.

Meanwhile, Bob Carrese, regional VP of international military business development, Asia Pacific at Bell Helicopter, said that Malaysia is interested in both the UH-1Y and AH-1Z.

'It fits with the region's requirements because the aircraft are fully marinised with lower maintenance required,' he explained. 'Malaysia is interested in the helicopter but we are in the early stages of the process. In their mind they have narrowed it down, but it still needs to be announced.'

Airbus Helicopters has taken its EC665 Tiger attack helicopter to the past two LIMA air shows at Langkawi in an effort to appeal to the Malaysian market, and has also carried out flight demonstrations of the aircraft in-country.

Daniel Cottard, operational marketing team leader at the company, said that the weapons range of the aircraft is some 8-10km depending on air conditions, which makes it effective in a range of environments.

'The Tiger has elected to carry out a more non-emitting role, unlike the Apache which has a radar. There is nothing wrong with a radar, but the Tiger is a passive mode aircraft,' he said.

'If you don't control the air you don't control anything… Malaysia is as capable as anywhere else and there is no difficulty in applying this aircraft to their requirements.'

Regarding the jungle environment prevalent in Malaysia, Cottard said that targeting insurgents among the foliage is difficult, but 'you can't say in the jungle for long'.

'You have to come out eventually and then you will be seen,' he continued. This application emphasises the reconnaissance role of the aircraft. 'The key is to combine air, land and sea. The Tiger would be fine in this [Malaysian] theatre of operations.'

By Beth Stevenson and Joyce de Thouars, Singapore

NEWS ON THE WEB

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Lockheed JAGM completes guidance demonstration

THE DUAL-MODE GUIDANCE SYSTEM FOR Lockheed Martin's Joint Air-to-Ground Missile (JAGM) completed a demonstration on 5 February at Eglin AFB, the company announced.

Funded as part of the US Army's 27-month continued technology development (CTD) programme, the test saw the rail-mounted guidance section of the missile use its semi-active laser to engage a moving target at 6km.

Frank St John, VP for tactical missiles at Lockheed Martin, said: 'The seeker has semi-active laser [SAL] and millimetre-wave [MMW] capabilities. The SAL provides a very precise aim point and the MMW provides excellent wave capability and the ability to engage moving targets as well as a fire-and-forget capability.'

Lockheed Martin is developing JAGM under a $60 million CTD contract that runs from August 2012 to November 2014.

St John said the CTD contract is to component-qualify a new guidance section for JAGM with the dual-mode seeker integrated onto a Hellfire bus, and then assist the army with qualification testing of that configuration.

He said the company is in the initial stages of component qualification, has completed design verification across different environmental trials, and recently completed a critical design review.

'We are taking the system into component qualification testing, and then later this year we will be delivering guidance sections to the army. They will integrate them onto a Hellfire bus and conduct a series of firings to system-qualify those units,' St John said.

'The next firing that we will do uses the radar to guide the missile all the way to the target and engage it,' he added. This will take place from the end of March through to early April and system qualification testing will start in Q3 2014 when the hardware is delivered and the range is ready.

Raytheon is progressing with its own JAGM contender, and a milestone decision on which design the army will select is expected in FY2015.

The plan is to build completely new seekers and missile buses, and Lockheed Martin plans to produce JAGM alongside Hellfire at its facility in Alabama. However, St John said that there is the option to upgrade existing Hellfire missiles if the Pentagon prefers.

By Tim Fish, Huntsville

India expected to award Chinook, Apache contracts in 2014

BOEING IS EXPECTING TO SIGN contracts with India for 15 CH-47F Chinook transport and 22 AH-64E Apache attack helicopters before the end of the year, a company representative has confirmed.

'We expect that the contract award for the Chinook will come in the first half of the year, and the award for the Apache in the second half of the year,' Leanne Caret, Boeing's VP and GM for vertical lift, told media at the Singapore Airshow.

Although Indian elections are to be held from 16 April to 13 May, holding up many defence procurements, Caret confirmed that she expects both contracts to be signed before the end of the year.

Proposals for the Chinook and Apache were made respectively in 2009 and 2010, and Caret noted that Boeing had been able to maintain the cost of the contract over these four years.

'That shows that we really have taken on an affordability measure, being able to give that back to the customer,' Caret said.

She added that the company is conscious of budget restraints around the globe as it operates in a more frugal environment: 'The more-for-less environment is driving how we do design work, sustainment and support in the future.'

During the show Boeing and partner Bell Helicopter also pitched the V-22 tiltrotor aircraft to the export market, following a formal request from Israel for six aircraft and interest shown from Japan for 17 platforms.

As deliveries of the first multi-year contract are about to be completed, a second such contract was signed in June 2013 for 99 aircraft, comprising 92 MV-22s for the USMC and seven CV-22s for Air Force Special Operations Command.

The contract provides flexibility in quantity, which leaves production slots open for foreign customers, among whom a market of 100 aircraft is foreseen.

By Joyce de Thouars, Singapore

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Game over?

With the retirement of Kiowa Warrior announced and the Armed Aerial Scout programme in doubt, **Tony Skinner** examines the rapidly diminishing future prospects for this class of helicopter, in the US at least.

Like any looming piece of bad news, the release of the US defence budget for FY2015 – announcing the retirement of several weapon systems and the shrinking of the army – would almost have come as a relief to many in the defence business.

The spectre of cuts and the bizarre money-saving mechanism that is sequestration had been hanging over the industry for many months without resolution.

After the Bipartisan Budget Act, the FY2015 budget has now been set at $496 billion, some $31 billion below that requested by President Obama, and the administration delivered its proposed defence budget to Congress on 4 March.

The enforced spending limits and the imminent conclusion of US involvement in Afghanistan have forced a number of difficult choices.

Most significant for those in the rotorcraft community was the decision to retire the US Army's Bell OH-58 Kiowa Warrior scout and TH-67 training helicopters, which came as a surprise to many given the active role the former has played in Afghanistan over the past decade.

PENTAGON BRIEFING

The changes were outlined in the Pentagon's briefing room on 4 March by Davis Welch, the army's deputy budget director. He explained that while the National Guard would receive an additional 111 UH-60s, all its AH-64 Apaches would be transferred to the active duty army to fulfil the armed scout mission.

'As a result of a comprehensive aviation review, the army decided to restructure its aviation formations to achieve leaner, more efficient and capable forces that balance operational capability and flexibility across the total force,' Welch said.

'Reserve components retain their 12 aviation brigades, but will be restructured and optimised for assault, lift and medevac missions. The National Guard will retain its current UH-60s, CH-47s and UH-72 Alphas, while garnering an additional 111 UH-60s to enhance their medevac and lift capabilities. All National Guard AH-64s will transfer to the active component.

'The initiative divests single-engine rotary-wing aircraft from the army's inventory. So, the Kiowa Warriors – A, C and D models – as well as the TH-67 trainer helicopter will go out of the inventory. And what that does is it allows for a streamlining of the initial entry rotary-wing training, and every aviator that is trained will be trained on the UH-72 Alpha,' he revealed.

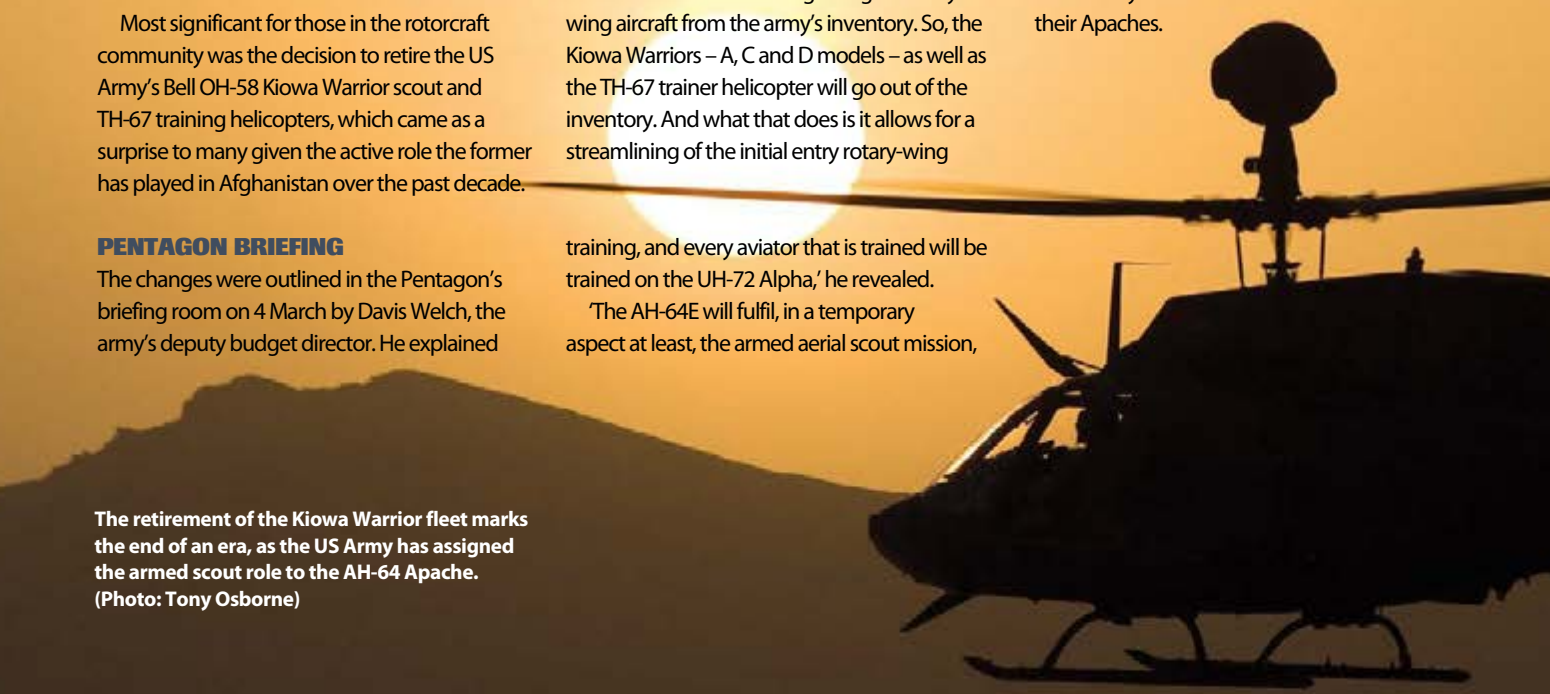
'The AH-64E will fulfil, in a temporary aspect at least, the armed aerial scout mission, leveraging a Level 4 manned/unmanned capability with unmanned aerial systems.'

The decision to retire Kiowa Warrior spells the end of an era, with the OH-58 having been in use by the US Army since 1969.

The move also abandons the army's steps to upgrade the fleet while it sought a replacement platform under the Armed Aerial Scout (AAS) programme, with Welch confirming that the Pentagon was discontinuing the Kiowa Warrior Cockpit and Sensor Upgrade Program (CASUP) in line with the restructuring.

CONTESTED DECISION

While the army is facing up to fiscal realities – consolidation of platforms is generally regarded as a sensible move for a force standing down from a wartime posture – assigning the scout role to the AH-64 has not gone unchallenged, not least by National Guard units that will lose their Apaches.



The retirement of the Kiowa Warrior fleet marks the end of an era, as the US Army has assigned the armed scout role to the AH-64 Apache. (Photo: Tony Osborne)

Boeing's AH-6i is now competing in a more crowded market, with the development of several similar types by MD Helicopters. (Photo: Boeing)

For Bell Helicopter, manufacturer of the Kiowa Warrior, the decision is likely to cost it somewhere in the region of $100 million in lost business, although CEO John Garrison explained to *Defence Helicopter* that the forfeiture of its close relationship with the army was a greater strategic consideration.

'We have had a multi-generational relationship with the US Army – the first army helicopter was a Bell. So it has been quite some time, and that is a strategic issue for us. Obviously we are working with the army on the V-280 programme, but not having something in the current fleet does have implications,' Garrison explained during Heli-Expo on 27 February.

At that stage Bell had yet to receive any formal notification to stop work on the CASUP and wartime cabin replacement efforts, and was carrying on with the modifications as normal.

Garrison unsurprisingly disagreed with the army's decision, and pointed to the plaudits the Kiowa Warrior has received over the past decade.

'The performance of the Kiowa Warrior was unmatched – the highest operational tempo, highest op times, lowest cost per flight hour and it performed the armed aerial scout mission extremely well, if you talked to the folks on the ground. We know what the platform did and can do, but the army had to make some difficult decisions and we understand that.'

He argued that this decision 'virtually eliminates' the chances of the AAS programme moving ahead, adding: 'I just can't see a path forward for that programme if they are going put the Apache into that role.'

VAIN EFFORTS?

The death of AAS will be hugely frustrating for a rotorcraft industry that has been starved of any new-start US military programmes for some time.

While competitions such as the Combat Rescue Helicopter and the new Presidential helicopter have attracted few bidders due to the nature of the requirements, every major OEM was chasing AAS, with many spending significant amounts of internal funding on flying demonstrators that met the army's stated needs.

Throughout the second half of 2012, every major manufacturer bar Sikorsky carried out a series of voluntary flight demonstrations in an effort to convince the customer that current production helicopters could fill the AAS need.

The companies that took part in the voluntary demonstrations were AgustaWestland with the AW139M (although it planned to submit the AW169 for AAS), Bell (OH-58F Block II), Boeing (AH-6), EADS North America (AAS-72X) and MD Helicopters (MD 540F).

Sikorsky was also developing its S-97 coaxial compound aircraft with one eye on AAS and, anticipating the likely funding available for each aircraft, had launched an advertising campaign touting the S-97's cost at $15 million per copy.

While it still plans to carry out a first flight in 2014, it is hard now to envisage a customer for Sikorsky's new design before the Joint Multi-role/Future Vertical Lift programme moves into production in the 2030s.

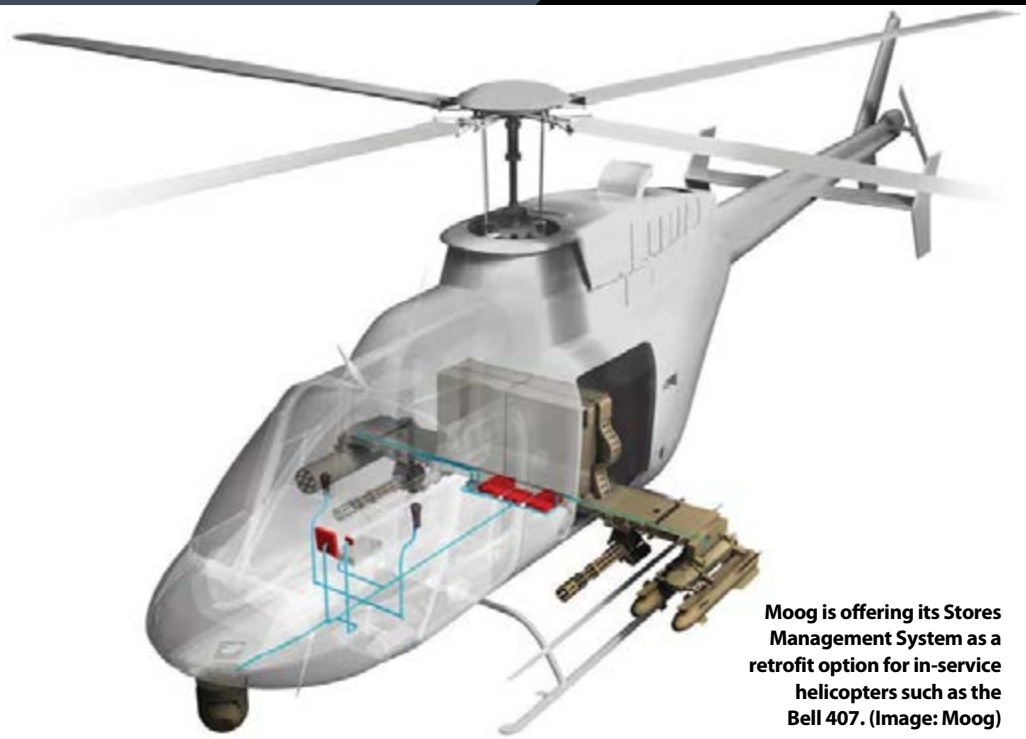
In August 2013, the then Program Executive Officer for Aviation, Maj Gen William Crosby, defended the decision to carry out voluntary demonstrations of candidate AAS aircraft, noting that the tests showed the army 'there was nothing out there today that could meet our 80% solution as we envisioned it'.

IMPOSSIBLE REQUIREMENTS?

Speaking during Heli-Expo, MD Helicopters CEO Lynn Tilton was blunter, arguing that the army was simply looking for an aircraft that does not exist at the price it was willing to pay.

The service has frequently cited a need to be able to hover out of ground effect at a minimum altitude of 6,000ft on a 95°F day – the 6K/95 performance requirement.

With AAS seemingly off the table in the near term, if not indefinitely, those companies that had prepared an off-the-shelf solution have no choice but to look to other markets, resulting in what is now a rather crowded field.



Moog is offering its Stores Management System as a retrofit option for in-service helicopters such as the Bell 407. (Image: Moog)

After overcoming a legal challenge in 2013 from Boeing aimed at preventing it from competing for AAS (see *DH*, July-August 2013), MD Helicopters has updated its scout/light attack range with renewed vigour.

At Heli-Expo, the company unveiled the MD 530G, which is an armed upgrade of the 530F – two examples of which were recently ordered by the Bolivian Ministry of the Interior – which features a higher gross take-off weight, modern weapons control and a wide selection of armament configurations.

'The MD 530G is built as an armed aircraft, so there is no green pricing, you only have baseline pricing. We're looking at $4-5 million armed, depending on what you put on the aircraft. So you should be able to own a multifaceted weapon system for under $5 million,' Tilton told reporters during the show.

Completion of the new aircraft is projected for Q2 2014, and the company will be in a position to deliver the first examples from Q3.

MD Helicopters boasts cruise speeds for the MD 530G in excess of 130kts, with the aircraft featuring capacity landing gear that supports a 1,700kg maximum gross take-off weight, allowing operators to harness increased useful load for additional range, endurance and weapons.

ARMAMENT OPTIONS

The aircraft on display featured a Moog Stores Management System (SMS), which allows for the deployment of various combinations on the Extended Range Weapons Wing developed by Mace Aviation, enabling the operator to meet any scout/attack mission profile.

Weighing less than 11.3kg, the SMS supports up to four weapon stations on the MD 530G and fully interfaces with the selected EO/IR sensor, which was the L-3 Wescam MX-10D on the display aircraft.

The selected weapons fit included the Dillon Aero M134D-H minigun, FN Herstal Heavy Machine Gun Pod and Rocket Machine Gun Pod, and the Arnold Defense M260 seven-shot pod loaded with the Raytheon Talon 70mm laser-guided rocket.

Speaking to *DH* at Heli-Expo, representatives from Moog explained that the company was also offering the SMS as a retrofit option for in-service helicopters.

Jeff Sowers, Moog's engineering manager for integrated defence systems, explained that the system was made up of a stores management computer (SMC), stores control panel and stores interface units, which were modular and scalable depending on a customer's needs.

'The beauty of the system is that its configuration is based on a modular architecture. The SMC is the brain of the system and you can connect the other elements as required. So it is very lightweight, very agile and you can build or take away elements as needed,' he said.

In addition to the MD 530F and G, MD Helicopters is also developing the MD 540F, which will now be known as the MD 540A in fully armed configuration. The company expects certification of the type in 2015, ready for delivery the following year, although no customers have yet been signed up.

In bringing the more powerful 540A to market, MD Helicopters is looking to take on the AH-6i directly, although it readily admits its offering is not as complex as Boeing's little brother to the Apache.

The latter company has now booked its first order for the AH-6i after securing a production contract for 24 aircraft from Saudi Arabia.

While Boeing has yet to officially confirm the customer, Saudi Arabia's purchase of the AH-6i has been widely acknowledged, as the kingdom undergoes a renewal of its military helicopter fleets that also includes purchase of the AH-64, UH-60M and 12 MD 530Fs.

CROWDED MARKET

Bell has also developed its Model 407 into an armed platform, offering the aircraft in analogue (407AH) or digital (407GT) versions.

While the company said it did not yet have approval to disclose any customers specifically, it has been targeting the African and South American markets, and plans to take the 407GT to the FIDAE air show in Chile later in March.

Meanwhile, at the 2013 IDEF exhibition in Istanbul, Eurocopter (now Airbus Helicopters) released details of the increased capabilities of its new EC635 T3/P3, which features a revamped rotor design, main blades that are 10cm longer, upgraded FADEC software and lateral air inlets that are compatible with barrier filter systems.

The improvements have increased maximum take-off weight by 30kg to 2,980kg, a significant increase in hot and high conditions.

Airbus Helicopters has also been working with Turkey's Roketsan to integrate the latter's Cirit laser-guided missile with the EC635/645 weapons package.

According to the then Eurocopter VP of sales for Europe, Thomas Hein, there is evidently an increasing demand from armed forces around the world for lighter helicopters to be employed in the scout/light attack role.

'Rather than the heavier transport helicopters, more and more military users are looking to introduce lighter aircraft, such as the [UH-72] Lakota with the US Army. More and more militaries are recognising the benefits of going to a lighter platform and the versatility that provides.' ***DH***

Elevating the Crowsnest

It was the 1982 Falklands conflict – and most pivotally the loss of the RN Type 42 destroyer HMS *Sheffield* to an Exocet sea-skimming missile – that spurred the UK's hurried development and deployment of rotary-wing AEW in the maritime arena.

The lack of organic AEW in the Falklands task force was a major capability shortfall, giving the navy insufficient warning of approaching low-level air threats, and thus requiring *Sheffield* and other Type 42s to be stationed 'up threat' as exposed radar pickets.

Necessity was very much the mother of invention, and the LAST (Low Altitude Surveillance Task) project was progressed with all haste. Fixed-wing AEW was not an option, with the UK having retired its last conventional 'big deck' carrier in 1978. So Westland Helicopters and Thorn EMI, assisted by the Naval Aircraft Support Unit, examined how Sea King HAS2 airframes could be jury-rigged to take an ARI 5980 Searchwater Mk 1 maritime surveillance radar and associated mission console in the rear cabin.

With time of the essence, and improvisation the order of the day, an initial two Sea Kings were converted to LAST configuration in just 90 days – both were deployed to the South Atlantic on HMS *Illustrious* just after the conflict's end. The rebirth of AEW in the RN was cemented in November 1984 when 849 Naval Air Squadron (NAS), as parent unit, formally recommissioned at RNAS Culdrose. A total of 13 Sea Kings were eventually converted to AEW2A standard.

PERMANENT SOLUTION

While the AEW2A was intended as a contingency solution, it enjoyed a 20-year career with the RN before a radar and mission system update spawned the successor Sea King Airborne Surveillance and Control (SKASaC) Mk 7, introduced to service in 2002.

Prime contractor Thales UK took overall responsibility for development of the new mission system, conversion and upgrade of the 13 existing AEW2A airframes to Mk 7 standard, and provision of a full mission trainer facility. It later modified two additional aircraft as replacements for a pair of SKASaCs lost in a mid-air collision during the 2003 Iraq war.

Externally, the SKASaC looks much the same as its forebear. However, the mission suite is

The UK is finally moving ahead with plans to procure a new rotary-wing airborne surveillance and control capability as part of its wider carrier strike recapitalisation. **Richard Scott** reviews the Crowsnest programme, and details the two very different solutions being proposed.

Lockheed Martin flew a developmental Vigilance pod on a Merlin HM1 in December 2012. This add-on radar package forms the basis of the company's Crowsnest bid. (Photo: Lockheed Martin)

The Sea King ASaC7 has demonstrated enormous flexibility over both land and sea, but will retire in early 2016. (Photo: Crown Copyright)

altogether different, with the Cerberus system integrating the Searchwater 2000AEW pulse-Doppler radar and Link 16 data link.

The Searchwater 2000AEW affords the ability to detect air, surface and ground moving targets, even in the presence of significant background clutter.

A key feature is the incorporation of multi-bar scanning for multiple-level raid detection, with Searchwater 2000AEW enabling near-simultaneous use of different beams to provide sector coverage at all altitudes. The top pulse envelope beam is used for long-range air detection at altitude; the pulse-Doppler beam below detects sub-clutter and overland targets; and the bottom beam provides either the surface picture (in maritime surveillance mode) or tracks moving targets on land (in ground moving target indication (GMTI) mode).

This capability to work in multiple domains gave rise to the 'ASaC' nomenclature, reflecting the aircraft's ability to provide simultaneous air and surface surveillance in the littoral and over land.

Dual multifunction consoles in the cabin allow two observers to view the tactical situation and exchange information with other participants in the Link 16 net. Tactical situation displays use air and surface picture symbology overlaid on geographical features, with on-screen windows to provide additional operator support.

FINAL COUNTDOWN

The SKASaC has given sterling service in both maritime and overland roles. However, the clock is now ticking – under the MoD's future rotary-wing strategy, the entire Sea King inventory retires in March 2016. Hence the increasing importance now attached to the successor Crowsnest programme, intended to introduce a role-fit ASaC capability to the RN's Merlin HM2 helicopter force.

Described by the MoD as a helicopter-based 'assured capability to provide long-range surveillance and battlespace management to carrier strike and littoral manoeuvre task groups', Crowsnest is the descendent of what began life as Future Organic AEW, later to become Maritime Airborne Surveillance and Control (MASC).

The MASC programme in fact completed two assessment phase activities (AP1 and AP2), but it, and subsequently Crowsnest, struggled to gain investment priority given pressures across the MoD budget. Indeed, the programme hung by a slender thread for a time and only in May 2012, as an outcome of Planning Round 12 (PR12), was Crowsnest confirmed as part of the core equipment set.

While Crowsnest survived PR12, its introduction to service was pushed to the right by four years to 2020, with initial operating capability (IOC) in 2021, and full operating capability (FOC) in 2022.

The fact that this would leave the RN with an uncomfortable capability gap in fleet force protection – during which time the new *Queen Elizabeth*-class (QEC) carriers will begin to enter service – did not go unnoticed. The House of Commons Defence Committee voiced concerns as to the 'increased risk caused by these emerging capability gaps' in maritime surveillance, while in its May 2013 report 'Carrier Strike: The 2012 reversion decision', the National Audit Office (NAO) remarked that 'operational use of Crowsnest is, along with the carriers and aircraft, a key element of carrier strike capability'.

The MoD was forced to acknowledge that delaying the introduction of Crowsnest would result in increased risk.

Andrew Robathan, Minister of State for the Armed Forces until October 2013, had suggested in a written reply to the committee that these risks 'can be mitigated to some extent by a ship's own sensors or embarked maritime helicopters (such as Lynx or Merlin)', noting that these 'can provide a modest area of surveillance and warning time of incoming threats, though at a reduced level relative to the capability to be provided by Crowsnest'.

In addition, while conceding that land-based AEW aircraft, such as the E-3 Sentry, are not optimised for the role SKASaC fills, Robathan contended that 'they could also provide long-range radar surveillance in the air environment'.

CAPABILITY GAP

In truth, the bottom line is that the absence of an organic ASaC capability would effectively leave the RN in exactly the same position it was in in the South Atlantic in 1982. As one industry source told *Defence Helicopter*: 'Type 45 is a very good piece of kit, with a very good radar – but it can't flatten the earth.'

Hence development work was undertaken in the MoD and RN throughout 2013 to advance the programme and ensure that the force protection capability delivered by Crowsnest would be operational by the time HMS *Queen Elizabeth* achieves IOC in the carrier strike role in 2020.

Confirming the accelerated schedule in early February 2014, the MoD said that savings achieved in the renegotiation of the QEC contract, concluded late last year, meant Crowsnest could now be brought forward to ensure IOC in 2019. It added that the decision to accelerate had been made as part of the annual review of the MoD's Ten-Year Equipment Plan, re-allocating funding from later years to 2015-16, and bringing forward the main gate investment decision to 2016.

Defence Secretary Philip Hammond said the introduction of Crowsnest 18 months earlier than previously planned 'will ensure HMS *Queen Elizabeth* has the full range of capabilities when it enters service'. As well as delivering the capability earlier than planned, the re-profiling will save £22 million ($37 million) over the period 2013-24.

While a number of earlier MASC studies had focused on a role-dedicated ASaC variant of Merlin, Crowsnest is predicated on a modular role-fit solution for the 30 Merlin HM2 helicopters being delivered to the RN under the Merlin Capability Sustainment Programme (MCSP).

PROGRAMME PROPOSALS

Lockheed Martin UK Integrated Systems & Solutions (LMUK ISS), as prime contractor for MCSP, has also been appointed as prime for Crowsnest, and is now managing a competition between Thales UK and a separate 'firewalled' Lockheed Martin team for the design, development and demonstration of the Crowsnest radar and mission system solution.

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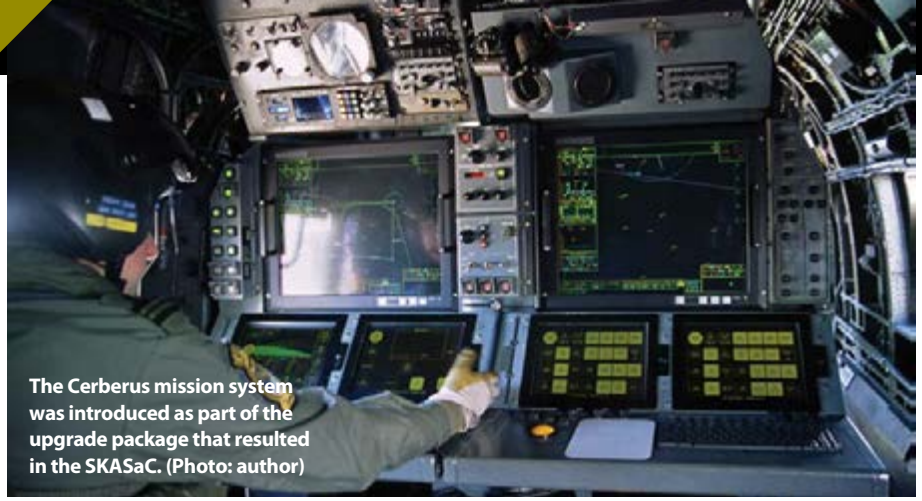

The Cerberus mission system was introduced as part of the upgrade package that resulted in the SKASaC. (Photo: author)

MoD planners have costed the programme in the £230-500 million bracket. Current planning assumptions call for the acquisition of ten Crowsnest kits, with the expectation that all 30 Merlin HM2s will get 'fit-to-receive' modifications to enable the 'quick-change' embarkation of the ASaC mission package.

Indeed, as well as being required to deliver performance at least equivalent to the current SKASaC, the Crowsnest kit must enable a fast role change, measured in hours, not days.

It is considered unlikely that a Merlin HM2 would be switched between ASW and ASaC configuration, or vice versa, on a day-to-day basis. However, the operator community wants sufficient flexibility to quickly re-role an airframe to respond to a changed mission focus, or mitigate aircraft unserviceability.

In March 2013, LMUK ISS received a £3 million start-up contract from the MoD to kick off assessment phase 3 (AP3), with the balance of funding (£24 million) awarded in late September 2013. AP3 activity, running for a little under 24 months, is intended to mature the capability requirement, system requirements, system design and subsequent programme for demonstration and manufacture and in-service support.

In turn, in late 2013 LMUK ISS awarded contracts, worth £6.5 million apiece, to Thales UK and the company's own Crowsnest bid team to undertake technology demonstration efforts to mature their mission system solutions in advance of a competitive evaluation. Current plans call for the downselection of the preferred mission system/radar during the first half of 2015 to support a main gate milestone in early 2016.

The rival mission system solutions are approaching the requirement from very different angles.

REFIT OPTION

Thales, as the incumbent mission system prime for SKASaC, is proposing to 'modularise' and migrate the existing Cerberus tactical suite and Searchwater 2000AEW radar into the Merlin HM2.

This decision to stay with a conventional rotating radar reflects a concerted effort to mitigate programme and technical risk. At the same time, Matt Avison, Thales UK's account director ISR, is adamant that active electronically

scanned array (AESA) technology, at its current level of maturity, 'cannot deliver the performance demanded to meet the Crowsnest requirement' in the near term.

'AESA has great attributes,' Avison told *DH*, 'but it struggles with long-range detection through 360 degrees. And that ability to scan through the hemisphere is what the [ASaC] mission requires.'

Instead, Thales is championing re-use of the existing SKASaC equipment fit to satisfy the programme need. This would see a 'bolt-on' Searchwater 2000AEW (inside a 'kettledrum' radome) attached onto elevator rails affixed to the port side of the fuselage.

Inside the Merlin's rear cabin, Thales envisages that the standard HM2 workstations would, in Crowsnest configuration, be swapped out for dual ASaC-specific operator consoles.

'Although the option is there to use the [Lockheed Martin] consoles, our view is that the HMI [human machine interface] is not optimised for the ASaC mission,' said Avison. 'The size and scope of the display and touch panels is not what we would want.

'Our view is that it is better to whip out the Mk 2 consoles and replace them with an ASaC-optimised form/fit console with multiple touch

Thales is proposing to repackage and migrate the Cerberus tactical suite and Searchwater 2000AEW radar into the Merlin HM2 as the basis for the Crowsnest role fit. (Image: Thales)

panels and different screens. Operational experience and operator feedback tells us that the HMI needs to be optimised for the two-person crew if they are going to do the job required of them.'

Some re-engineering of Cerberus is also planned to address obsolescence and rationalise hardware.

'However, the core of the system will remain,' Avison said. 'That's good from a risk perspective, and means the MoD can make best use of what it already owns, including corporate knowledge.

'On top of that, re-using Cerberus and Searchwater 2000 allows us to plug into other defence lines of development – logistics, training and simulator facilities are already in place. We have good ARM data, which means we can predict mean failure rates and stores requirements very accurately. And we have high confidence in cost.'

NEW PACKAGE

LMUK is taking a very different approach. Its Crowsnest proposal is an instantiation of its private-venture Vigilance airborne surveillance mission package, engineered as a roll-on/roll-off kit to provide new or existing fixed- and rotary-wing aircraft with a maritime surveillance and control capability.

Unlike Thales, Lockheed Martin believes that AESA technology is now able to offer the performance required to perform the ASaC mission.

In essence, Vigilance takes the core architecture of the Merlin HM2 mission system and marries it to a pod-mounted AESA radar. Younus Mustafa, LMUK's advanced technology director, explained: 'We saw the need for a modular and scalable system that could be adapted for different missions and platforms. But what our analysis showed was that sensors – primarily radar – represented one of the biggest cost items in the mission system.

'So the solution we developed was to decouple the radar from the platform, allowing the sensor package to be easily taken on and off the aircraft while at the same time offering a level of performance equivalent to that of a fixed sensor.'

In the case of Crowsnest, two self-contained pods would be fitted – one on either side of the Merlin's fuselage – to provide uninterrupted radar coverage.

Lockheed Martin undertook initial trials of an early model Vigilance sensor pod in December 2012 using a Merlin HM1. The key objective – successfully achieved according to the company – was to ensure that sensor performance was not adversely affected by the vibration and resonance effects typical of rotary-wing platforms.

Mustafa pointed out that the Vigilance core mission system is itself based on that now being delivered by LMUK for the MCSP programme.

'So the mission computing architecture already in place on the Merlin HM2 is functionally the same system. We can reuse that proven

The Vigilance suite reuses the mission system now in service on the Merlin HM2. Lockheed Martin believes this significantly de-risks its Crowsnest bid. (Photo: author)

mission computer and interfaces to introduce additional sensors.'

He added: 'What Vigilance offers is affordable but high-end performance. And it gives the frontline community huge flexibility in the way they role and reconfigure their force to meet operational needs. We think that we will be able to missionise the platform typically in just two or three hours.'

Early AESA study and demonstration activity for Vigilance was performed in cooperation with Northrop Grumman, proposing a radar based on AN/APG-80/81 technology.

Lockheed Martin subsequently examined alternative AESA solutions proposed by IAI's Elta Systems subsidiary and Selex ES as part of a radar options study for Crowsnest. Although the company has made no official statement on its final choice of radar, industry sources have informed *DH* that Lockheed Martin last year elected to bid in partnership with Elta, offering a tailored derivative of the latter's multi-mode EL/M-2052.

So the rival Thales and Lockheed Martin teams will have very different questions to answer.

CUSTOMER VIEW

Speaking to *DH* at Culdrose in August last year, Cdre Andy Lison, head of Helicopters 1 (responsible for the Merlin, Lynx and Sea King teams) in the MoD's Defence Equipment & Support organisation, framed the big issues from the customer side.

'The two candidate mission system solutions are approaching the requirement from quite different perspectives,' he said, 'and that will make this a very interesting competition because each has different risks and challenges to address.

'The podded AESA solution represents a new and cutting-edge approach that offers the prospect of easier role change, but carries some risk with regard to both technical approach and radar performance. For example, you have to look at the issues involved in scan coherence and picture integration from the two separate podded arrays.

'Then you have the repackaged [SKASaC] solution. From a radar performance perspective, we have a very good understanding of what the equipment can do. The issue is whether you can sensibly repackage that existing capability as a role-fit, and how you can future-proof the system for growth in the long term.' ***DH***

Southern discomfort

Is the ongoing struggle against narco-terrorism and insurgency in many of Latin America's often troubled nation states translating into contracts for helicopter OEMs? **Jonathan Tringham** and **Joyce de Thouars** analyse the market.

One of 12 recently delivered Brazilian Mi-35M gunships, known locally as the AH-2 Sabre. (Photo: Tony Skinner)

Drug cartels, organised crime and insurgencies continue to present serious challenges for security forces in Latin American countries. To compound the problem, well-armed paramilitary groups often forge alliances with drug lords, creating formidable criminal networks capable of waging drawn-out, guerrilla-style wars against state military and police elements.

While this kind of violent activity is a region-wide issue, Colombia, Venezuela and Peru are particularly affected by the growth of narco-terrorism and armed outlaw factions.

The potential for conflict between certain neighbouring countries in South America, while significantly reduced in recent times, is also never off the table. However, criminal groups engaged in drug manufacture and trafficking continue to present the main threat to stability in the region.

Regional helicopter procurement programmes have therefore been primarily focused on platforms that can be effectively deployed on border control, counter-narcotics and internal security operations.

Over the past five years, a total of 14 Latin American/Caribbean states have undertaken rotary-wing procurement programmes of one kind or another, according to the International Institute for Strategic Studies (IISS).

Argentina, Bolivia, Brazil, Colombia, Ecuador, El Salvador, Panama and Trinidad and Tobago have placed orders for multirole helicopters; Argentina, Bolivia, Brazil, Colombia, Ecuador, Mexico and Peru have acquired transport helicopters; and Brazil, Peru and Venezuela have purchased attack helicopters.

SPENDING SLOWDOWN

The Latin American market is attractive for helicopter OEMs that are looking to increase sales in emerging markets to offset a decline in domestic military budgets. However, defence spending in Latin America appears to be slowing again after it grew from $61.3 billion in 2010 to $70 billion in 2013.

In Brazil in particular, the region's biggest defence market, spending is slowing down,

Brazil has ordered 50 EC725 multirole helicopters for its armed forces, with deliveries to be completed by the end of 2017. (Photo: Tony Skinner)

whereas real spending rose by 6.9% in Mexico and Central America, according to the IISS.

In addition to its activities in Brazil (see box, p20), Airbus Helicopters has subsidiaries in Mexico and Chile. A manufacturing centre in Querétaro in Mexico produces structural metallic components including tail booms for Ecureuil helicopters. The site also includes a maintenance centre that specialises in the AS350 family.

AgustaWestland is also trying to increase its market share, which it currently claims to be 20%, in the region. However, last year negotiations between the company and Embraer for the establishment of a joint venture in Brazil to build commercial and eventually also military helicopters was abandoned. The companies gave no reasons for their decision, but analysts believe that Embraer will continue to explore the possibility of a domestically built helicopter.

In August 2013, AgustaWestland announced that its subsidiary, AgustaWestland do Brasil, is to undergo major expansion with construction of a new facility in São Paulo scheduled to be completed by the end of 2014.

Boeing strengthened its position in the Latin American market by the establishment of Boeing Research and Technology-Brazil, which was announced in May 2013. This facility, located in São Paulo State, will develop aerospace technologies including sustainable biofuels, advanced air traffic management, remote sensing, advanced metals and bio-maters.

Sikorsky, Bell and Russian Helicopters are also looking to grow their presence. In May 2013, Sikorsky opened a Black Hawk training facility in Colombia, which has a large fleet of these helicopters, providing pilot and crew training for the country's armed forces as well as other Sikorsky military customers in the region.

The company also expanded its footprint in Brazil by establishing in-country warehousing of spare parts to support commercial S-76 and S-92 operators.

BORDER ENFORCERS

Elsewhere, Bolivia finalised the purchase of six AS332 C1e Super Pumas in January 2014. The deal will allow for the retirement of old helicopters donated by the US for use in the war on drugs. The contract comes as the Bolivian government

looks to implement more aggressive regulation of the country's airspace to clamp down on trafficking. Cartels often use light aircraft for the transfer of cocaine from Peru, across Bolivian territory, to Brazil.

Operating conditions in Bolivia are extreme, and the AS332 was specifically chosen by the Bolivian Air Force (FAB) because of its versatility, safety and ability to operate at altitude.

The air force already operates the AS350 B3, and, since 2013, two multirole EC145s. The first two Super Pumas are scheduled for delivery before the end of 2014, with Airbus Helicopters delivering the remaining four before 2016.

Other recent additions to the FAB's rotary fleet include six Robinson R44 trainers and four former Brazilian Air Force UH-1Hs, which were donated in October 2012.

In 2011, an order was also placed for six Hafei H425s, worth $108 million, as part of a push to create a new army-controlled air cavalry unit. The H425 is a developed version of the Z-9, the Chinese version of the AS365 Dauphin.

Meanwhile, the Colombian government faces both an external threat from Venezuela's increasing military capability, and an ongoing internal struggle against drug traffickers and criminal paramilitary groups. As a result, the Colombian Army has prioritised acquisitions directly related to counter-insurgency (COIN) operations.

Helicopters represent a key capability when fighting irregular warfare, and Colombia has invested heavily in rotary-wing platforms in order to give its military and parapublic forces the ability to rapidly deploy to inaccessible areas.

In March 2013, the army formally inducted five new Sikorsky S-70i multi-mission helicopters, joining a fleet of 96 UH-60Ls operated by the Colombian National Police, Colombian Air Force, and army. The latter also took delivery of eight assault-configured Black Hawk helicopters in Q1 2013, increasing its total H-60/S-70 fleet to 57. Colombia's combined armed forces now operate the world's fourth-largest Black Hawk fleet.

RUSSIAN RELATIONS

Peru operates a fleet of Mi-17 transport and Mi-35 attack helicopters, and has a long history of procuring military equipment from Russia. In December 2013, the Peruvian Ministry of Defence continued this partnership with an order for an additional 24 Mi-171Sh models.

The contract, worth an estimated $400 million, includes the provision of a flight simulator and related equipment. As part of the deal, a Russian-operated helicopter maintenance and repair centre will be opened in Peru in early 2016. The aircraft are scheduled to be delivered in 2014-2015, with the first batch expected to be supplied by December. The Mi-171Shs will be deployed by the Peruvian armed forces on counter-drug and anti-terrorism operations.

Peru had previously ordered six Mi-171Shs and two Mi-35Ps from Russia in 2010. These aircraft were delivered by the end of 2011.

Argentina, Brazil, Chile and Venezuela have also purchased new examples of the Mi-17 or Mi-171 in recent years.

One of three Russian-built Mil Mi-26Ts operated by the Venezuelan Army. (Photo: *DH* picture library)

Chilean defence expenditure has declined steeply in recent years due to the transfer of the Carabineros and the Investigations Police to the Ministry of Interior and Public Security.

However, according to industry analysts, an aggressive modernisation strategy, border disputes and persistent threats from drug traffickers are likely to push the country's defence spending to at least $4 billion by 2017.

During 2013, the Chilean Army purchased a single AS532 Cougar, worth $25 million, and has budgeted for the acquisition of three more. Santiago has also launched a procurement programme for 16 attack helicopters, with Airbus Helicopters offering the EC635 Tiger, Boeing tendering the AH-6i and Bell submitting the Model 407AH.

The AS532 forms the backbone of the army's aviation component, and the procurements are part of a strategy to create an airmobile brigade of up to 24 transport helicopters. The Tiger is reportedly also a contender for a possible fire support platform requirement.

As of December 2013, the Venezuelan Air Force operated a fleet of eight AS332 Super Pumas, eight AS532 Cougars and seven Kazan Helicopters Mi-17s, with the army operating ten Mi-35s, 18 Mi-17s, three Mi-26s, 14 Bell 205s and 206s, two Bell 412s and three Sikorsky S-61s. The Venezuelan Navy operates a fleet of ten Bell 412s and 212s, six Mi-17s and two Bell 206s, with eight Harbin Z-9s on order – first delivery is expected to take place in 2015.

In addition, the Venezuelan MoD has just signed up for 16 Enstrom 480D training helicopters, its first aircraft purchase from a US OEM in more than ten years.

The Enstroms are scheduled for delivery within the next 18 months, and will be used for training by the air force and navy. The Venezuelan National Guard already operates Enstrom helicopters purchased in the 1970s, and expanded this fleet in 2001.

CHINA IN HAND

Argentina signed an MoU with Russia in May 2012 for the supply of three Mi-171s, plus three Kamov Ka-226T utility helicopters.

The deal follows a similar agreement reached in April 2010, when Buenos Aires purchased two Mi-171s for €20 million, for use on SAR operations and to supply Argentine stations in Antarctica. The helicopters were delivered in November 2011, and subsequently assigned to the 7th Air Brigade at Marambio, the main Antarctic base.

The Argentine Army is continuing to upgrade its three AS532s, and modify UH-1s to Huey II standard.

In 2012, the Argentine Air Force acquired two ex-civil Bell 412s, with the defence ministry also approving the purchase of two more examples from the Canadian Commercial Corporation. One is a new-build aircraft and was delivered in November 2013, while the second is being acquired second-hand, and has yet to arrive.

Argentina may also acquire the Chinese Changhe Z-11, having reached an agreement with Beijing in 2011 covering the assembly of 30 examples for operation by military and security forces. The Z-11, a copy of the AS350, is expected to replace the country's ageing SA 315 Lamas, which have been in service for 40 years. ***DH***

Demand grows in Brazil

BRAZIL'S MILITARY IS IN THE EARLY STAGES OF A MAJOR FORCEWIDE TRANSFORMATION AND UPGRADE EFFORT which will run into the early 2040s. The sheer size of the country, its difficult terrain, limited road infrastructure and the need to increase the presence of the state have led to a doctrinal shift, requiring Brazilian forces to significantly expand their sensing and mobility capabilities, leading to a raft of rotary-wing requirements for all services over the next three decades.

The largest programme is the €1.9 billion procurement of 50 EC725 multirole helicopters known as H-XBR. Airbus Helicopters' local subsidiary Helibras is the main contractor and the programme will progressively feature up to 50% domestic content.

Deliveries are scheduled to end in 2017, comprising 18 for the air force and 16 each for the army and navy.

The navy refers to the type as the UH-15 Super Cougar and its last eight examples will be UH-15As, equipped with the SAMSARA data management system and armed with the MBDA AM39 Exocet Block 2 Mod 2 anti-ship missile.

The army designates its EC725s as HM-4s and will operate them primarily in the transport role. The service is investing some $890 million in its helicopter fleet up to 2022, including the major upgrade of 34 AS365 K Panteras, 18 AS550 A2 Fennecs and 14 HB350 L1 Esquilos.

In December 2013, Helibras announced offsets worth over €452 million, which puts it in a privileged position vis-à-vis its main competitors to address growing Brazilian rotary-wing requirements.

The navy alone is planning to procure 206 helicopters by 2032, consisting of 30 training (IHP), 60 light (UHP), 50 medium general purpose (HME) and 66 medium utility (UHM) aircraft.

Launched in late 2013, the IHP programme intends to replace the IH-6B (Bell 206) from 2015, with bidders including AgustaWestland, Bell, Helibras and Sikorsky. IHP is important, as the winner will be a preferred contender for UHP in 2015.

Since 2011, Sikorsky has been awarded three contracts worth a combined $370 million to provide eight MH-60R Seahawk ASW/ASuW helicopters armed with AGM-119B Penguin missiles and Mk 46 torpedoes, and the type is the navy's preferred choice for the HME programme.

Additionally, in 2006 Sikorsky was awarded $313 million to supply 16 CSAR-configured UH-60Ls for the air force. The Black Hawks operate alongside 12 recently delivered Mi-35M gunships, known locally as the AH-2 Sabre, proving that the Brazilian market is not off-limits to non-Western types.

By Iñigo Guevara

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Delayed impact

Doubts remain over the in-service date of the UK Royal Navy's Future Anti-Surface Guided Weapon, as delays on the Anglo-French 'Heavy' side of the project continue to impact the overall programme. **Robin Hughes** provides a timely update.

The UK MoD was expected to sign off the long-awaited development and manufacture (D&M) contract for the RN's Future Anti-Surface Guided Weapon-Light (FASGW(L)) capability as *Defence Helicopter* went to press.

Delivered through the Thales UK Lightweight Multi-Role Missile (LMM) effector, FASGW(L) is the precision-guided missile variant intended to equip the RN's new Wildcat Helicopter Maritime Attack (HMA) Mk 1 to address the lower end of the FASGW target set under the provisions of the UK Complex Weapons programme.

The MoD was expected to have awarded the D&M contract towards the end of 2013, however this did not materialise, and contract award was subsequently anticipated by the end of February 2014. Thales is now understood to be working through the terms and conditions for FASGW(L) in anticipation of an 'imminent' D&M contract.

An MoD spokesperson declined to confirm a contract award date, noting only that it was 'expected soon'.

WINNING AWARDS

The UK approved LMM as the preferred technical solution for FASGW(L) in 2008, followed in April 2011 by the award of a full-scale development and series production contract – this provided for the design, development and qualification of the missile and production of some 1,000 LMM laser beam-guided rounds.

The April 2011 agreement was the outcome of an innovative approach to contracting under the principles of Team Complex Weapons', under which Thales agreed to re-role previously contracted funding for Starstreak Tranche 4 production high-velocity missiles

FASGW(L) was originally planned to be ready by 2015 to coincide with the introduction into RN service of the Wildcat HMA1 platform. (Photo: AgustaWestland)

(HVMs) to finance development and series production of LMM.

This 'innovation' also reflects tight budget constraints within the MoD at that time, and is likely underscored by the fact that the perceived target set priority for Starstreak is currently lower than that assigned to LMM.

Defence insiders note that the 1,000+ LMM laser-beam-riding rounds will provide 'a cost-effective' solution to equip two different requirement pockets in the MoD – the helicopter-launched air-to-surface role for the FASGW(L) requirement and a potential surface-to-surface/surface-to-air role for current and potential HVM-equipped land platforms.

It was originally anticipated that the FASGW(L) D&M contract would be awarded in the mid-2011 time frame, with production and initial deliveries to begin in 2012 and 2013 respectively, then an in-service date (ISD) of 2015 to coincide with the introduction into RN service of the Wildcat HMA1.

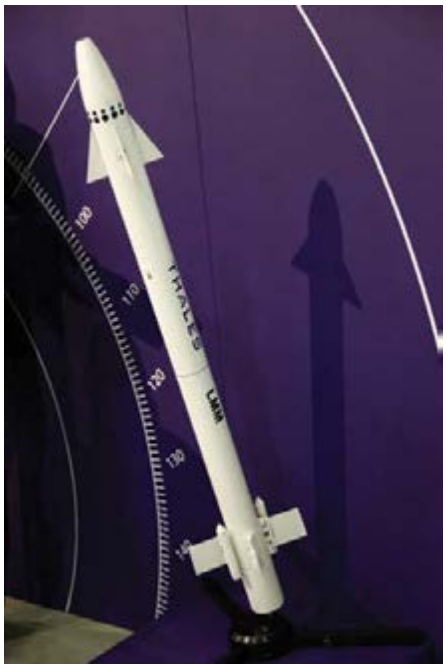
However, FASGW(L) and the heavier FASGW(H) variant are covered by a single business case, and while the MoD has long sought coherence of both elements of the programme to synergise missile trials and integration with the entry into service of the Wildcat to mitigate risk and cost, some of the interim FASGW timescales have been impacted by the drive to align Anglo-French collaboration on FASGW(H).

HAPPY MEDIUM

Additionally, defence sources note that aside from ongoing assessments of the FASGW(H) requirement, the MoD had also considered a medium-weight FASGW path.

'There was also an assessment of a medium solution,' one source said. 'However, to specifically counter a swarming FIAC [fast inshore attack craft] threat you require quantities of missiles on the helicopter – with a medium or heavyweight solution the helicopter could not carry sufficient quantities to effectively deal with this threat – which is what FASGW(L) is about and where LMM comes into its own.

'So the assessment has always come back that both a light and heavy solution was required – and that is why they have ended up where they are now, with FASGW(L) and FASGW(H). Those kind of assessments, combined with the funding atmosphere within UK MoD procurement circles at the moment, plus the international collaboration angle, has led to longer timescales than originally estimated.'



The Thales LMM is the basis for the UK's FASGW(L) missile. (Photo: Thales)

Furthermore, while technically more mature than FASGW(H), the LMM development has also been subject to its own delays.

Defence sources note that there have been issues with the value-engineered two-stage rocket motor supply from Roxel.

The National Audit Office (NAO) Major Projects Report 2013 states a total of 28 months' delay to the Brimstone 2 programme due to 'significant technical issues' with the Roxel-manufactured motor. Thales UK now sources the LMM's two-stage rocket motor from Nammo of Norway.

However, Thales UK declined to comment on the status or source of the LMM rocket motor.

CAPABILITY GAP

In 2012, the NAO warned of the capability gap that would result if LMM was not ready in time for Wildcat's entry into service.

'Failure to provide a FASGW capability synchronous with [Wildcat's] initial operating capability will mean significant elements of attack capability will not be available in several mission scenarios. These core attack missions are dependent upon the ability to deliver a proportional and autonomous attack capability for which [FASGW(L) and FASGW(H)] are fundamental.'

Nevertheless, LMM assessment and qualification pursuits remain on track. From 2012, Thales UK completed a series of guided firing trials over water in Cumbria and Scotland.

The company has also conducted Wildcat flight carriage trials with the FASGW(L) five-round pannier and instrumented missiles, and integrated its Thales Missile Electronics laser transmitter unit with the Wildcat's L-3 Wescam MX-15Di nose-mounted EO/IR payload, projecting a coded laser beam to guide LMM on target.

Flight qualification trials of the complete missile system, with the Nammo two-stage rocket system in its final configuration, are now under way. A Thales source told *DH* that the company was now 'in the process of ramp-up activities as the missile is now into flight trials, and we are starting to look at long lead items for a conclusion of that qualification programme. The missile should be fully built by the back end of this year, beginning of next year.'

COMMON APPROACH

While its origins derive from Thales' HVM Starstreak SAM technology base, LMM introduces a number of subsystems designed to advance its precision strike capability for a range of air, land and sea targets, although there is commonality and backwards compatibility with existing platforms previously equipped with the HVM.

The LMM – in a hermetically sealed five-cell launcher for its FASGW(L) application – comprises a four-fin and laser receiver tail assembly; a two-phase (boost/sustain) Nammo solid rocket motor accelerating to above Mach 1.5; a Thales Missile Electronics-developed ignition safety and arming unit; and a 3kg multi-effects (blast fragmentation/shaped charge) high-level IM warhead.

The missile's control actuation system – derived from Starstreak and developed internally by Thales –– provides skid-to-turn command to four fully controlled nose-mounted canard fins for precision guidance. The company describes this actuation system as a technology 'nugget' that delivers a reduction in weight and power uptake to optimise the performance of the missile.

The system also includes an inertial measurement unit – currently understood to be sourced from Atlantic Scientific (although

Thales contracted Goodrich for 1,000 SilMU02 inertial sensors for LMM in June 2012, with deliveries scheduled for 2013); and a laser proximity fuse (with specific fusing algorithms to address the FIAC threat).

With an all-up weight of some 13kg, LMM is understood to have an effective range against its wide target set out to 8-9km.

RECONFIGURABLE SUITE

The LMM/FASGW(L) five-cell missile pannier is a Thales UK design – the company has worked closely with AgustaWestland, the design authority for FASGW missile integration on the Wildcat HMA1, to ensure that the pannier interfaces with the AgustaWestland common carrier for a reconfigurable suite of helicopter missiles on the Wildcat.

Thales UK is also working on alternative guidance modes for LMM, including a semi-active laser (SAL) seeker, and a number of SAL-guided LMM rounds have been flown since early 2013. However, it emphasises that its focus at the moment is to bring the laser beam rider through to production.

The company has been contracted by the MoD to look at the growth path for an LMM-based lightweight family of weapons through various sponsored Weapon Technology Centre technology studies.

These essentially consider the technology roadmap to optimise the LMM/LMM airframe for other roles and configurations – particularly with regard to guidance, warhead, fuse and propulsion.

DH understands that these studies include the aforementioned SAL seeker, along with low-cost terminal homer and GPS/INS guidance variants, low collateral, enhanced blast and mini-tandem warhead variants and a single-stage rocket motor. It is understood that the company is also examining the potential for a modular electric power propulsion option, although the technical challenges therein would likely put development of this solution to the right of any mainstream growth path.

Private venture-funded activities on some aspects of the growth path include examination of an LMM-based UAV-launched freefall/glide munition with SAL terminal homing guidance. At least three flight tests of this munition type (launched from a Lynx Mk 8, as a UAV launch is not permitted in the UK) have been conducted at the West Freugh Range in Scotland.

FASGW(H) meets the RN's requirement to replace the Sea Skua missile system. (Image: MBDA)

Heavy commitment – FASGW(H)

The 31 January Anglo-French MoU enabling the development and production phase of the bilateral Anti-Navire Léger/FASGW – Heavy (ANL/FASGW(H)) delivers the long-delayed prerequisite to progress the contract, but falls short of formally authorising the approved £452 million ($755 million) funding commitment to formally kick-start the programme.

ANL/FASGW(H) is the solution mandated to meet the RN's requirement to replace the Sea Skua missile system when it reaches its end of life in 2016 and to succeed the AS 15TT system in French Navy service.

It is intended that the new missile will provide a long-range stand-off anti-surface capability for French Navy NH90/FR Panthers and RN Wildcat HMA1s. Many of the requirements are common, including much of the maritime and land target set, which covers a spectrum from corvette-sized vessels to FIAC and littoral land targets.

While the MoU confirms future joint orders, crucially the RN's air-launched anti-ship capability still remains particularly exposed, and the service now faces the very realistic prospect of not being able to field its new Wildcat HMA1 'Surface Combatant Maritime Rotorcraft' with its principal anti-ship armament until the end of this decade.

COMMITMENT ISSUES

Lauded as a symbolic government-to-government agreement, the MoU does goes some way to assuage earlier UK concerns of France's commitment to the programme – although the French government did not officially confirm its commitment to ANL/FASGW(H) until April 2013, with formal approval sanctioned by French Defence Minister Jean-Yves Le Drian in the National Assembly only in the following November.

The intent to pursue joint ANL/FASGW(H) development was announced in March 2008, followed by a formal statement of intent signed between the UK and France in January 2009, with a single contract for a £35 million 27-month joint assessment phase awarded to MBDA UK in July 2009.

At the time, it was envisaged that this phase would mature the programme to the next stage in the development process by 2011 and that a cooperative D&M programme would follow, with a projected initial ISD in the 2015 time frame.

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The ANL/FASGW(H) will also provide a long-range stand-off anti-surface capability for French Navy NH90s. (Image: MBDA)

However, politically driven budget considerations, spending reviews and service funding line demands have underscored ongoing in-year delays by France to commit to ANL/FASGW(H) approval – a lack of urgency perhaps compounded by the fact that ANL acquisition for its NH90 NFH variants is not required until the 2019-20 time frame.

With the MBDA-led joint assessment phase completed in September 2011 (including the completion of the first critical design review in May 2010), the drive to maintain the ANL/FASGW(H) drumbeat has largely been down to the UK.

BEHIND THE SCENES

Intense lobbying by the UK MoD (notwithstanding letters from UK Secretary of State for Defence Phillip Hammond to his counterpart Le Drian in January 2013 seeking a commitment on the programme, and crucially from UK Prime Minister David Cameron to President Hollande in February 2013 warning it was key to future defence cooperation), has ensured that French agreement to the provision in the 2010 Lancaster House Treaties to use the missile sector, and in particular ANL/FASGW(H) programme, as the test case for bilateral cooperation and mutual dependency in the acquisition of equipment and technologies remains credible.

The UK MoD, hoping to synchronise a 2015 entry into service of the Wildcat HMA1 integrated with FASGW(H) – and withdrawal of Sea Skua along with the current RN Lynx HMA8 helicopters – authorised interim main gate D&M approval for FASGW(H) in January 2012, subject to an Investment Approvals Committee caveat 'that negotiations should be concluded with France before 31 March 2012'.

However, negotiations remained unresolved, and the FASGW(H) 2015 ISD is now redundant.

The 2012 UK NAO Major Projects Report noted: 'The main investment decision point for FASGW(H)… was delayed in-year. This was due to the need to secure approval from France. Discussions are still ongoing, but are dependent on the outcome of the French government's spending review that is currently being undertaken.

'There will now be at least a 19-month gap between the existing capability leaving service and the new missile being available. The department may extend the life of the existing missile to mitigate the gap.' The report added that the expected ISD for FASGW(H) was January 2018.

UNDEFINED SOLUTION

However, it is now likely that the projected FASGW(H) ISD will be pushed back even further, while a solution to the ever-widening capability gap between the planned withdrawal of Sea Skua and introduction of FASGW(H) remains, at least publicly, undefined.

A UK MoD spokesperson stated: 'Plans for the future of Sea Skua are ongoing, and it would be inappropriate to speculate further at this time. A contract for FASGW(H) will be awarded as soon as is reasonably practicable in order to support a planned ISD of late 2020.'

However, the MoD's Maritime & Air Weapons Systems Project Team in Abbeywood awarded MBDA UK a £41 million contract on 26 February for in-service support to ensure 'a continued ASW capability on board the [RN] Lynx Mk 8 helicopters'.

The contract covers a period of 27 months, with an option to extend for a further 12 if required.

It would perhaps be unfair to completely lay the blame for what essentially could amount to a five-year ISD delay for the FASGW(H) at the feet of France's irresolution.

True, the RN and French Navy are arguably five years apart in terms of capability priority, but the 2013 NAO Major Projects Report also indicates resourcing and capability issues on the part of the UK MoD.

INDUSTRY RELIANCE

'There have also been instances where project teams have relied too heavily on industry partners, owing to resourcing problems,' it states. 'For example, the department's Scrutiny Team assessed in January 2012 that the teams responsible for implementing the [FASGW(H)] appeared to have entirely relied on industry partners to plan the weapon's integration on to Wildcat and it was not evident they had the necessary skills and staff required to successfully manage the integration.

'While funding is in place, the team has had difficulty in recruiting and retaining staff. The project team is currently conducting a review of staffing requirements to deliver this project.'

In the interim, a de-risked ANL/FASGW(H) missile design has been delivered and its subsystems matured under the completed joint assessment phase, in anticipation of an imminent D&M contract.

While the assessment phase is effectively complete, there is an industry 'requirement' to suggest that it remains 'ongoing' until the D&M phase is contracted. MBDA UK noted that since the assessment phase, various aspects of the programme have continued.

'Examples are understanding export market needs as related to this product type and developing solutions,' the company stated. 'Subsystems that are shared with or reused from other programmes continue. The team continues to manage core activities and risk-reduction activities as appropriate and to respond to questions arising out of the scrutiny and approvals process in [France] and the UK.' *DH*

UH-60 operations in Afghanistan started around mid-March 2013, just 15 months after the first aircraft was delivered. (Photo: FH)

Collective action

Sweden boasts one of the most modern military helicopter arms in Europe. **Alan Warnes** gives an overview of its recent operational procurement and activity.

For a force with around 40 aircraft and 480 personnel, the Försvarsmaktens Helikopterflottilj (FH, Swedish Armed Forces Helicopter Wing) punches well above its weight. With all the former air force, army and navy rotary-wing assets consolidated into one command back in 1998, the FH ensures a little goes a long way.

Today it operates two principal helicopter types, the A109LUH (designated HKP 15 in Sweden) and UH-60M (HKP 16) and has finally begun taking delivery of the 18 NH90s (HKP 14s) on order. The latter procurement has been a painful saga, not just in Sweden, but the worst now appears to be over. Meanwhile the FH deployed four UH-60Ms to Afghanistan in March 2013 to replace two Super Pumas, while a pair of A109LUHs have participated in anti-piracy operations off the coast of Somalia.

Most activity is currently centred on Malmen Air Base outside Linköping, where the battalion and one of the squadrons (Helikopterskvadronen, Hkpskv) are based. Two other squadrons are based at Ronneby (in southern Sweden) and Luleå (in the north), where the NH90s will move to once they have worked up.

REVOLUTION UNDER WAY

All 20 A109LUHs ordered in June 2001 under a SKr1.4 billion ($180 million) contract were delivered by the end of 2009. The deal covered 12 HKP 15A variants optimised for land-based operations and eight HKP 15Bs for maritime use. Eight HKP 15As are based at Malmen where they operate with the flying school (Flygskolan), while another four support special operations with co-located 2 Hkpskv. The eight HKP 15Bs at Ronneby provide the Swedish Navy with an airborne capability.

The B variant can operate from the navy's *Visby*-class stealth corvettes and the patrol ship HSwMS *Carlskrona*, and differs from the camouflaged HKP 15A in having a parking brake, air conditioning unit, flotation gear and sonobuoy. Both versions can be armed with a machine gun for defence.

On 5 July 2012, the Swedish government opted to send the *Carlskrona* to the Gulf of Aden once again, to participate in the EU Naval Force's anti-piracy mission, Operation *Atalanta*.

'The NH90 will be a very capable helicopter, but it will take a few years.'

FH commander Lt Col Ulf Landgren told *Defence Helicopter*: 'With an A109 on board and another ground-based at Djibouti for maintenance needs, the helicopters equipped with an infrared high resolution camera commenced operations on April 6 and by the time the deployment ended in late August, [they] had flown 270 hours.'

NH90 SNAGS

While the A109 has fitted seamlessly into the Swedish military, the same cannot be said of the NH90. In November 2001, in a joint $1.2 billion acquisition, Sweden along with Finland and Norway ordered 52 multirole NH90s as part of the Nordic Standard Helicopter Programme agreed among the three countries. Sweden is set to receive 18 High Cabin Variants (HCVs) eventually, 13 for land forces support and five optimised for naval operations. The programme has not gone well, mainly due to software, engine and spares issues that have affected all NH90 customers.

Swedish Air Force Chief of Staff Maj Gen Micael Bydén spoke of his frustration with the new helicopter on the eve of the

One of four interim-configuration NH90s delivered in 2007 comes into land at its current home base, Malmen. (Photo: author)

2012 Farnborough air show: 'We are not happy with the NH90. It should have started flying operationally in 2007 but we didn't receive the first ones [operationally] until 2011. The NH90 will be very capable, but it will take a few years.'

Deliveries commenced in 2007 when four NH90s arrived at Malmen. However, they operate with restrictions and while they can be used for low-altitude and formation flight training, they cannot fly with troops on board.

All four HKP 14As on strength are basic TTT (Tactical Troop Transport) models. The FH flew 270 hours on the NH90 in 2011, a figure which rose to 455 hours in 2012 and nearly doubled to 800 in 2013.

On 17 December the fifth NH90, an HKP 14D, was delivered to Malmen. This is the first in TTT/IM (Tactical Troop Transport – International Mission) configuration. New features include a rescue hoist, cargo hook, weather radar, SX-16 searchlight and Saab tactical mission computer as well as a chaff and flare dispenser.

RIGHT DIRECTION

In Sweden there is a sense the programme is finally moving in the right direction, as Landgren told *DH*: 'It has been a really stable platform over the past 18 months, without any real problems and that's why we have flown 800 hours on the four helicopters this year.'

The fleet will eventually be split between SAR and ASW versions, and divided between the bases at Luleå (land-based ops) and Ronneby (maritime). Landgren is excited about the NH90: 'Among the 18 HKP 14s on order, nine will be configured for naval operations with the necessary plumbing, although only five will house mission kits. They will fulfil a number of roles – ASW equipped with sonar/torpedoes, sea surveillance, ASuW with no weapons, command and control, amphibious warfare and transportation.

'We eventually hope to have all nine with mission kits at some point in the future. We already use the A109s with sonobuoys and hopefully we can fit such a system on the NH90. There are also plans to arm the NH90s with torpedoes, although one hasn't been selected yet.'

The NH90s will move to Ronneby in April, eventually replacing three HKP 10A/D Super Pumas. Operations should commence there on May 1, while the maritime component is expected to transfer to the base in late 2015/early 2016. 'We will not be able to base them on our naval vessels, due to a lack of hangar space. Meanwhile a third software upgrade in June/July 2015 will allow the NH90 to have SAR capabilities, although the mission equipment is yet to be defined,' Landgren said.

The introduction of the NH90 means the Super Pumas are edging closer to retirement. In early February six were providing SAR cover at Luleå (1 Hkpskv) and Ronneby (3 Hkpskv). As the AS332s are phased out, pilots and aircrews will migrate to the NH90. By January 2015 only three will be operational at Luleå, where the first permanently based HKP 14 is expected to arrive after the summer.

URGENT ORDER

Under an FMS deal valued at $207 million, 15 UH-60M Black Hawks were ordered in December 2010, because the NH90 delays had led to a lack of tactical, transport and medevac helicopters to cover defence needs in Sweden and abroad.

Afghanistan was the driving factor behind the first UH-60Ms taking only 13 months from order to delivery. An initial pair was delivered to Malmen in January 2012, joined by two more the following month, all in 'green' configuration without any mission systems. UH-60Ms from the fifth helicopter onwards are equipped with a flight control system to reduce pilot workload, full night vision capability and an advanced communications suite.

The aircraft were modified by the US Army with a variety of equipment, including an exterior rescue hoist, gunner seats, armoured floor, stackable litters, a cockpit heater and an environmental control system. The first four will be returned to the US and upgraded to the same standard as the other 11.

Swedish Black Hawk crews were flight qualified after 40 hours of training on UH-60As and Ms at Fort Rucker, Alabama, before receiving follow-on unit training at Malmen.

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Flight engineer training tailored for Sweden took place at Fort Eustis, Virginia, while Sikorsky Aerospace Services and Saab provide maintenance training and long-term logistics support for the fleet.

The final two UH-60Ms were handed over to the US Army on 17 September 2012 and arrived in Sweden during April 2013 to complete deliveries. All 15 HKP 16s are based at Malmen with 2 Hkpskv.

AFGHAN OPS

Prior to deploying to Afghanistan, a focused operational evaluation took place in Sweden in late 2012, ensuring everything was ready. Personnel had also gone through a desert training exercise at Fort Irwin, California. Having deployed to Mazar-e Sharif in late March 2013, the four UH-60Ms had flown nearly 700 hours by the end of the year – quite an impressive feat for an operator which did not receive its first aircraft until December 2012.

One helicopter is always in maintenance and another acts as standby for the two on alert. Landgren added: 'We try to keep them at the same level of flying hours. The difference over the previous Super Puma deployment is that we now go forward and land in unprepared areas to pick up wounded. Following a roadside bomb, the UH-60s will land as close to the road as possible. On board there are usually two pilots, a gunner and a technician who doubles up as a gunner.'

Their main role is to provide tactical medevac, with a doctor and anaesthetic nurse on board. The second helicopter in the 'chase' formation carries an additional nurse and doctor and can transport up to two wounded.

Two Black Hawks are on 15-minute alert and an aircraft usually lifts off, heads to its destination, picks up casualties and returns to the German field hospital at Mazar-e Sharif in around 20-40 minutes.

The Swedish UH-60Ms have done more flying than the Puma (592 flying hours in two years) largely due to the doubling the number of helicopters available. While there are ten personnel ready to fly out, there are another 25 staff including the unit commander, working in plans, operations, intelligence and other roles to ensure everything is running smoothly.

Rotation is eight weeks on/eight weeks off, with two deployable units – one is in Sweden while the other is in Afghanistan. The Pumas did four weeks on/eight weeks off. The four UH-60Ms will stay in-theatre until mid-May 2014, when the mission is expected to end

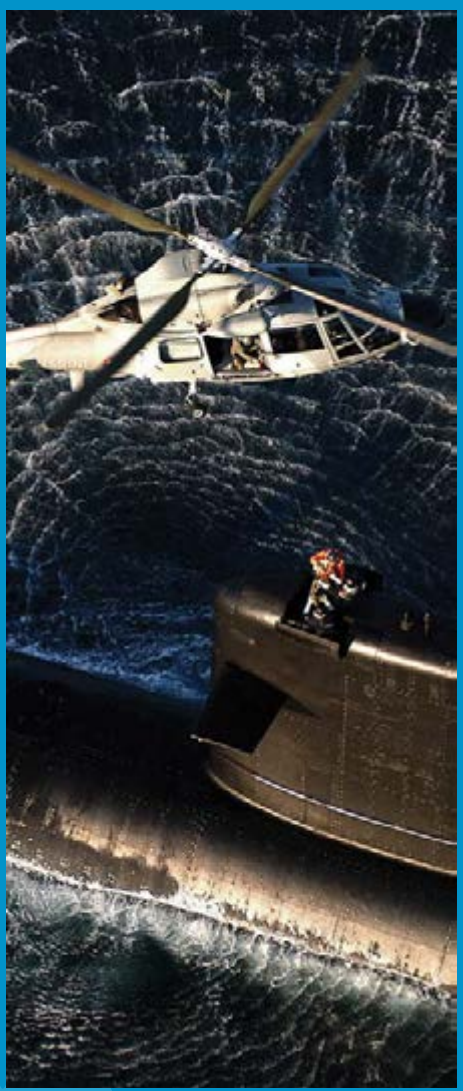
FUTURE PLANS

Eventually, 1 Hkpskv at Luleå, specialising in arctic warfare, will operate the NH90, 2 Hkpskv at Malmen will use the UH-60M and A109LUH for training, and 3 Hkpskv at Ronneby will take on the ASW-configured NH90s, in addition to the maritime A109LUHs currently in service.

'Since 2004 the Swedish Army Helicopter Battalion deployed on international missions, but now we are focusing on the integrity of Sweden that will see us working more and more [at home]. The Pumas and 109s are deploying to exercises in the Baltic now, while land forces are working with UH-60s and Pumas from Luleå. It will be good for pilots to fly in different environments and keep them current in the roles they are trained for,' Landgren concluded.

It might be lost on many, but when the four UH-60Ms return from Afghanistan during May/June, it will be the first time in almost five years that none of the FH's helicopters will be deployed overseas. Not wanting to waste its newly gained operational nous, plans are already being drawn up for three UH-60Ms to join the EU's Nordic Battlegroup 15. ***DH***

The maritime HKP 15B variant of the A109LUH is modified with a parking brake, air conditioning unit and flotation gear. (Photo: FH)



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Manila pushes the envelope

The Philippines has recently announced an ambitious modernisation programme for its armed forces. Against this background, **David Saw** examines the past and future role of helicopters in the country's defence.

Asia has not been immune from the global financial crisis, despite the fact that many of its nations are declaring growth rates that would be the envy of countries elsewhere in the world.

Inevitably, these economic difficulties are having an adverse effect on defence procurement behaviour. Even so, despite the overall budgetary environment there are governments in Asia that continue to invest sizable sums in their armed forces.

Also, some countries in the region are doing rather well in economic terms. One example is the Philippines – the Philippine Statistics Authority released data at the end of January for 2013, which showed that the national economy had grown by 7.2% in 2013, an improvement on the 6.8% rate achieved in 2012. This is said to be the best economic performance over two years by the Philippines since 1953/1954, and the government is aiming to achieve an 8.5% annual growth rate through to 2016.

Apart from economic and social progress, the current administration has made modernisation of the Armed Forces of the Philippines (AFP) a priority. In December 2012, Republic Act No 10349 came into force. Known as the 'AFP Modernisation Act', the measure sets out a 15-year defence programme.

Previous efforts at defence modernisation, particularly in the 1990s, failed due to mismanagement and funding problems. By contrast, the current government appears to have both the will and the funding to support an ambitious agenda.

The modern Philippine Air Force (PAF) was established on 1 July 1947, although its history can actually be traced back to just after World War 1. At its inception the PAF was reliant on the US for the supply of equipment, and this proved to be advantageous as it built up its strength to become one of the best-equipped air arms in Asia at the time.

ORIGINAL SUPPLIER

Inevitably Washington was the source of the first military helicopters to reach the Philippines, under a 1953 order for two Sikorsky S-55s, delivered a year later. This was followed by a second order for the type in 1956 that covered the supply of five aircraft, delivered between 1957 and 1958.

Then in 1961 a Sikorsky S-62A was ordered and delivered the next year, followed by two Mitsubishi-built S-62Js later in the 1960s. Sikorsky also supplied two S-58s to the Philippines in 1965-66.

If there is one helicopter that has stood the test of time in the PAF it is the Bell UH-1H. At the end of the 1960s the Philippines placed its first order for 28 of these helicopters, all of which were in service by 1971.

A second order for 17 examples came in 1976, with all delivered in 1977. This was followed by an order for 18 in 1980, with deliveries completed that year. There was a 1982 order for 15 UH-1Hs, with another batch of 12 ordered and delivered in 1983. Eight more UH-1Hs arrived in 1985, and a further ten in 1987.

Over the course of some 16 years, the PAF took delivery of 108 UH-1Hs. In fact, the service is still in the business of acquiring the type, with a contract covering the acquisition of 21 examples being signed on 22 December 2013 with Rice Aircraft Services of the US and Eagle Copters of Canada, which will be refurbishing the aircraft prior to delivery this year.

There were other UH-1H acquisitions as well – ten in 1990, eight in 2001, six more in 2003 and five more in 2009. In addition, 20 refurbished UH-1Hs were acquired via Singapore.

Two existing UH-1H/Bell 205s were upgraded to Huey II configuration in the Philippines, but no more modifications of this nature have been conducted since. The PAF also acquired two Bell 412EPs in the mid-1990s, and a Bell 212 was used as a VIP transport but was later lost in a crash.

Add these numbers together and since the early 1970s the Philippines has operated some 150 UH-1H helicopters.

The type has been the backbone of the PAF helicopter fleet but attrition has been high. Furthermore years of limited budgets have seen aircraft cannibalised for spares, further reducing numbers. At present, the active UH-1H fleet stands at around 50, with the most recent batch of 21 helicopters due to be delivered this year.

NAVAL NEEDS

Although the US has clearly played a major role in meeting the helicopter needs of the Philippine military, European manufacturers have also been involved.

In 1974 an order was placed for 19 MBB Bö 105Cs, which were all delivered by 1981. This was followed by a second order for four in 1988.

The Bell UH-1H has served as the backbone of the Philippine Air Force helicopter fleet for many years. (Photo: Canadian Forces)


The MD 520MG arrived in the 1990s to provide an effective armed helicopter capability. (Photo: USN)

These aircraft were utilised by both military and government operators. Currently the Philippine Navy Naval Air Group (NAG) operates four Bö 105Cs, having received six directly at the end of the 1970s and a further example via the PAF in 1988. Since September 2007 the NAG has also operated a single Robinson R22 Beta II in the training role.

These have now been joined by a third type, the AgustaWestland AW109 Power, with three aircraft arriving in December 2013. The AW109 will be operated from the navy's two *Gregorio del Pilar*-class frigates.

Earlier this year, two more AW109s were ordered by the NAG and these are due to be delivered before the end of 2014. The AW109 Power has also been selected by the PAF to meet an armed helicopter requirement, with eight ordered in October 2013 and deliveries due to start this year.

Beyond the current AW109 acquisition, the NAG has ambitious re-equipment plans in progress. It sees its future fleet as consisting of two types, the first of which is the 'naval helicopter', of which 18 examples are required. The five AW109s in service and on order fall into to this category, indicating the potential for more contracts for the type.

The NAG has also identified a requirement for a 'multi-purpose helicopter', which will be a dedicated maritime platform and operate from Philippine Navy frigates, of which six will eventually be in service. In total eight such helicopters are required, and the project appears to be defined around the capabilities of the AW159 Wildcat.

MIXED FLEET

In 2010 PZL-Świdnik of Poland became part of AgustaWestland, and the same year saw the company sign a contract with the PAF covering eight W-3 Sokół helicopters for the service's Combat Utility Helicopter (CUH) requirement. The first four were delivered in February 2012, two more followed later that year, and the last two were handed over in February 2013.

The PAF also operated two Aérospatiale SA330L Pumas throughout the 1990s for the VIP mission, although these were eventually retired. This role has now passed to the Sikorsky S-70, two of which were acquired in the mid-1980s. Only one remains in service and is used as the presidential helicopter.

Another Sikorsky acquisition in the mid-1980s involved the S-76A – 12 AUH-76 gunships, two SAR and three VIP variants were taken on charge. Five of these helicopters were lost on operations or in accidents and some were transferred to other government users. Six examples are currently in service, two of which have been converted for the air ambulance mission.

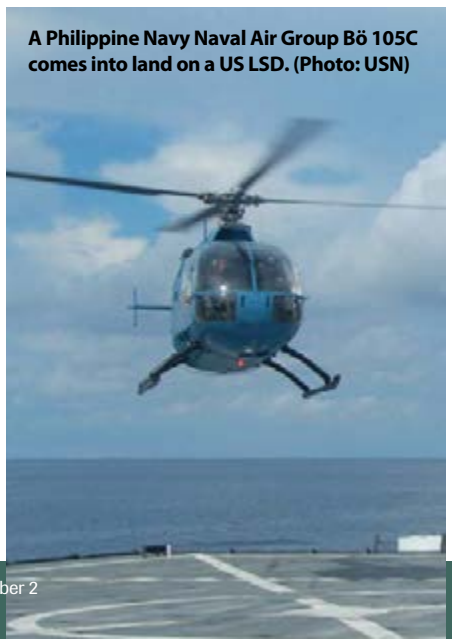
A second type acquired for gunship duties was the McDonnell Douglas MD 520MG, with 22 ordered initially and a further small buy subsequently. These aircraft were widely used by the PAF on counter-insurgency missions and attrition has reduced the fleet down to some 17 helicopters, although not all are operational.

At this point the rotary-wing plans of the Philippine Coast Guard (PCG) should be mentioned, as this service is also due to receive significant modernisation funding.

Currently it operates a Bö 105C, but plans to acquire seven new aircraft under the Multi-Purpose Maritime Helicopter programme, with Bell identified as the favoured candidate to meet the requirement at this point.

The PAF still has major issues to confront in terms of modernising its helicopter assets.

The UH-1H fleet will be around for many years to come, and interest still exists in acquiring refurbished examples on the international market. This is one way of preserving fleet numbers, but resources could also be directed towards seeing if more non-airworthy UH-1Hs can be restored to operational condition. Considering how many Hueys there are in the Philippines, there is major potential in looking to rebuild what is already available.


A Philippine Navy Naval Air Group Bö 105C comes into land on a US LSD. (Photo: USN)

This year will also see the arrival of the first AW109 Powers for the PAF, marking the third year in a row that it has received new helicopters following on from the W-3 Sokółs in 2012-13.

These are the first new (rather than refurbished) PAF helicopter deliveries since the mid-1990s – a point that illustrates why the Philippine military needs major modernisation.

IMPROVED PROCESS

As previously noted, the government is now in a position to fund defence programmes, but this process will take many years to conclude, as decades of neglect need to be made good.

One particularly positive development is that there is now a real and transparent procurement structure in place – previously this was characterised by its dispiriting and disorganised nature in the Philippines. These improvements to process are important, but it must be remembered that the needs of the national military are so varied that it is simply impossible to make consistent progress across all aspects of the modernisation agenda.

As can be seen above, the Philippine Navy has seemingly identified what its helicopter needs are, but for the PAF the situation is not so clear-cut.

One of the reasons for this is competing priorities for funding – the upcoming acquisition of the Korea Aerospace Industries FA-50 jet for the Lead-In Fighter Trainer/Light Attack Aircraft requirement will be an expensive process, as will fulfilling a future transport aircraft requirement.

Despite this, the PAF does have requirements in the near term for combat/utility helicopter types and eventually will have to confront finding a replacement for the UH-1H or at least a solution to take some of the strain off the Huey fleet. ***DH***

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Informed decisions

Dan Bailey, the US Army's Joint Multi-Role/Future Vertical Lift programme director, speaks to Tim Fish about the challenges ahead for the project.

The Future Vertical Lift (FVL) programme has the intention of replacing all the rotorcraft in the US DoD's inventory, but first PEO Aviation is running the Joint Multi-Role (JMR) demonstration as a science and technology effort to find the best available technologies.

In replacing US helicopter fleets, hanging over everyone's heads was a concrete timeline, as the Pentagon has a rapidly ageing inventory, according to Bailey. 'The most significant... at this point is in the medium class, and that is in the H-60 fleet in both the army and navy,' he said. 'As they put additional hours on their fuselage, we have an end of life coming. There is debate on exactly when that is, but they are all around the 2030 time frame.'

FILLING THE GAPS

The JMR programme will identify the technologies that will inform a decision about whether to upgrade the H-60 fleet again or do an FVL programme that will meet up to 55 capability gaps that cannot be filled with the current fleet.

'The only way we get to that answer is: one, does the technology give us the capabilities to satisfy the gaps; and, two, is it affordable? From a schedule perspective, we are trying to get to a milestone decision – first is a materiel development decision in August 2015, which will put us into an analysis of alternatives in 2016-17, and then a Milestone A decision in 2018, so that is the timeline that we are on.'

Bailey noted that existing aircraft 'can't conduct ops in all environments'. Some cannot handle hot and high conditions or self-deploy. The army's metric is the 6K/95 requirement, but this depends on the payload. JMR is designed for such conditions from take-off through to landing, and has a target top speed of 230kt.

'JMR is about conducting a science and technology [S&T] system-level demonstration of technologies in configurations and new designs that will inform us whether there is a material solution available for the capabilities that we are looking for.'

There are two efforts under JMR – the air vehicle demonstration that focuses on platform performance and configurations, and a mission systems architecture demonstration.

Four vendors were selected to conduct initial designs from an original nine offers. The companies: are Bell (teamed with Lockheed Martin) with the V-280 Valor tiltrotor; Boeing and Sikorsky with the SB-1 Defiant; Karem Aircraft with the TR36TD optimum speed tiltrotor; and AVX.

'They are finishing up the final details of the overall initial design, and they are starting to conduct component-level preliminary design reviews,' said Bailey, adding that the first flight of these test aircraft will take place at different points for each vendor in 2017.

'The technology investment agreements with all four take them through the entire effort... to 2019, so we negotiated those agreements all the way for all four vendors, but we have only exercised this first year for each one, so we have to make a decision to continue each one, but everyone has a set flight test point in 2017.'

The four contenders will then be narrowed down to two. 'It is not a downselect because what we are doing is investing in S&T and knowledge, increasing our tools,' Bailey insisted. 'We are not buying an aircraft under JMR, it is not a prototype effort, they are not aircraft that can turn into a FVL.'

Under the mission systems architecture part of JMR, the PEO does not intend to select any systems until the 2020-25 time frame, and Bailey wants to develop a joint common architecture (JCA) backbone to support the variety of future systems that will be employed on the aircraft, adhering to the Future Airborne Capability Environment (FACE) standard.

STANDARD SPECIFICATIONS

The JCA effort has been ongoing since 2009, funded by the army and developed at AMRDEC. It is being brought into JMR, and a base standard has been developed. Bailey said it intends to demonstrate the validity of the standard and evolve it 'to what could become the specification that ultimately we would put on a programme of record for FVL'.

In late January, PEO Aviation issued a solicitation for a JCA small lab demonstrator for one vendor to develop a software module called the Situation Awareness Correlator to put in a lab environment. This will be followed in 2015 with solicitation for the architecture implementation process demonstration.

'Funding allows for two vendors at this point to build a more robust JCA/FACE-compliant lab architecture, independent of each other. The two vendors can implement the standard in whatever way they have to, to meet the standard,' he said. 'Then we will take other second- and third-party subsystems and do integration on it to test the process. What we are looking for is that robust enduring architecture that you can seamlessly and affordably integrate new subsystems into.'

JMR is also looking outside the medium-class category of rotorcraft. Bailey told *DH* that the programme 'has in it an objective to look at the scalability of the vehicle designs that we are looking at' to fit the light and heavy categories. ***DH***

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